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RESEARCH ARTICLE
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FREQUENCY OF MALARIA IN CHILDREN AGED 1-15 YEARS PRESENTING WITH ACUTE FEBRILE ILLNESS AT A TERTIARY CARE HOSPITAL IN PESHAWAR

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ABSTRACT

Introduction: Acute febrile illness (AFI) is a frequent cause of pediatric hospital visits, with a wide range of underlying etiologies. In malaria-endemic regions like Peshawar, malaria remains a significant and treatable cause of fever in children.

Objective: To determine the frequency of malaria among children aged 1–15 years presenting with acute febrile illness at a tertiary care hospital in Peshawar.

Study Design: Cross-sectional descriptive study.

Setting and Duration: Department of Pediatrics, Hayatabad Medical Complex, Peshawar, from October 21, 2024 to April 28, 2025

Methods: A total of 104 children aged 1 to 15 years presenting with AFI were enrolled through non-probability consecutive sampling. After obtaining informed consent, 5cc of venous blood was drawn under aseptic conditions and tested for malarial parasites using thick and thin blood smear microscopy. Data were analyzed using SPSS version 27.

Results: The mean age of participants was 7.22 ± 3.5 years; 52.9% were male and 47.1% female. The average duration of illness was 6.53 ± 2.05 days. A majority of the children belonged to the middle socioeconomic class (48.1%) and lived in urban areas (66.3%). Most parents had at least secondary education (35.6%). Malaria was diagnosed in 23.1% of the children presenting with AFI.

Conclusion: Malaria is a prevalent cause of acute febrile illness in children within this population. Early recognition and diagnosis remain crucial in regions where malaria is endemic.

Keywords: Acute febrile illness, Malaria, Pediatrics, Prevalence, Peshawar.

INTRODUCTION

Febrile illnesses are among the most common reasons for pediatric hospital visits globally. In developing countries, the burden is amplified by lower vaccination coverage, coexisting infections, and delayed medical care. Malaria, a mosquito-borne parasitic disease, is a prevalent cause of febrile illness in South Asia. Despite progress in malaria control, children in endemic regions remain highly vulnerable. Early diagnosis and prompt treatment are critical in minimizing complications.

Acute febrile illness (AFI) remains one of the top reasons for pediatric hospital admissions worldwide, carrying notable morbidity and mortality—particularly in low- and middle-income

countries (LMICs). In these settings, contributing factors include low immunization rates, untreated co-morbidities, and delayed presentations [1–4]. The non-specific nature of these febrile syndromes, compounded by limited diagnostic capacity, complicates accurate etiological diagnosis [5].

Globally, malaria remains a critical cause of AFI; yet the epidemiological picture varies considerably across regions. Systematic reviews from Africa and Asia indicate that invasive infections are major contributors to community-acquired bloodstream infections among febrile children [6,7]. In South-East Asia, studies of non-malarial febrile illnesses revealed notable gaps in pathogen identification due to geographical heterogeneity [6,7].

Malaria significantly contributes to poverty in resource-limited tropical regions. Vulnerable populations such as children under 5, pregnant women, and immunocompromised individuals bear the greatest burden [8]. Beyond acute symptoms, children may suffer neurological sequelae and cognitive impairment, while families experience substantial economic consequences via healthcare costs and lost productivity [9].

In Pakistan, particularly in Peshawar-level tertiary hospitals, several cross-sectional studies have documented malaria prevalence among children presenting with AFI. Notably, a 2019 study at Hayatabad Medical Complex found malaria in 5.3% (15/292) of febrile children, with P. falciparum predominating over P. vivax (3.4% vs. 1.7%) [10].

A more recent (2024) analysis from Lady Reading Hospital, Peshawar, on children with fever without localizing symptoms reported a malaria prevalence of 14% among children aged 1–36 months [11]. These data underscore both the persistence and clinical relevance of malaria in pediatric febrile illnesses.

Broader meta-analyses of Pakistan's malaria burden reveal an overall pooled prevalence of 23.3%, with P. vivax accounting for approximately 79%, P. falciparum 16%, and mixed infections 4% [12]. In Khyber Pakhtunkhwa (KP), the province encompassing Peshawar, prevalence fluctuates between 21–28%, with P. vivax most common around 67%, followed by P. falciparum (16%) and mixed infections (17%) [13].

A cross-sectional co-infection study conducted between June and December 2023 at three tertiary hospitals, evaluated 322 febrile patients and reported malaria-dengue co-infection in 22.4%, with significant urban predominance. This highlights the diagnostic complexity in regions facing overlapping vector-borne epidemics[14].

Climate change and environmental disruption; most notably, the 2022 floods significantly escalated malaria risk in North West Pakistan, including Peshawar. Official reports describe a threefold increase in cases following climate-driven changes [15], pressuring healthcare systems already stretched by febrile disease burdens.

Most existing Peshawar studies have focused on younger children (<3 years) or broader hospital populations, leaving a gap regarding malaria frequency in older children (1–15 years). Additionally, the prevalence across the pediatric age spectrum has not been recently updated post-2019, despite shifting regional disease dynamics and climate-related transmission changes.[16]

This study aims to fill these gaps by estimating malaria frequency among 1–15-year-old children presenting with AFI at a tertiary hospital in Peshawar. It will yield the most current age-specific prevalence data essential for guiding diagnostic algorithms, empiric treatment practices, and targeted vector-control interventions.

Objective

To evaluate the frequency of malaria in children aged 1 to 15 years presenting with acute febrile illness at Hayatabad Medical Complex, Peshawar.

RESEARCH METHODOLOGY

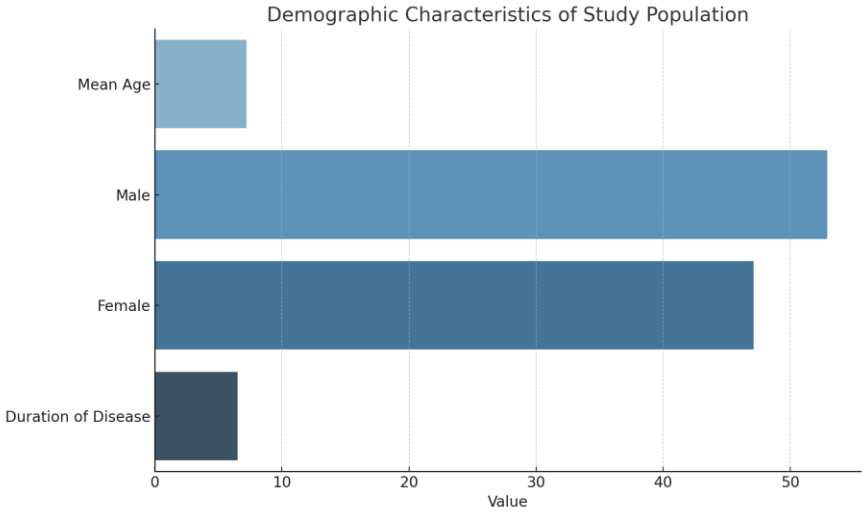
The study was conducted at the Department of Pediatrics, Hayatabad Medical Complex, Peshawar, using a cross-sectional (descriptive) design over a period from October 21, 2024 to 21 April 2025. A sample size of 104 was calculated using the WHO formula, based on a 22.1% malaria prevalence

among febrile children, with a 95% confidence interval and 8% margin of error. Children aged 1 to 15 years of both genders presenting with acute febrile illness were included through consecutive non-probability sampling. Those already diagnosed with malaria or who had received anti-malarial treatment within the last 48 hours were excluded to avoid confounding. After obtaining permission from the hospital and informed consent from parents, data were collected through clinical evaluation and laboratory testing. Each eligible child had 5cc of blood drawn under aseptic conditions, which was analyzed for malarial parasites by a consultant pathologist (FCPS). Demographic and clinical data, including age, gender, duration of illness, socioeconomic status, residence, and parental education, were recorded in a structured proforma. The data were analyzed using SPSS version 27. Numerical variables such as age and illness duration were expressed as mean ± standard deviation, while categorical variables like gender, socioeconomic class, residence, parental education, and malaria diagnosis were presented as frequencies and percentages. Stratification was applied to assess effect modifiers using the chi-square test, with a p-value of less than 0.05 considered statistically significant.

RESULTS

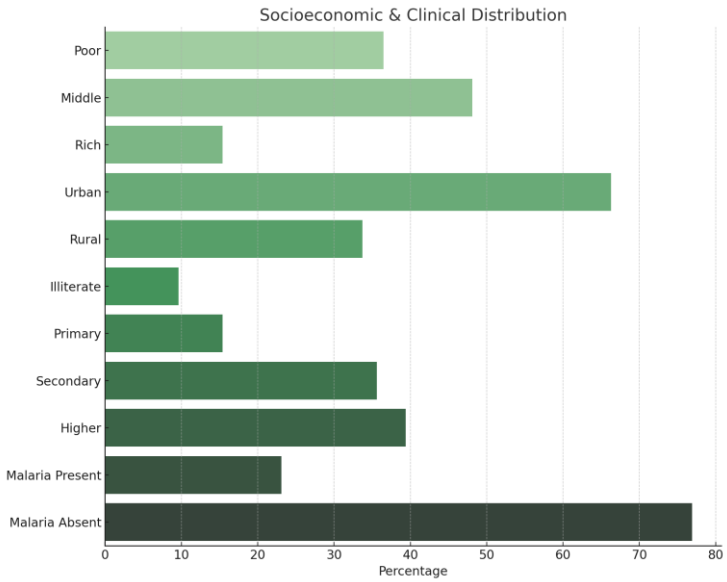
Demographic Characteristics Table

Category	Value
Mean Age (years)	7.22 ± 3.5
Gender - Male (%)	52.9%
Gender - Female (%)	47.1%
Mean Duration of Disease (days)	6.53 ± 2.0



Socioeconomic and Clinical Details Table

Category	Value
Socioeconomic Status - Poor (%)	36.5%
Socioeconomic Status - Middle (%)	48.1%
Socioeconomic Status - Rich (%)	15.4%
Residence - Urban (%)	66.3%
Residence - Rural (%)	33.7%
Parent Education - Illiterate (%)	9.6%
Parent Education - Primary (%)	15.4%
Parent Education - Secondary (%)	35.6%
Parent Education - Higher (%)	39.4%
Malaria Present (%)	23.1%
Malaria Absent (%)	76.9%

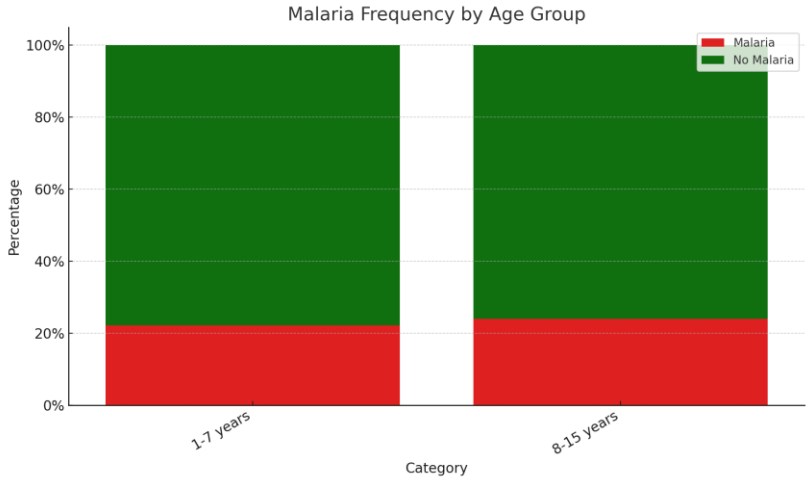


The study enrolled a total of 104 children presenting with acute febrile illness. The average age of the participants was 7.22 years (±3.5), indicating a broad inclusion of both younger and older children within the 1–15-year age bracket. Gender distribution was relatively balanced, with a slight male predominance (52.9% males and 47.1% females). On average, the duration of illness before presentation was 6.53 days (±2), reflecting moderate delay in healthcare-seeking behavior. Socioeconomically, nearly half (48.1%) of the children belonged to middle-class families, while 36.5% came from lower-income backgrounds. Only 15.4% were from affluent households. A significant majority of the patients resided in urban areas (66.3%), likely due to the tertiary hospital's location in Peshawar. Regarding parental education, most had achieved secondary (35.6%) or higher (39.4%) education levels, while 9.6% were illiterate. The prevalence of malaria among these febrile children was 23.1%, confirming that nearly one in four cases of pediatric fever in this setting was due to malaria.

Stratified Analysis of Malaria Frequency in Children

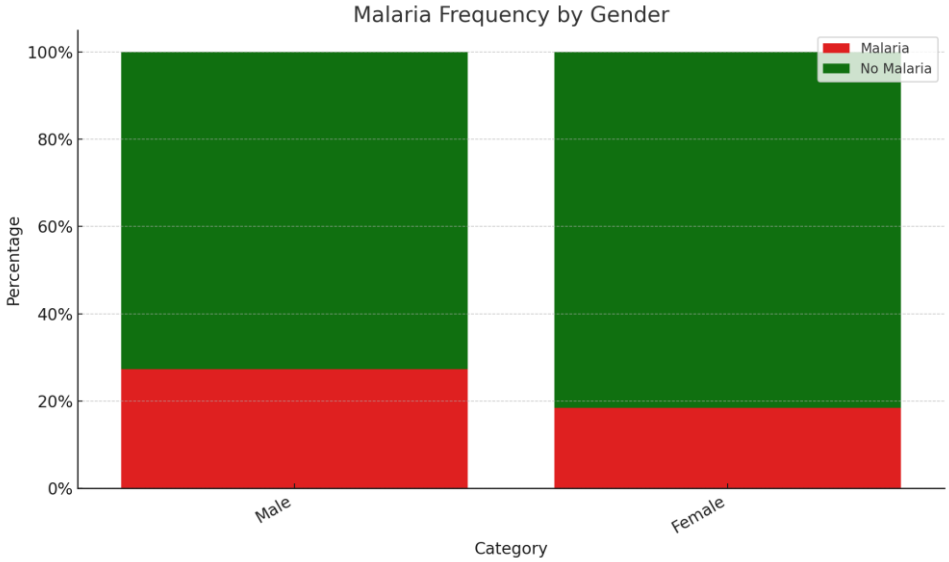
Malaria Frequency by Age Group

Category	Yes	No	Total	% Yes	% No	p-value
1-7 years	12	42	54	22.2	77.8	0.83
8-15 years	12	38	50	24.0	76.0	



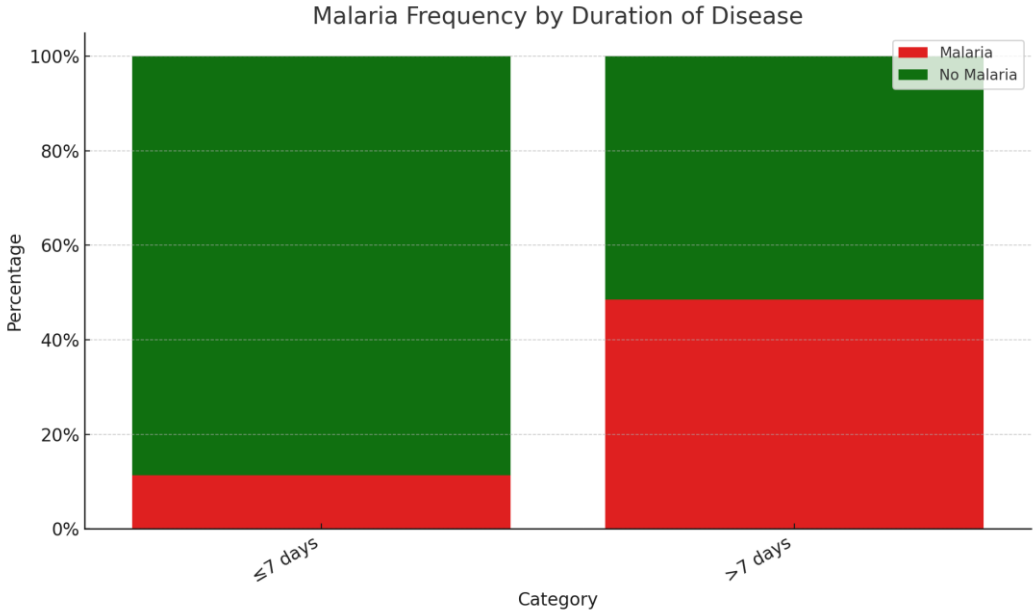
Malaria Frequency by Gender

Category	Yes	No	Total	% Yes	% No	p-value
Male	15	40	55	27.3	72.7	0.282
Female	9	40	49	18.4	81.6	



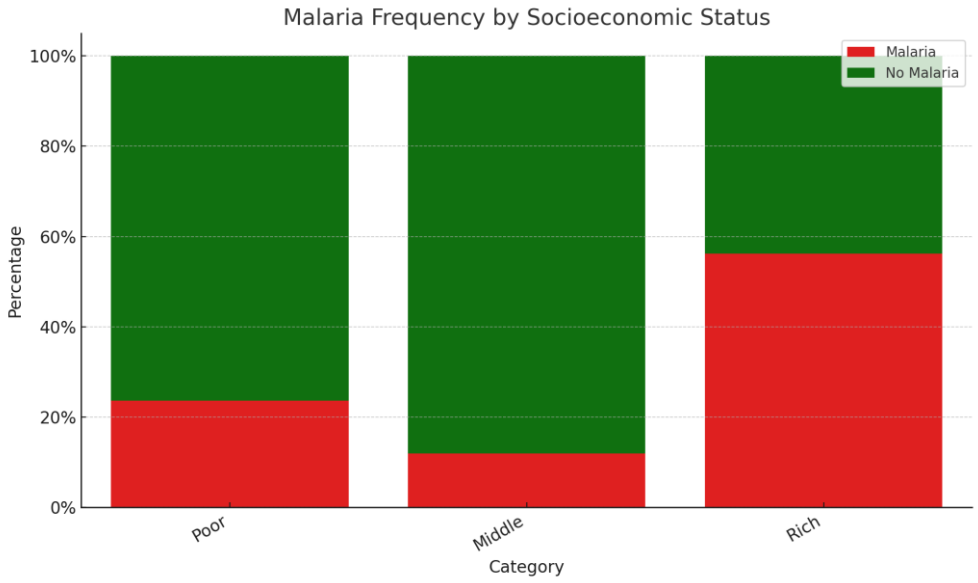
Malaria Frequency by Duration of Disease

Category	Yes	No	Total	% Yes	% No	p-value
≤7 days	8	63	71	11.3	88.7	0.001
>7 days	16	17	33	48.5	51.5	



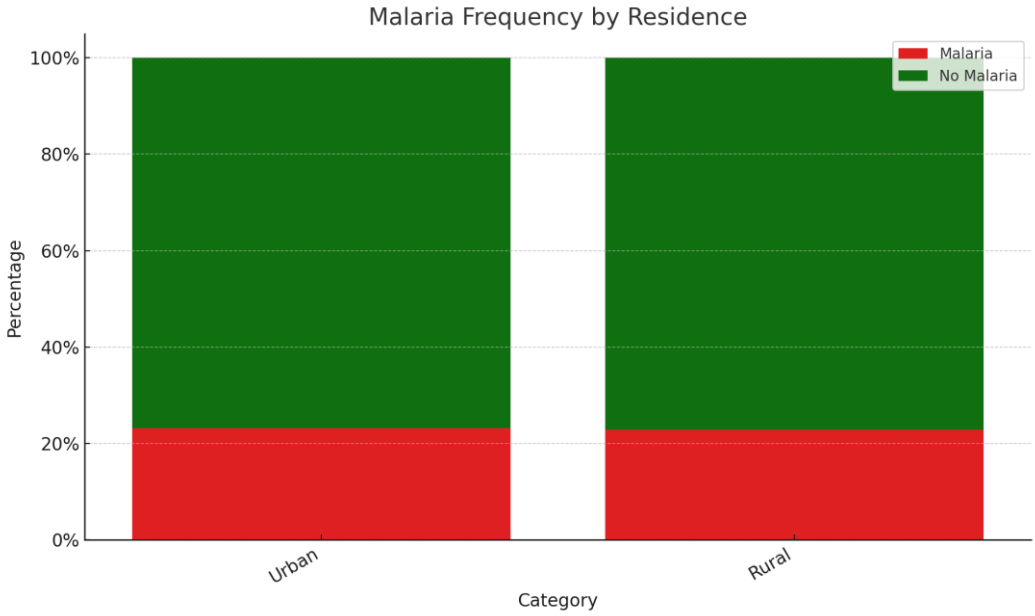
Malaria Frequency by Socioeconomic Status

Category	Yes	No	Total	% Yes	% No	p-value
Poor	9	29	38	23.7	76.3	0.001
Middle	6	44	50	12.0	88.0	
Rich	9	7	16	56.2	43.8	



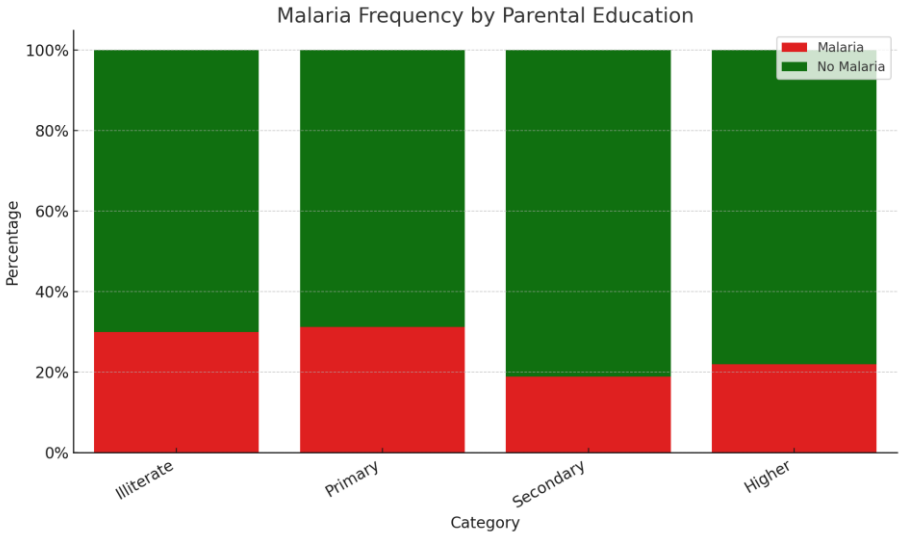
Malaria Frequency by Residence

Category	Yes	No	Total	% Yes	% No	p-value
Urban	16	53	69	23.2	76.8	0.97
Rural	8	27	35	22.9	77.1	



Malaria Frequency by Parental Education

Category	Yes	No	Total	% Yes	% No	p-value
Illiterate	3	7	10	30.0	70.0	0.738
Primary	5	11	16	31.2	68.8	
Secondary	7	30	37	18.9	81.1	
Higher	9	32	41	22.0	78.0	



The stratified analysis provides insights into how various demographic and socioeconomic factors correlate with malaria prevalence among children presenting with acute febrile illness. Malaria was slightly more common in the 8–15-year age group (24%) compared to the 1–7-year group (22.2%), though this difference was not statistically significant. Males showed a higher frequency (27.3%) than females (18.4%), again without statistical significance. Duration of illness had a strong association children ill for more than 7 days had a significantly higher malaria rate (48.5%) compared to those with ≤7 days of illness (11.3%), highlighting delayed presentation as a key risk factor (p=0.001). Socioeconomic status revealed a stark contrast: children from affluent families had the highest malaria prevalence (56.2%), possibly due to exposure during travel or residence near stagnant water bodies, with a significant p-value of 0.001. Urban and rural residence had nearly identical rates (23.2% vs. 22.9%), suggesting widespread transmission regardless of geography. Education level of parents showed a non-significant trend where children of less educated parents had slightly higher malaria prevalence, underscoring the need for broader health education and awareness efforts.

DISCUSSION

Febrile illnesses in children are worrisome to caregivers and are one of the major reasons for hospital visits in the Paediatric department in developing countries. At times, it creates anxiety among caregivers leading to presentation to the Children's emergency room. [17] Infectious causes of febrile illnesses could be viral, bacterial, fungal, or parasitic agents. Malaria a life-threatening disease caused by the plasmodium parasite which is transmitted to humans by the female Anopheles mosquito is present in 99 countries and territories. The disease is of serious public health concern in developing countries especially among children. [18] Children under five years of age are highly vulnerable to malaria and face dire consequences such as severe malaria if they are not promptly and adequately treated. [19] The 2019 world malaria report indicated that 228 million malaria cases and 405,000 malaria deaths occurred worldwide. A documented 93% of the estimated cases and 94% of the global malaria deaths occurred in the developing countries. [20] One of the key malaria control strategies in an area with a high burden of malaria is early diagnosis and prompt and effective treatment of childhood fevers caused by malaria. [21] The signs and symptoms obtained from patients by physicians play a key role in the clinical diagnosis of malaria. Clinical diagnosis is still used for the therapeutic care of most febrile individuals by physicians in several malaria-endemic regions despite some reported cases of its imprecision as early malarial clinical features vary and are nonspecific hence, its sole utilization becomes quite challenging and unreliable. [22] Therefore, clinical diagnosis of malaria without laboratory support may lead to misdiagnosis and wrong treatment. [23] This study was done to determine frequency of malaria in children presenting

with acute febrile illness in our population.

Our results were similar to other studies found in literature. In another study conducted [24] had reported that among those febrile children, 22.1% (60/271) were positive for malaria; 50.0%, 48.33% and 1.66% of them were positive for Plasmodium falciparum, Plasmodium vivax and mixed infections of both parasites, respectively. [25] The finding was comparable to reports of 22.1% in Ghana [26] and 22.0% in Gabon [54] A study conducted in India reported a prevalence of 36.6%. [27]

Some studies reported very high very frequency as compared to our study like 75.77% in Benin [28] and 83.1% in Imo State [29] These variations in malaria prevalence may be due to the age of study participants, diagnostic methods, and differences in sensitivities of mRDT kits used; While we used thick and thin slide for diagnosis of malaria.

CONCLUSION

This study demonstrates that malaria continues to be a prevalent cause of acute febrile illness in children aged 1–15 years in Peshawar. With a frequency of 23.1%, the findings underscore the need for physicians to maintain a high index of suspicion for malaria in all febrile children, regardless of socioeconomic status or residence. Early diagnosis and prompt treatment remain essential components of malaria control. The observed association between longer fever duration and malaria positivity calls for public awareness campaigns to reduce delays in seeking care. Future studies should explore seasonal variations, species-specific trends, and incorporate molecular diagnostics to further refine epidemiological understanding in this region.

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