

Knowledge and Practices about Malaria Among the Sandstone Quarry Workers in Jodhpur District, Rajasthan

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Abstract: Malaria is a common parasitic disease transmitted through mosquitoes. It affects health as well as economic condition of victims. Following rains, water is accumulated in quarries which become breeding grounds for mosquitoes round the year. This study was conducted on the sandstone quarry workers for determining their level of awareness and practices about malaria. It revealed that majority (79.2%) of the sandstone quarry workers were below the age of 40 years and 71.1% were illiterate. In all 33% of respondents were aware of the cause of malaria as mosquito bite. Awareness about causation of disease increased with the literacy status, being 22.5% in illiterates and 88.5% in those with middle school or higher education. Nearly 40% of the respondents attributed high fever with chills and rigor as the most important symptom of malaria. Less than 49% of workers knew that mosquito bred in water while only 22.2% knew mosquito breeding could be prevented. This knowledge was more prevalent among educated workers as compared to illiterates. Our study has shown that the awareness about the cause and practices of prevention of malaria were just fair among the sandstone quarry workers and needs to be strengthened.

Key words: Awareness, practices, malaria, sandstone, quarry, workers.

Malaria is an important health problem globally. It is endemic in 91 countries and 40% of the world population is at risk (WHO, 1996). Malaria was nearly eradicated from India in the early 1960s, but it has re-emerged as a major public health hazard (Sharma, 1996; Sharma and Mehrotra, 1986). Although the efforts are being made to control malaria in the country, but falciparum malaria is on the increase and has intruded new areas (Tyagi, 2004; Singh *et al.*, 2004).

In Rajasthan stone quarrying is an important occupation, next only to agriculture. There are approximately 50,000 workers engaged in store quarries in Jodhpur districts. During rains water is accumulated in stone quarries, which subsequently

become sites for mosquito breeding. This results in increased transmission of malaria in the area around quarries (Sharma, 1993; Batra *et al.*, 1999; Tiwari *et al.*, 1997). This can best be prevented by quarry workers themselves by checking mosquito breeding in quarries, provided they are well versed with the causes of the problem and the measures of its prevention and control. The present study was therefore carried out among sandstone quarry workers of Jodhpur district of Rajasthan, to assess their level of awareness about malaria and practices for its prevention and control.

Material and Methods

It was a cross sectional study. Forty-three sandstone-quarrying sites were selected by

using systematic random sampling from Jodhpur district. A total of 463 workers, 5-15 from each selected site, who consented to participate in the study were interviewed. The questionnaire was prepared in English, but it was communicated to the respondents in local dialect (Marwadi). All the questions were objective in nature with several options for answers. The information was collected on socio-demographic conditions, type of housing, awareness about cause of malaria, vector of the disease, vector breeding and its prevention, knowledge of symptoms and treatment of malaria and preventive measures practiced by the respondents. The workers who could not read or write were considered illiterate while those who could write their own name were taken as just literate. Collected information was analyzed with the help of software SPSS 10.0 version.

Results and Discussion

Out of 463 sandstone quarry workers interviewed, 438 (94.6%) were adult males and 25 (5.4%) were adult females. Majority (82.3%) of workers were Hindus, 82.4% of whom belonged to scheduled castes or scheduled tribes (SC or ST), 10.8% were OBC (Other backward caste) and only 6.8% were from higher castes. Majority (74.4%) of workers were in age group of 20-39 years. Only 7.6% workers were of 50 years or more age (Table 1). Most (71.1%) workers were illiterate while 14.5% had primary or higher education. About 69.0% respondents lived at or near quarrying site, while remaining (31.3%) workers lived in village or town away from the mined area. Since vector of malaria mostly bites humans at night, workers staying in mined area during night are at risk of quarry malaria.

Only one-third (33.0%) of respondents knew that malaria is caused by mosquito bite (Table 2). This proportion increased with the level of literacy, it was 22.5% in illiterates, 44.8% in just literates, 63.4% in those having primary education and 88.5% in those with middle school or higher level of education. Majority of the respondents had wrong notion and believed that malaria is caused by consumption of contaminated water or eating of impure food stuffs (19.2%), poor hygiene (14.5%), changing environment (15.6%) etc. Nearly 4.8% mentioned two or more of above causes and 13.0% respondents expressed their inability to pin point any cause of malaria. Of all, 40.2 % workers attributed high fever with chills and rigor, as the most important symptom of malaria (Table 3). This proportion also increased with the literacy status of the respondents. Similar observations of better awareness in educated persons have also been made by other workers in Rajasthan and other states of India (Yadav *et al.*, 1993; Yadav *et al.*, 1999; Tyagi and Yadav, 1996). Some of the respondents mentioned only high fever, high fever with diarrhea or high fever with rash as main symptoms of malaria.

About half (48.6%) of the respondents knew that mosquito bred in water though only 22.2% knew that mosquito breeding could be prevented (Table 4). This knowledge significantly varied with level of education of the workers. About one-fourth (25.5%) of the respondents informed that mosquitoes also bred in garbage. More than two-third (68.3%) respondents knew that putting meshes on the windows and doors in the houses could prevent the entry of the mosquito.

Table 1. Socio-demographic characteristics of study subjects

Characteristics	Number	Percentages
Age (Years)		
<20	22	4.8
20-29	195	42.2
30-39	149	32.2
40-49	62	13.4
>50	35	7.6
Education		
Illiterate	329	71.1
Literate	67	14.5
Primary	41	8.9
Middle and above	26	5.6
Place of living		
At the work-site	60	13.0
Slum within the mining area	258	55.7
Village/Towns	145	31.3
Personal habits		
Smokers	392	84.7
Alcoholics	205	44.3
Opium addicts	47	10.2

Awareness about lifecycle, sitting posture and resting behavior of the mosquitoes was not common. More than half (52.3%) respondents mentioned that common biting time of mosquito was after dusk.

Majority (85.7%) of the respondents had never gone for a laboratory investigation for confirmation of malaria during any spell of fever. About 64.0% respondents used presumptive treatment provided for fever but only 15.8% could tell the name of drug chloroquine. A very small percentage (19.2%) of respondents remembered the correct dosage of the drug. However, 13.6% respondents stated that they followed dosage prescribed by health worker or doctor. Knowledge about the name of medicine (69.2%) and its correct dosage (73.1%) was higher among those with at least middle

education. It also indicates poor impact of the information, education and communication (IEC) on stone quarry workers of Jodhpur. This probably was a result of the lack of adequate communication between health services and sandstone quarry workers in need of medical care as only 13.6% respondents told that health workers had explained them how to consume the drug. This may also depend on the intelligence of the respondent, as majority of these workers were illiterate. In another study from Ghana, awareness about malaria was so high that about half of the workers had been reported to consume regular chemoprophylaxis for malaria. Intensive IEC activities can bring similar situation in Rajasthan, which is likely to add to effective control of malaria. Any

Table 2. Knowledge of respondents about causation of malaria

Causation of disease	Level of education				
	Illiterate n=329	Literate n=67	Primary n=41	Middle & above n=26	Total n=463
Mosquito-bite	74 (22.5)	30 (44.8)	26 (63.4)	23 (88.5)	153 (33.0)
Impure water & food	68 (20.7)	13 (19.4)	6 (14.6)	2 (7.7)	89 (19.2)
Poor hygiene	51 (15.5)	10 (14.9)	5 (12.2)	1 (3.8)	67 (14.5)
Changing environment	63 (19.1)	7 (10.4)	2 (4.9)	0 (0.0)	72 (15.6)
Multiple causes	18 (5.5)	3 (4.5)	1 (2.4)	0 (0.0)	22 (4.8)
Not aware	55 (16.7)	4 (6.0)	1 (2.4)	0 (0.0)	60 (13.0)

Figures in parentheses denote column percentage

worker residing in quarrying area did not give history of insecticidal spray in their dwellings in the quarrying area. Anti larval measures like application of mineral or other oil on surface of water were also not practiced by these workers. Biological control of mosquito breeding was neither known nor practiced by these workers in their quarries. Only 96 (20.7%) respondents practiced some measures to protect themselves from mosquito bites. Some (6.3%) of the respondents used mosquito net or some cloth to cover body while sleeping at night, 5.2% applied some oil on uncovered parts of their body, 12.7% applied repellents topically on their body or used fumigants, 10.6% used smoke of cow dung, neem leaves, etc. to repel

mosquitoes from their dwellings and 11.2% adopted other measures like fans to prevent landing of mosquito on human body. Usage of these measures increased with level of education of workers. This behavior of the respondents indicated the ignorance as well as lack of affordability that has also been reported earlier from Barmer (Mathur *et al.*, 1990).

Malaria in stone-quarrying areas is an important entity that significantly contributes to overall problem of malaria in India (Sharma, 1993; Batra *et al.*, 1999; Tiwari *et al.*, 1997) as well as in other countries. High positive parasite infestation in blood samples (67%) has been reported from quarrying area of Jodhpur (Batra *et al.*, 1999). In the present study education

Table 3. Knowledge regarding symptoms of malaria

Symptom	Level of education				
	Illiterate n=329	Literate n=67	Primary n=41	Middle and Above n=26	Total n=463
High fever	87 (26.4)	14 (20.9)	6 (14.6)	3 (11.5)	110 (23.8)
High fever with chills and rigor	90 (27.4)	41 (61.2)	30 (73.2)	25 (96.2)	186 (40.2)
High fever with diarrhea	72 (21.9)	13 (19.4)	7 (17.1)	2 (7.7)	94 (20.3)
High fever with rash	21 (6.4)	2 (3.0)	1 (2.4)	0 (0.0)	24 (5.2)
Not aware	59 (17.9)	7 (10.4)	2 (4.9)	0 (0.0)	68 (14.2)

Figures in parentheses denote column percentage.

Table 4. Knowledge regarding mosquito (only affirmative responses)

Knowledge about mosquito	Level of education				
	Illiterate n=329	Literate n=67	Primary n=41	Middle and above n=26	Total n=26
osquitoes breed in water	124 (37.7)	43 (64.2)	33 (80.5)	25 (96.2)	225 (48.6)
Mosquito breeding can be prevented	13 (3.9)	38 (56.7)	30 (73.1)	22 (84.6)	103 (22.2)
Mesh can prevent entry of mosquito in house	198 (60.2)	55 (82.1)	36(87.8)	24 (92.3)	313 (68.3)

Figures in parentheses denote column percentage

has emerged as an important predictor of awareness of workers about malaria. Although the educational status and living standards of the sand stone quarry workers in the area cannot be uplifted immediately and needs long process of developmental activities, however they can be made aware of risk of malaria transmission by mosquitoes, breeding in water collected in quarries. In the IEC activities stress should also be laid on malaria risk due to mosquito breeding in water lodgings, outdoor sleeping habit, wearing of short clothes not covering complete body and non-use of mosquito net. Perception of the community about the causation of malaria is important and malaria control can best be achieved, when community becomes aware of their responsibility, ways and means to be adopted in their life style, which can prevent malaria. Improving the literacy status and putting stress on complete education are one of the most important measures to increase the ability of workers towards understanding this responsibility (Tyagi and Yadav, 1996).

Though quarrying area is an important site of mosquito breeding where quarry workers reside in their temporary dwellings. This study showed that these dwellings were not covered by insecticidal spray under

National Antimalaria Program and the biological control of mosquito breeding or use of other larvicides are also not practiced in water collected in stone quarries. The quarry workers live in such malariogenic situations and when they suffer from malaria, 87.5% do not go for their blood examination. These workers frequently go to their villages and may play an important role in transmission of malaria from quarrying area to other parts of the district. Number of deep quarries has tremendously increased during last few years in Jodhpur and this may be an important epidemiological factor responsible for increasing temporal trend of malaria in these years in the district.

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