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EFFECT OF POWER OUTAGES ON THE SURGE OF MALARIA

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ABSTRACT

Objectives: To determine the effect of power outages on the surge of malaria by comparing slide positivity proportion for malarial parasites at Matani (power outages 12-18 hours) and urban Peshawar (power outages for 6-10 hours).

Material and Methods: It was a retrospective study involving examination of thick and thin smears for malarial parasite in patients with suspected malaria during the period between February 2007 and December 2008. Data obtained from EDO (Health) office, Peshawar was also used. The data was analyzed using simple mathematical calculations.

Results: A total of 53521 slides were examined, of which 2057 (3.9%) slides were positive for malarial parasites. Highest incidence was found in the period between May and August (3.9% overall, 3.8% in urban Peshawar and 4.5% in the rural area of Matani). The surge in malaria in rural Matani with longer periods of power outages (4.5%) was significantly higher when compared to urban Peshawar (3.8%).

Conclusion: There is an increase in the number of malaria patients in the hot summer with a higher surge in areas affected by longer periods of power outages.

Key Words: Malaria, power outages.

INTRODUCTION

Malaria is a global health problem, with a risk to affect nearly three billion people[1] resulting in 1.5-3 million deaths/year, mostly children[2,3,4]. The incidence and prevalence of malaria has been reduced in the developed world icluding United States (1 in 151000)[5], Canada (1.39 per 100000)[6] and Australia (2.4 per 100000)[7], but still remains a major public health problem in the under developed and developing world, with 95% cases occurring in the tropics[8]. The incidence of potentially threatening and complicated falciparum malaria is increasing along with increasing resistance to the currently available drugs. Adding to the misery, the signs and symptoms of malaria are not reliable as diagnostic and differentiating features in non-endemic areas[9].

With the current economic downfall, the duration of power outages has increased to about 12 to 18 hours per day in the rural areas and about 6 to 10 hours per day in the urban areas in peak summers along with increase in the cost of electricity per unit. We analyzed the data retrospectively to see the effect of power outages on the surge of malaria.

MATERIAL AND METHODS

The retrospective study was conducted in Matani, a thinly populated rural area, and the urban area of Peshawar City. Matani area is affected by power outages for 12-18 hours/day as compared to the urban area of Peshawar (power outages for 6-10 hours/day). The study period was from February 2007 till the end of December 2008. Patients of all ages and both sexes, presenting with features of malaria were included. Both thick and thin films were examined, including both passive and active case detection. The primary data was structured on a simple questionnaire. The data was analyzed via simple mathematical calculations.

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RESULTS

Total number of slides examined was 53521. The total and location/periodwise, number of malarial parasite positive slides is given in Table 1, 2, 3. Slide positivity was high in the period between May to August in both groups (Fig. 1).

Table 1: Overall and within groups slide positivity for malarial parasite

	Total No. slides examined	No. of slides + for malaria
Matani (Rural)	3444	156 (4.5%)
Peshawar (Urban)	49787	1901 (3.8%)
Total	53231	2057 (3.9%)

Table 2: Overall, Periodwise slide positivity
Periodwise distribution of slides

Period	Slides		
	Positive	Negative	Total
January-April	530 (2.9%)	17537 (97.7%)	18067 (100%)
May-August	942 (5.1%)	17465 (94.9%)	18396 (100%)
September-December	585 (3.5%)	16183 (96.5%)	16768 (100%)
Total	2057 (3.9%)	51174 (96.1%)	53231 (100%)

p value = $3.13x10^{-32}$

Table 3: Areawise distribution of slides

Area	Slides		
	Positive	Negative	Total
Matani	156 (4.5%)	3288 (95.5%)	3444 (100%)
Peshawar	1901 (3.8%)	47886 (96.2%)	49787 (100%)
Total	2057 (3.9%)	51174 (96.1%)	53231 (100%)

p value = 0.000

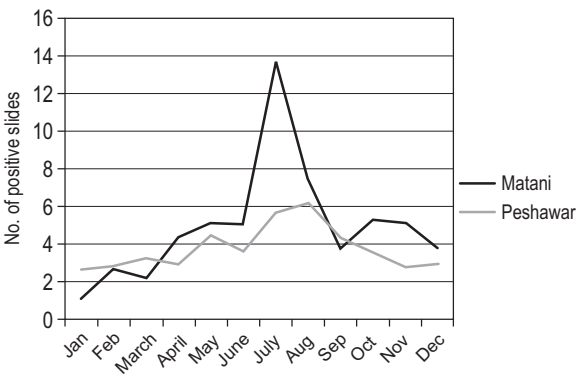

Fig 1. Slide positivity in Peshawar and Matani

The overall slide positivity for malarial parasite was 4.5% for Matani rural as compared to 3.8% for Peshawar urban. This difference was significant with a *p* value of 0.000.

DISCUSSION

Malaria is an avoidable disaster both in human and financial terms. It incapacitates productive people, makes millions stay at home either because of sickness or to care for the sick, resulting in low productivity. Further, it imposes enormous healthcare costs resulting in the reduction in budget required for other social welfare and development programs.

WHO recommends RDT (Rapid Diagnostic Test) with a sensitivity and specificity of more than 95% to evaluate patients suspected of malaria[10,11,12]. The slide positivity rate (number of laboratory-confirmed malaria cases per 100 suspected cases) is a reasonable alternative to estimate temporal changes in the malaria incidence. It has been used in cross-sectional studies to measure malaria endemicity[13,14] with the additional benefit of being cheap and widely performed locally.

This study is one of its kind to find out the effect of power outages on the surge in malaria. The slide positivity rate was highest in overall terms and in both groups during the period between May-August. This is expected as this period corresponds to hot summer with reasonable rains. The incidence of malaria in our study is similar to that in the tropics. J. F Trape[15] reports 2.4%-3.2% incidence malaria in children between ages of 5 and 13 years in Congo. The weighted average of malaria was reported to be 3.97% in 13 endemic districts of Bangladesh in a study by Ubydul Haque et al[16]. Higher percentage of positive slides has been reported from some districts of Baluchistan (26.64%)[17]. In India, the incidence was found to be 13% in an endemic malarious region of Orissa[18].

Comparing two groups, the surge in malaria was significantly higher in Matani. This could be attributed to longer periods of power outages (12-18 hours) compared to urban Peshawar (6-10 hours). The incidence of malaria may be reduced by preventing mosquito bites through physical means. Using bed nets either doubled or impregnated, as suggested by studies from Vietnam[19] and Somalia[20], could be one way of doing so. Fans running on electricity serve the same purpose by blowing mosquitoes away. Power outages on the one hand and rising cost of electricity on the other hand deprive common people of this preventive measure. It is thus clear that continuous supply and low cost of electricity will help reduce the incidence of malaria with consequent reduction in health care cost and enhanced productivity.

The number of slides examined in the urban area of Peshawar was 49787 as compared to 3444 slides at Matani (rural area). Higher number of slides in the urban area of Peshawar could be due to easy access to health facilities and the area being thickly populated. On the other hand, Matani area is thinly populated with limited access of people to health facilities. Law and order situation due to war on terror in Matani could be an additional factor for the low number of slides examined.

CONCLUSIONS

It is concluded that power outages, if not the sole reason, play an important role in the surge of malaria resulting in both individual and societal

suffering and loss of earning. However it is recommended that further studies should be conducted through more sensitive means for reconfirming the results of this study.

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