

## Malaria and Dengue: Assessment of Knowledge among Households in Rural Sindh, Pakistan

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### ABSTRACT

**Objectives:** To assess knowledge and attitude about malaria and dengue, its spread, symptoms and prevention among the population of Dadu and Badin district of Sindh province.

**Study Design and Methods:** A cross sectional baseline survey was conducted in rural areas of Dadu and Badin districts of Sindh in 2014. Cluster sampling technique was utilized for selection of 900 households from two union councils. Personal interviews were conducted by trained data collectors on pretested questionnaire. Data was entered on SPSS version 20. Descriptive analysis was conducted.

**Results:** Only 22.4% in Dadu and 34.4% of Badin residents heard about dengue fever. Merely 13% from both districts knew about bleeding in dengue fever. Only 17.9% in Dadu and 25% in Badin opined that malaria occurred post rainfall. Only 3.5% in Dadu and 2.9% in Badin had the perception that malaria incurred after floods. In Badin only 3% had ever sprayed inside their homes compared to 7% in Dadu in past one year. In Badin 84% were using mosquito nets as prevention while in Dadu 66%. Only 3.5% in Dadu and 6.2% were covering water buckets as a precautionary measure against mosquitoes.

**Conclusion:** In the present survey, situation is alarming as there are gross deficiencies in knowledge and attitudes pertaining to malaria and dengue while preventive practices are negligible.

**Key words:** Frequency, knowledge, rural areas, malaria, dengue fever.

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### INTRODUCTION

Diseases originating or transferred through mosquito are escalating incessantly specifically malaria and dengue that have created havoc for human beings throughout the world<sup>1</sup>. The phenomena stemming from the fact that both have deteriorated life by attaining high degree of morbidity for some while banishing life for others<sup>2</sup>. Even today Malaria surfaces globally effectuating a gargantuan number of 216 million cases and 655,000 deaths per year with special insistence for developing countries<sup>3</sup>. Dengue on the other hand

is swiftly looming infectious disease with 50-100 million humans persevering the infection per year according to WHO and 24000 succumbing to death<sup>4</sup>. Complementing malaria dengue races itself with high morbidity and mortality becoming endemic in over 100 countries hence classified as an emerging health problem. Half of mankind on earth dwells in areas at high risk of dengue transmission<sup>5</sup> with a case fatality rate of 5-7%<sup>6</sup>. Malaria presents as a calamitous parasitic disease and a serious public health problem in Southeast Asia<sup>7</sup> along with dengue<sup>8</sup>.

Pakistan is narrated to be a country with moderate malaria prevalence and well established control yet annually 0.5 million cases with 50000 deaths emerge. The statistics stand dubious as majority cases are reported from Government hospitals data, in actuality the burden is assumed to be 5 times higher than what is reported<sup>9</sup>. For Dengue literature, emanates that most deaths for admitted patients surface in the province of Sindh<sup>10</sup> and the vector for Dengue is spreading to other areas of Sindh<sup>11</sup> as for malaria the risk for resurgence blooms again owing to contracted global funding<sup>12</sup>.

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Recent floods in Pakistan have made favorable situations for diseases<sup>8</sup> Though vector biology and behavior have been established by studies, host behavior has been left out. Community practices and belief have not been given their due share in research resulting in failure of programs to procure sustainable control<sup>13</sup>.

Demographic, social, behavioral and economic factors are usually leads for effectuating proficient disease control and fortifying successful public health programmes. Even after acknowledging the dearth of issue not much has been documented regarding Knowledge, practices and attitudes of people towards Malaria and Dengue<sup>13</sup>. Given this void, the aim of our study was to assess the level of knowledge about dengue and malaria, its spread, symptoms and prevention among the population of Dadu and Badin district of Sindh province.

## MATERIALS & METHODS

The cross sectional survey was conducted from January 2014 to August 2014 by Pakistan Red Crescent Society in two districts of Sindh, Dadu and Badin. The household listings for both district was compiled by Pakistan Red Crescent society with the help of Pakistan Bureau of Statistics (PBS). The survey area comprised of one union council from Dadu with 96 villages having 3765 households and a total population of 17845 individuals. The survey area from Badin consisted of one union council with 106 villages having 4416 households and a total population of 27632 individuals,  $n$  was the recommended sample size,  $N$  is population size,  $p$  is proportion of a characteristic of interest,  $C$  is error rate (confidence interval), and  $Z$  is tabulated value for confidence level (Tryfos, 1996). The proportion for a baseline survey is taken at 0.5 (which gives the maximum variance,  $0.5*(1-0.5)= 0.25$ ), error rate (confidence interval) of 5% and 1.96 tabulated value of  $Z$  for 95% confidence level and number of households (population) of the above mentioned Union Council, sample size was estimated.

The total sample size was  $N=900$  households, equally divided among the selected union Councils of Badin and Dadu districts. Cluster sampling technique was utilized for selecting households. Residents staying for less than 6 months, guests and those who refused to consent were excluded.

Trained individuals undertook Focus Group Discussion (FGD) in the first phase of the study after random selection of two villages. FGD included 10-12 villagers with mosque imam, community health workers, school teachers, area influential's, elderly females and heterogeneous group with diverse background to stress

community needs. A semi structured questionnaire was developed through information generated from FGD with both open and close ended questions.

Questionnaires were then translated into the national language, Urdu, and the local language, Sindhi then pretested. Training sessions of Interviewers and Supervisors respectively in both districts of Dadu and Badin were carried out. Post training one day field practice was carried out in different villages. Eight teams were organized to collect data; each consisted of a field supervisor, one male interviewer and a female interviewer. Informed consent was taken verbally from each head of the household and objectives of the survey were explained in detail before commencing face to face in-house interviews.

Questions on age, gender, literacy and socioeconomic status were included in questionnaires. The questionnaire related to the health seeking behavior assessed about the availability of various types of health facilities and other associated services particularly transportation, cost etc. The portion on Malaria and Dengue was related to knowledge, attitude and practices towards the disease.

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008. Informed consent was obtained from all participants for being included in the study.

Data quality was ensured with supervisors reviewing the completed questionnaires to ensure that information was recorded correctly and verifying information by revisiting and re interviewing respondents and finally signing the questionnaires. The supervisors were in the field from the beginning of the fieldwork to the end of the survey. Data was entered by two data entry officers for 100 percent verification. It was entered first on Microsoft excel version 10 which after editing was imported to SPSS version 20 for data analysis. Descriptive analysis was carried out with frequencies and percentages for categorical variables and mean and standard deviation for numerical variables.

## RESULTS

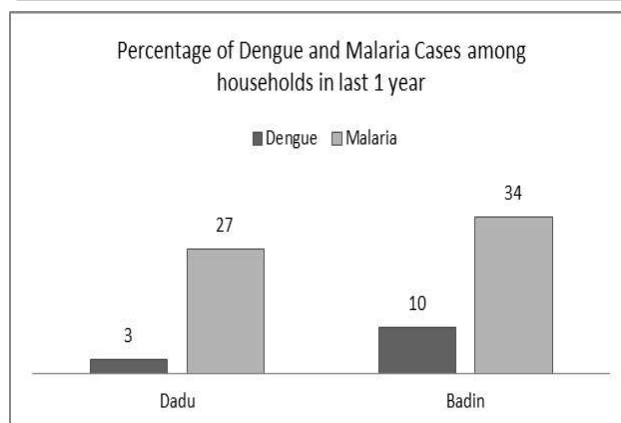
The survey was conducted in districts of Dadu and Badin. Interview was conducted from the head of the households and a female member preferably a mother in both the districts. In Dadu 65 %( $n=298$ ) whereas in Badin 52%( $n=236$ ) were found to be illiterate. Main profession for almost 50 %( $n=228$ ) residents in Dadu was farming compared to 30%( $n=136$ ) in Badin. Of the remaining majority were daily wage laborers.

Majority 94% (n=425) were married in both districts. Poverty was widespread as majority households 75% (n=341) in Dadu and 69% (n=311) in Badin were earning less than rupees 10,000 per month. Sixty percent and more of the households were of nuclear structure in both the districts. The housing structure in both districts were observed by the data collectors and majority 63% (n=285) households in Dadu and 70% (n=315) in Badin were made of mud walls and thatched roofs. In both the districts majority of the households 90% and above owned the houses yet overcrowding was a marked feature as the houses were either 1 or 2 roomed with average number of household members seven to eight in both districts. Within both districts main source of water was hand pumps with principle method of carrying water from the source to home by earthen ware pots (65%). Only 15% (n=67) households were boiling water before drinking in Dadu as compared to 12% (n=54) in Badin district. Majority was using both soap and water for washing hands and hand hygiene practices were relatively better in both the districts. Facility of own latrine was present in 74% (n=333) households in Dadu whereas in district Badin only 22% (n=99) had this facility with the remainder utilizing the field for this purpose. Sanitary conditions were deplorable as 77% (n=346) households in Dadu and 67% (n=301) in Badin had animal and human feces visible in their yards, 90% (n=405) residents from both districts threw garbage outside the house, 70% (n=315) solid waste was visible in the yard in both districts. Sewage overflow was seen in 53.2% (n=242) homes in Dadu and 30.4% (n=137) in Badin.

When households were inquired regarding occurrence of malaria in last one month among the household members 27% (n=123) in Dadu and 34.4% (n=155) in Badin households affirmed being afflicted by malaria in the last one month. Fourteen percent (n=64) in Dadu and 49% in Badin (n=220) of participants of survey were of the opinion that malaria occurs in summers. Merely 17.9% (n=82) in Dadu and 25% (n=113) in Badin opined that malaria occurred post rainfall. Very few 3.5% (n=16) and 2.9% (n=13) had the perception that malaria incurred after floods. Some residents 14.9% (n=68) from both Dadu and Badin perceived winter as the season for malaria. Majority households 65.7% (n=299) in Dadu and 83.6% (n=376) in Badin were using bed nets while sleeping. However only 0.7% (n=3) in Dadu and 4% (n=18) in Badin had insecticide treated nets. In Dadu 5.7% (n=26) and 3.1% (n=14) in Badin were utilizing insect repellants whereas only 3.5% (n=16) in Dadu and 6.2% (n=28) were covering water buckets as a precautionary measure. Estimated 17.4% (n=79) in Dadu and 4% (n=18) in

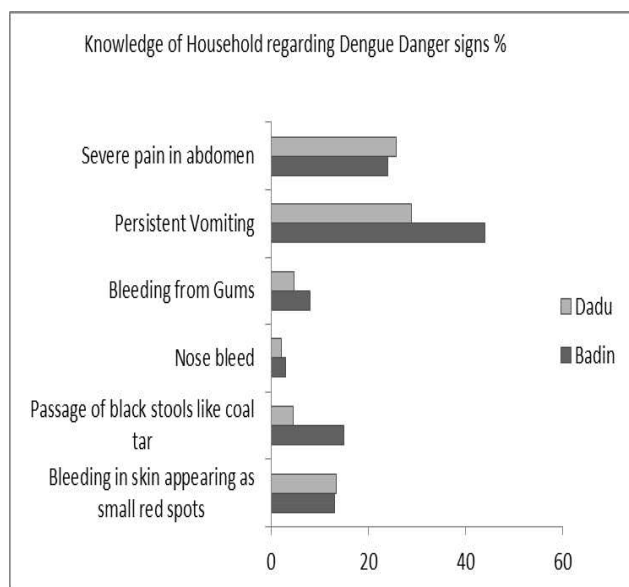
Table 1: Knowledge and Practices of Households with regards to Malaria

	Dadu (n=450)		Badin (n=450)	
	n	%	n	%
Interior of the house was sprayed against mosquitoes in the past 12 months				
Yes	33	7.3	15	3.3
No	378	83.1	391	86.9
Don't know	44	9.7	44	9.8
Outside of the house was sprayed against mosquitoes in the past 12 months				
Yes	23	5.1	14	3.1
No	380	83.5	390	86.7
Don't know	52	11.4	46	10.2
Source of spray outside the house against mosquitoes				
Government worker/ program	20	4.4	26	5.8
Private company	0	0	2	.4
Household member	14	3.1	48	10.7
Don't know	421	92.5	374	83.1
Precautionary measures against mosquitoes protection				
Use mosquito nets	299	65.7	361	80.2
Use insect repellents	26	5.7	14	3.1
Use insecticide treated bed nets	3	.7	18	4.0
Use chemo prophylactic medicines	32	7.0	11	2.4
Cover water buckets	16	3.5	28	6.2
No measure	79	17.4	18	4.0
Household have any mosquito nets that can be used while sleeping				
Yes	299	65.7	376	83.6
No	156	34.3	74	16.4
Time of year when Malaria cases are at increase				
Summers	64	14	220	48.9
Winters	68	14.9	67	14.9
After rains	82	17.9	113	25.1
After floods	16	3.5	6	1.3
Summer and after floods	16	3.5	3	.7



Graph 1: Dengue and Malaria cases among households in District Badin and Dadu

Badin were adopting no precautionary means against malaria. Only 7.3% (n=33) in Dadu and 3.3% (n=15) people had sprayed mosquito repellants inside their house. Fewer residents asserted that mosquito repellent was sprayed outside their homes whether by Government or themselves in both districts.



Graph 2: Knowledge of households regarding Dengue danger signs

When information regarding Dengue fever was assessed 22.4% (n=102) in Dadu and 34.4% (n=155) of Badin residents had actually heard about dengue fever. Only 2.9% (n=13) in Dadu and 10.2% (n=46) in Badin households ever had an episode of dengue fever among family members. Knowledge regarding the danger signs of dengue fever is illustrated in Graph 2.

## DISCUSSION

In our study most participants belonged to lower socioeconomic status residing in homes with one or two rooms and mostly comprising of farmers. Spending time outside has been demonstrated a risk factor for malaria and dengue<sup>14</sup>. Plus such living conditions augment malariogenic potential<sup>15</sup>. Approximately one third residents were inflicted with malaria in last one year which was quite higher compared to another study where 11% prevalence was seen<sup>16</sup>. Literature from Sudan highlighted that compromise in food, water supply, language and education are factors predisposing towards malaria being more common among illiterate<sup>17</sup>. Most were illiterate from our study and majority were not familiar with dengue as illustrated in earlier studies in Karachi<sup>18</sup>. Studies in USA and India have mentioned us that possessing better socioeconomic status stands directly proportional to knowledge scores<sup>19</sup>. Utensils and earthen pots were common mediums to carry water in our study. Now mosquitoes for dengue and malaria

prefer water stored in houses, tree holes, plastic containers, oval earthen pots used in Sindh and Punjab areas, barrels, drums, jars, underground cemented tanks with Dengue mosquito resting indoors in dark places and outdoors in shaded areas all these sites seen in abundance in Dadu and Badin districts<sup>8</sup>. All these factors were immensely supportive of diseases in rural areas of Dadu and Badin. Additionally live stocks were living with residents in yards outside rooms another risk factor for malaria as seen in earlier studies in NWFP province and Phillipines<sup>20</sup>. Sewage, garbage, waste and feces were frequently observed in yards and outside home which has been illustrated in Taiwan to augment the risk<sup>21</sup>.

Knowledge on causation of malaria by mosquitoes was astounding as majority were familiar with the vector similar to studies in Bangladesh<sup>22</sup> and Peshawar<sup>23</sup>. Malaria had a well established reputé compared to Dengue where participants marginally knew about it. This supported an earlier study in Karachi where majority who had not heard of Dengue were illiterate or lower socioeconomic standing<sup>18</sup>. While contradicting another study in Karachi where socioeconomic status lodged no differentiation of knowledge<sup>15</sup>. Possible cause might be absence of its peculiar mosquito as seen by earlier works in Thatta, Dadu and Badin<sup>24</sup>.

Our study showed that symptom recognition for dengue was quite poor which was contrary to studies in Karachi<sup>18</sup> India and Brazil<sup>25</sup>. Very few participants identified bleeding in the skin as a symptom similar to studies in Karachi<sup>15</sup>. As for malaria symptoms most were well accustomed with it similar to study in Bangladesh<sup>22</sup> and Pakistan<sup>13</sup>. Most thought that Summer and winter are times for malaria to spread in the localities which was identical to a study in Pakistan<sup>26</sup> and Khyber Pakhtoonkhwa where summer was taken as the favorite season<sup>27</sup>.

Habits like covering water buckets, repellants and prophylactic medicines were only performed to a negligible extent. In large portion of both districts no spraying was done in the house or outside. This held contrary to study in Thailand where water stagnation was targeted and urban area like Karachi where sprays and coils were utilized<sup>18</sup>. Untreated bed nets were the only common barricade for malaria prevention used by most residents<sup>28</sup>. A study in Iran found that risk augments 5 times when there are no nets on doors or windows as observed in study in Mexico and Venezuela. Additionally Insecticide treated nets (ITN) reduce morbidity and mortality by 43% as demonstrated in Peshawar<sup>23</sup> and conveyed by World Health

Organization. Recognition of symptoms leads to early treatment<sup>22</sup> as this was quite low it translated into low health seeking behavior by residents from both districts. However it must also be realistically borne in mind that all good knowledge doesn't necessarily lead to all good practices as seen in studies among underprivileged nations<sup>29</sup>. Modification of health seeking behavior is needed for prompt response and treatment indicating that behavior change is one area to target in programmes. Early response to Dengue has reduced its duration and severity plus served pivotal role in malaria recovery<sup>30</sup>.

The primary limitation of our study was reliance on the ability of recall. Underreporting may jeopardize the results yet the strengths cannot be overlooked. However, attempts were made to minimize this potential bias by pre-testing the questionnaire, including only interviewers trained through workshops by consultants and making the wording culturally appropriate. High participation from a randomly selected sample was utilized for this survey overcoming bias. Participants from both districts were living in similar conditions thus overcoming confounding.

Intensive supervision of researchers in the field and at the time of data compilation ensured quality of data used for final analysis

Dengue mosquito prefers fresh<sup>8</sup> while Malaria breeds in dirty stagnant water<sup>27</sup>. Personal protection measures recommended for halting transmission include draining stagnant water from all forms of containers, proper waste disposal, using insect repellants or insecticides and using ITNs<sup>31</sup>. Wearing full sleeve clothes with socks, rechecking of ITNs should be done as its ingredients might be effected by cooking in same room, dust or lower frequency of washing<sup>22</sup>. Health administration should enact billboards, health programmes should be conducted in compatible sociocultural context for effective reception while sensitizing the community, clean up campaigns before and after epidemics, floods and rains with weekly dry day activities, involving community health workers for regular reminders. Along with it insecticide treatment of livestock has proven effective for malaria in Pakistan<sup>32</sup>. Control for both dengue and malaria will be insufficient without coordinated international financial and technical support for local programmes<sup>33</sup>.

## CONCLUSION

In the present survey, situation is dismal as there are gross deficiencies regarding knowledge and attitudes pertaining to malaria and dengue while preventive practices were oblivious. The lack of knowledge likely

stems from a lack of information, education and communication activities in the study area. Drugs and vaccines are needed but deeply entrenched activities need to be modified while education of the community is the need of the day. Concentration should be given to vector control for effective, quick and long lasting control and circumventing the problem. Mosquito control can be attained through annihilation of its breeding sites Community health workers would mould positive attitudes and cultivate better preventive practices among the public.

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