Prevalence of Malarial disease and its clinical manifestations in rural and urban areas of Multan

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ABSTRACT

This cross-sectional survey based study was conducted to assess malarial frequency in rural and urban areas of Multan District from 1st December 2019 to 1st May 2020. Additionally, evaluation of clinical features and splenomegaly of the respondents were also included in the study objectives. A total of 300 patients, who visited the hospital with fever, were included. Microscopy and clinical evaluation was done to evaluate malarial infection. According to results, 4.7% of the rural and 2.7% of the urban population were positive for malaria. All malaria positive patients also showed symptoms of sweating, vomiting, and had splenomegaly. Over 50% of patients from both, urban and rural, regions were below 30 years of age. Almost 60% of rural participants were male while majority of urban participants (64%) were female. The study thus concluded high prevalence of malaria among rural residents than urban residents.

Keywords: Malaria, Prevalence, Clinical symptoms, Rural areas, Urban areas, Clinical presentation

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INTRODUCTION

The word 'malaria' is coined from the Italian word 'mala aria' meaning foul air. It is characterized as the blood infection caused by a mosquito-borne parasite that is dependent upon female Anopheles mosquito species for its transmission to humans. The responsible parasite belongs to the genus Plasmodium which has more than 200 species; however, only 13 are known to be disease-causing to humans. Among these 13, the following five are well known for their pathogenicity: knowlesi, malaria, falciparum, vivax, and ovale (2 species)[1,2].

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According to estimates around 44% of the world's population is vulnerable to malarial disease. It is one of the top 10 infections of the world which one of the significant causes of mortality among pregnant women and children less than 5 years old. In 2017, the mortality rate among children due to malaria was estimated to be 266,000. Apart from that, it also imposes an economic burden on the affected regions[3].

Malarial infection onsets a set of pathological events[4] that leads to mild, acute, and complex clinical characteristics, depending on parasites developed, patient immunity, infection severity, and the presence of underlying conditions, such as multiple diseases and malnutrition. In severe cases, patients may experience kidney insufficiency, jaundice, anemia, epilepsy, and retinal damage[5].

Although, malaria is a threat to the entire world, yet developing countries including Pakistan are at higher risk. In Pakistan, contributing factors including the weak immune status of the people, humid conditions, low literacy rate and ineffective management strategies by policymakers are responsible for the high reporting rate of malaria.

While the outer world is making serious efforts in restraining the prevalent infection, the Pakistan lags behinds in launching an effective strategy since only a few serious studies are conducted to ascertain the prevalence rate in High-risk areas. Therefore, the following study is designed to determine the malarial prevalence rate in rural and urban areas of Multan. Furthermore, the symptoms of malaria, including sweating, vomiting and splenomegaly, were also evaluated in the study. So we have conducted this study with an objective to assess malarial frequency in rural and urban areas of some parts of Multan district.

METHODOLOGY

The cross-sectional, survey-based study was conducted at a tertiary care hospital, Multan, for 6 months from 1st December 2019 to 1st May 2020. A total of 300 residents, aged above 20 who visited the general outdoor patient department with the complaint of fever, from rural and urban areas of Multan were included in the study through the random sampling technique. Data confidentiality was ensured, and before data collection consent was obtained. The participants were confirmed for malarial infection through microscopy. All the participants were then observed for episodes of sweating and vomiting during their stay in the hospital. The participants were also evaluated for splenomegaly by a trained physician during disease and soon after the recovery through imaging techniques. All the patients who were already diagnosed with other disorders following the complaint of fever and those who refused to give consent were excluded from the study.

The collected data were analyzed through SPSS 20.0. Frequencies and percentages were calculated, and data were presented in the form of tables. The student's t-test was used to establish comparison between malarial and non-malarial patients for qualitative data and p-Value was calculated. A P-value less than 0.05 was considered statistically significant.

RESULTS

A total of 300, 150 urban and 150 rural, participants were included in the study. The mean age of the rural and urban interviewees was 30.84 ±16.71 years and 32.55 ±14.72 years, respectively. 63.3% of rural and 54.6% of urban respondents were under the age of 30, and the remainder were above 30. Gender distribution of the participants revealed that the majority of rural participants were male (60%) while the majority of urban participants were female (64.7%). Among study participants, 4.7% and 2.7% of rural and urban patients were confirmed positive for malaria through microscopy (Table-I).

Table-I: Microscopic Evaluation of Malarial Parasite among Rural and Urban Population (N=300)

Malaria Microscopy	Rural		Urban	
	Freq.	%age	Freq.	%age
Positive	7	4.7	4	2.7
Negative	143	95.3	146	97.3

Table-II indicates that all 4.7% of rural and 2.7% of the urban population who were positive for malarial microscopy were also positive for vomiting, sweating and splenomegaly while the rest of participants for both the groups were negative for all the assessed variables. The difference in appearance of clinical consequences was significant among malarial positive and negative patients.

Table-II: Respondent frequency distribution by age and gender and according to Malaria Microscopy (N=300)

	Rural			Urban		
	Malaria Microscopy		Total	Malaria Microscopy		Total
	+ve	-ve		+ve	-ve	
Vomiting						
Total	7 (4.7%)	143 (95.3%)	150 (100.0%)	4 (2.7%)	146 (97.3%)	150 (100.0%)
	P value = 0.04			P-value = 0.03		
Sweating						
Total	7 (4.7%)	143 (95.3%)	150 (100.0%)	4 (2.7%)	146 (97.3%)	150 (100.0%)
	P value =0.49			P-value =0.23		
Splenomegaly						
Total	7 (4.7%)	143 (95.3%)	150 (100.0%)	4 (2.7%)	146 (97.3%)	150 (100.0%)
	P value = 0.03			P value = 0.43		

DISCUSSION

According to the results, 4.7% of the rural and 2.7% of the urban population were suffering from malaria. The results are in contrast with the study conducted by Rehman et al., who found the prevalence rate of 13.9% among the residents of a district of Khyber Pakhtunkhwa (KPK)[6]. A similar prevalence rate of 13% was found in another study conducted in KPK[7]. The study results can't be assumed different due to regional differences as according to a study conducted in Punjab, the prevalence rate of malaria was found to be 18% in Multan[8]. Variation in the study could be possibly due to the conduction of the study during the non-malarial season.

Furthermore, all the disease positive patients were positive for sweating, splenomegaly, and vomiting. The results also varied with the previous studies as according to Vecchio et al[9], vomiting was observed in 35% of malarial positive patients in contrast to our 100% in our study. Similarly, the occurrence rate of splenomegaly and sweating is contrasted by a study that found 32% of patients with an enlarged liver and sweating due to malarial infection[10]. The variation in the prevalence of consequences could be due to relatively smaller sample size of our study as compared to previous researches. Moreover, our study lacked the information about disease stage at which patients visited the hospital and the infecting malarial specie, is it is save to interpret that all malarial positive patients were infected with same malarial specie who produced similar clinical consequences.

The study found that 63.3% of rural and 54.6% of urban respondents were under the age of 30, and the remainders were above 30. The related analysis of Shah et al[11], in Pakistan showed similar distribution where over half (56.4%) of the respondents were under 30 year of age.

The study was limited in terms of study duration, sample size, and study period. The prevalence could have been better evaluated during the rainy season when malarial vectors, Anopheles mosquitos, are assumed to be in higher amounts.

CONCLUSION

Malarial prevalence is low in urban areas than rural areas. Moreover, all the malaria positive patients present with vomiting, sweating, and splenomegaly.

AUTHOR'S CONTRIBUTION

Tahir Z: Manuscript writing, Data collection, Data analysis, Final critical review of manuscript
Shah AA: Conceived idea, Designed research study, Data analysis, Manuscript writing, Data collection, Literature review
Irum S: Data analysis, Manuscript writing, Manuscript drafting, Data collection, Literature review

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