

Malaria related knowledge, practices and behaviour of people in Nepal

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Abstract

Background & objectives: The information on malaria related knowledge, practices and behaviour of the people of Nepal living in malaria endemic areas are essential to develop behavioural change communication messages and for producing policy to prevent and control malaria in the country. The objective of this study was to assess knowledge, practices and behaviour of the people living in malaria endemic districts and relate with malaria control policy in Nepal.

Methods: The paper utilizes data from a cross-sectional study of 1330 households conducted during December 2004 to April 2005 in rural areas of Jhapa, Kailali and Kanchanpur districts. The method used includes structured questionnaire and focus group discussions.

Results: The results revealed that 40% respondents were illiterates. Eighty-six percent respondents have heard about malaria but only 50% responded fever with chills as the sign and symptom of malaria. Seventy-three percent responded that mosquito bite causes malaria transmission and 74% respondents considered that malaria is the fatal disease but very few have knowledge that the treatment of malaria in time can save life. More than 50% did not have information on availability of free treatment of malaria in Nepal. Still 16% were found consulting traditional healers for the treatment. The outside sleeping habit was found in almost one fourth of the population mainly in summer season indicating no knowledge about prevention of malaria. Although bednet use practice was higher, only 4% had knowledge on insecticide impregnated bednets and 23% of them practicing it. Issues regarding the proper and regular use of bednets, the quality of the bednet and use of free treatment provided by the government, since these districts are reporting high incidence of malaria.

Interpretation & conclusion: Health education must be taken into account for communities in malaria endemic areas to produce desired outcomes in malaria control.

Key words Behaviour – community knowledge – control policy – malaria – practices

Introduction

Malaria caused by four species of *Plasmodium* is increasingly becoming a serious burden in most tropical countries and a major cause of death in children in sub-Saharan Africa. Approximately 300 million people worldwide are affected by malaria and between 1 and 1.5 million people die every year due to malaria¹.

About 70% of Nepal's population live in areas with unstable malaria transmission. In 2001, out of 23.2 million population of the country, 16.5 million are at malaria risk in Nepal². Malaria remains uncontrolled due to emergence of the drug resistant parasite, insecticide resistant mosquito vector and non-availability of suitable and effective malaria vaccine. The disease burden is increasing in almost all the tropical countries since malaria creates socioeconomic problems

and also leads to large number of deaths, particularly among young children³.

Ignoring community's attitudes and beliefs regarding malaria has contributed to the inability of control programmes to achieve sustainable control. Understanding community perceptions of aetiology, symptom identification and treatment of malaria is an important step towards the disease control^{4,5}. It needs for targeting health messages towards poorly educated people in order to empower them with the knowledge and resources to recognize and manage their health problems⁶.

Health education remains an indispensable component for the malaria control activities in Nepal. The main objective of the health education activities is to involve community as much as possible in different aspects of malaria control programme. This is done through different methods of health education activities such as personal contact, workshops, and malaria education to the school children. To achieve community participation, increased health education, distribution of malaria-related posters, pamphlets, booklets, calendars, etc. are adopted in the context of primary health care approach⁷.

This cross-sectional study was conducted to establish baseline information assessing knowledge, practices and behaviour of the population in regard to malaria in three malaria endemic districts of Nepal. The ultimate use of this study would enable to develop effective behavioural change communication (BCC) messages. An intervention will be designed and implemented by the Epidemiology and Disease Control Division, Ministry of Health and Population.

Material & Methods

It was a cross-sectional study conducted to assess the knowledge, practices and behaviour related to malaria during December 2004 to April 2005. The sample was designed to provide estimates of the

study objectives for the three malaria endemic districts, Jhapa in the Eastern Development Region, Kailali and Kanchanpur in the Far Western Development Region of Nepal. Further, the study population was selected from the disease endemic and malaria potential areas of the districts. The primary sampling unit was the Village Development Committee (VDC), a small geopolitical unit in different disease endemic/epidemic areas of the districts.

Data regarding malaria status (endemic or epidemic) of the study districts were reviewed using Annual Reports of the Department of Health Services and data were obtained through Health Management Information System (HMIS). The malaria endemic VDCs of the study districts, Jhapa, Kailali and Kanchanpur were listed using HMIS reporting data. From each district, three VDCs were randomly selected. These VDCs represent different districts with different disease status (Table 1). The classification of the study area was based on the areas of the district where disease had become endemic/epidemic and areas of past epidemic.

After selecting study VDCs, the study households were selected by using sampling interval. The total number of households in that VDC was divided by 450 (the required sample size) and sampling interval was calculated. The households to be interviewed

Table 1. Study Village Development Committees (VDCs) and sample size

Districts	VDC/Municipality	No. of samples
Jhapa	Anarmani	150
	Mechi Municipality	150
	Shanischre	150
Kailali	Malakheti	153
	Shripur	148
	Tikapur	141
Kanchanpur	Daijee	149
	Krishnapur	158
	Pipladi	131
Total		1330

were then identified in every sampling interval of first randomly selected households.

The questionnaire was prepared to assess the knowledge, practices and malaria-related behaviour in different selected malaria endemic district. The BCC materials developed by the Department of Health Services and Environment Health Project of United States Agency for International Development (USAID) were also reviewed. The questions were developed in English and translated into Nepali. The study tool consisted of questions regarding demographic characteristics of the respondents, availability of communication media, preference of communication media, knowledge/information on malaria and mosquito, preventive and control measures of malaria, and availability of free treatment, bednet using practices and the different preventive and control activities conducted by different institutions.

Training of field supervisors and enumerators was done to ensure quality and completeness of data collection, manage appropriate data collection in difficult situations and to handle difficulties, if any. The training was concentrated on sampling of households, validity and reliability of data, introducing each question of the questionnaire for easy of use. Altogether, 1330 questionnaires were filled constituting 450 from Jhapa, 442 from Kailali and 438 from Kanchanpur. Focus group discussions were conducted in each district in seven to eight groups. These groups consisted of female community health volunteers, health professionals, mothers, pregnant women, school teachers, local clubs, NGOs, drug vendors and local health practitioners.

Ethical approval was taken from the Institutional Review Board (IRB) of the Institute of Medicine, Tribhuvan University, Nepal. Verbal ethical consent was taken from the respondent before administering the questionnaire.

Database was prepared using Epi Info Version 6 and

accordingly data entry was done. Data were analyzed using SPSS version 11.5. Chi-square test was used to test for significance among groups. A p-value of 0.05 was used to indicate statistical significance. Sub-group analyses were performed for gender, age, level of education and previous infection with malaria.

Results

Among total 1330 respondents constituting 450 from Jhapa, 442 from Kailali, 438 from Kanchanpur, 64.5% were males and 35.5% were females. The mean age of the respondents was 36.8 ± 14.4 yr. The education level of the respondents showed that about 40% were illiterate. Others were literate (25.5%), 5–10 class (16.8%), 10 to 12 (16.3%) and graduate and above (1.7%).

The average family size was 7 ± 4 ranging from 1 to 30. Majority of respondents had agriculture occupation (58.8%), followed by business (8.2%), housewife (9.4%), students (9.6%), carpenter/driver/tailor/labour (7.7%), teachers (3.5%) and other services (2.7%). In those households, 98 (7.4%) suffered from malaria in the past.

Among all of the respondents, 86.1% had heard about malaria. The respondents who have heard reported that radio (58.1%) and television (25.4%) are the media sources for malaria messages. Other reported health workers (21.7%), relatives/friends (13.5%), malaria patients (10.2%) and posters/pamphlets/newspapers (9.1%) as the source of malaria messages.

Twenty-one percent of the respondents did not have knowledge about the signs and symptoms of malaria. Those having knowledge mentioned fever with chills (50.4%), and continuous fever (46.9%) as the symptoms of malaria. Among total, 72.6% respondents replied that mosquito bite causes malaria transmission. This was found significantly associated with male gender or previous infection with malaria in the household ($p = 0.000$). Some respondents considered

dirty environment and staying with malaria patient as the cause of malaria transmission. Majority of the respondents (73.7%), replied that malaria is transmitted by the mosquitoes. Similarly, 41.9 and 9.6% replied that encephalitis and filariasis respectively are also the diseases transmitted by the mosquitoes.

Regarding the breeding places of mosquitoes, 59.8% responded stagnant water. Rotten things and animal shed are considered as breeding places of mosquitoes by 20.9 and 20.6% respectively. Among total, 54.4 and 41.1% of the respondents considered dark corner of the house and bushes respectively are the living places of mosquitoes during the daytime (Table 2).

Regarding the knowledge on fatality of malaria, 73.9% considered malaria as the fatal disease. Sixteen percent respondents replied that treatment of malaria

in time can save life. Among the total, 90.1% respondents replied that people could protect from malaria. Regarding the method to protect from malaria, 41.9% replied to take precaution to prevent mosquito bite. Similarly, 41.3, 25.8 and 17.8% respondents replied to take prophylactic medicine, personal hygiene and spraying respectively. Regarding the knowledge on measures to limit the mosquito population, 73.2% respondents have knowledge on measures to limit the mosquito population. However, 66.7, 48.1 and 32.1% responded removal of the water collected in ditches, spraying insecticides and cutting of bushes respectively to limit the mosquitoes population. Very few responded fish farming as a method of limiting mosquito population. Information on knowledge about protection from mosquito bite was collected. Among total, 92% responded the use of bednet protects from mosquito bite. Similarly, the responses on cleaning environment, insecticide spraying, making smoke and using mosquito coil were 22.9, 18.9, 11.7 and 7.4%, respectively (Table 3).

Table 2. Knowledge and perceptions about malaria, mosquitoes

Particulars	Frequency	Percent
<i>Knowledge on signs and symptoms of malaria (n = 1330)</i>		
Continuous fever	625	46.9
Fever with chills	670	50.4
Others	69	5.2
Don't know	280	21.1
<i>Perceptions of the causes of malaria transmission as reported by the respondents (n = 1330)</i>		
Mosquito bite	966	72.6
Dirty environment	230	17.3
Staying with malaria patient	35	2.6
Don't know	263	19.8
<i>Knowledge on breeding places of mosquito (n = 1328)</i>		
Animal shed	274	20.6
Stagnant water	794	59.8
Rotten things	278	20.9
Others	9	0.7
Don't know	271	20.4
<i>Living place of mosquito during the daytime (n = 1330)</i>		
Dark corner of the house	725	54.5
Bushes	548	41.2
Paddy-fields	57	4.3
Others	18	1.3
Don't know	206	15.5

Among all respondents, 95.3% responded that malaria could be treated. Among them, 98.9% responded that health worker can treat malaria. Very few respondents (0.5%) have faith on traditional healer and 5.4% respondents still do not know the person who can treat malaria. Free treatment of malaria is available in Nepal. However, 50.7% of the respondents didn't have information on free treatment (Table 4).

Information regarding the sleeping habit of household members in the animal shed, in the open areas outside the house, 9.5% respondents replied that their household members sleep inside the animal shed. But the sleeping habit of the household members outside the house in the open is quite high (23%).

Among total, 90.1% households are using bed net as preventive measure. Among households having bednets in the house, all members are using bednets in 93.9% households. Few households (2.6%) have priority on children below five years for bednet use.

Table 3. Knowledge and information regarding preventive measures

Particulars	Frequency	Percent
<i>Knowledge on methods to protect from malaria (multiple response) (n = 1198)</i>		
Taking precaution to prevent mosquito bite	502	41.9
Killing mosquitoes e.g. spraying	213	17.8
Taking prophylactic medicine	495	41.3
Keeping personal hygiene	309	25.8
Others	2	0.2
Don't know	18	1.5
<i>Measures of limiting the mosquito population (multiple response)</i>		
Know the measures	973	73.2
Removal of the water collected in ditches	649	66.7
Spraying insecticides	468	48.1
Cutting bushes	312	32.1
Fish farming	23	2.4
Others	8	0.8
<i>Protection from mosquito bite (multiple response) (n = 1330)</i>		
Using a bednet	1224	92.0
Cleaning environment	304	22.9
Insecticide spraying	252	18.9
Plastering the wall/floor	36	2.7
Keeping away domestic animals/pets	56	4.2
Making smoke	155	11.7
Using mosquito coil	99	7.4
Others	4	0.3
Don't know	38	2.9

Table 4. Information regarding treatment of malaria

Particulars	Frequency	Percent
<i>Requirement of treatment of malaria (n = 1330)</i>		
Yes	1267	95.3
No	35	2.6
Doesn't require treatment	28	2.1
<i>Person can treat malaria (n = 1330)</i>		
Health workers	1254	98.9
Chemists/pharmacists	11	0.9
Faith/traditional healers	6	0.5
Self-medication	1	0.1
Don't know	68	5.4

Since most of the households are using bednets, they also know the reason of using it. Among total, 95.2% responded that bednet use is to prevent mosquito/insect bite and 11.2% responded to prevent from malaria. The knowledge of insecticide impregnated bednet was low (3.6%). Among them, use of impregnated bednet was also found low (22.9%). The respondents who don't have bednet in the house were further asked for reasons of not having the bednet in the house. Majority of them responded that they cannot afford it. Other responses were bednet was not available locally (6.1%) and they do not like it (4.5%).

The respondents were asked whether the insecticide spray was done in their houses within last twelve months. Most of them (86.8%) responded that they do not allow their houses to be sprayed. Among those who got their houses sprayed within last twelve months, 58% responded that they plastered or painted the house walls after spraying. They responded that 12.6% plastered/painted immediately after spray. Similarly, 39.1 and 20.7% plastered /painted within one month and two months of spray respectively. But 14.9 and 12.6% responded that they plastered/painted the walls within and after three months respectively. The reasons for plastering or painting the house walls within three months after spraying were bad smell (28.9%), festivals (57.9%), and regular activities of painting/plastering (14.5%) (Table 5).

Discussion

This study was conducted to provide baseline information about malaria related knowledge, practices

Table 5. Households adopting preventive measures

Particulars	Frequency n = 1330	Percent
Households having bednets	1198	90.1
Information on insecticides impregnated bednet	48	3.6
Household using ITNs	11	0.8
Households spraying insecticides within last twelve months	150	11.3

and behaviour to be used in the development of community health education messages to increase community participation in the prevention and control of malaria. The development of behavioural change communication messages is to emphasize the need of bednet use, early diagnosis and prompt treatment for effective control of malaria. Health education needs to be context sensitive, i.e. mindful of the ways in which knowledge will ultimately be transformed into action⁸. Health education was the main reason for an increase in knowledge about the vector and the use of bednets in Ecuador and Peru; which ultimately led to a decrease in malaria⁹.

The study results show that majority of the respondents were illiterate. Illiteracy had a profound influence on their perception of cause and treatment-seeking behaviour for malaria¹⁰. Most of the respondents have heard about the disease malaria through radio and television. The recognition of signs and symptoms of malaria was low in our study; however, this response was reported more than 80% in an African study¹¹. Majority respondents considered that malaria is the fatal disease but very few had knowledge that the treatment of malaria in time can save life.

Almost 73% respondents replied that mosquito bite is the cause of malaria transmission which was lower as compared to more than 92% of Mpumalanga and Guyana studies^{4,11}. Response on dirty water as a cause of malaria transmission is still significant similar to other studies¹². As compared to knowledge on diseases transmitted by the mosquitoes, the knowledge on breeding places of mosquitoes, living places of mosquitoes during the daytime is lower. To educate entire population, effective messages with relation to breeding places of mosquitoes and their role in disease transmission should be delivered.

Regarding the treatment of past malaria cases in the household, most of them consulted with the health facilities. But 16.3% did not consult anywhere and

16.1% consulted with the traditional healers. Absence of health workers in the health facilities, lack of time to go to the health facilities and lack of knowledge where to go were the reasons of not consulting the health facilities for the treatment during fever with chills. Similar study reported inaccessibility of health care, waiting until the disease worsened, and a belief that febrile disease resolves spontaneously as the reasons for not seeking modern treatment in time¹³. Among the total, 50.7% did not have knowledge on availability of free treatment of malaria in Nepal. Necessity of full course of treatment and availability of free treatment of malaria need to be informed.

The sleeping habit inside the animal shed, and the outside sleeping habits were found and these were mainly in summer season. In Nepal, the epidemic peak of vector borne diseases is higher during summer season starting from April/May and diminishes in October/November. Therefore, seasonality of malaria and its relation with mosquito bite need to be informed. The bednet use practice was higher (90.1%) but the information and practice of using insecticide impregnated bednet was quite low. Majority of respondents who were not using bednet replied that they could not afford it. Since the bednet use was found higher in these areas, they are reporting higher number of malaria cases. It raises a question regarding the proper and regular use of bednet and quality of the bednet.

It was found that most of the households did not use spraying. Therefore, recommending spray of households should be considered. The regular plastering and painting practices need to be considered even if the spraying is done.

Health education in the community may be a more effective way to disseminate health information^{14,15}. Based on this study, it can be recommended that health education materials oriented towards increasing the knowledge and practice to prevent and control malaria infection should be developed.

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References

1. Winstanley P, Ward S, Snow R, Breckenridge A. Therapy of falciparum malaria in sub-Saharan Africa: from molecule to policy. *Clin Microbiol Rev* 2004; 17(3): 612–37.
2. Annual Report. Kathmandu, Nepal: Department of Health Services, Ministry of Health 2002/2003.
3. Wongsrichanalai C, Pickard AL, Wernsdorfer WH, Meshnick SR. Epidemiology of drug-resistant malaria. *Lancet Infect Dis* 2002; 2: 209–18.
4. Govere J, Durrheim D, Grange KI, Mabuza A, Booman M. Community knowledge and perceptions about malaria and practices influencing malaria control in Mpumalanga province, South Africa. *S Afr Med J* 2000; 90: 611–6.
5. Simsek Z, Kurcer MA. Malaria: knowledge and behaviour in an epidemic rural area of Turkey. *Public Health* 2005; 119: 202–8.
6. Ibidapo CA. Perceptions of causes of malaria and treatment seeking behaviour of nursing mothers in a rural community. *Aust J Rural Health* 2005; 13: 214–8.
7. Bista MB, Banarjee MK, Vaidya RG, Thakur GD. The annual internal assessment of malaria and kala-azar control activities, 2003. Kathmandu, Nepal: Epidemiology and Disease Control Division, Department of Health Services, Ministry of Health 2005.
8. Montgomery CM, Mwengee W, Kong'ong'o M, Pool R. To help them is to educate them: power and pedagogy in the prevention and treatment of malaria in Tanzania. *Trop Med Int Hlth* 2006; 11(11): 1661–9.
9. Nieto T, Mendez F, Carrasquilla G. Knowledge, beliefs and practices relevant for malaria control in an endemic urban area of the Colombian Pacific. *Soc Sci Med* 1999; 49: 601–9.
10. Barish G, Maude GH, Bockarie MJ, Eggele TA, Greenwood BM, Ceesay S. Malaria in a rural area of Sierra Leone: initial results. *Ann Trop Med Parasitol* 1993; 87: 125–36.
11. Booth CM, MacLean JD. Knowledge, treatment-seeking, and socioeconomic impact of malaria on the Essequibo Coast of Guyana. *McGill J Med* 2001; 6: 17–25.
12. Tsuyuoka R, Wagatsuma Y, Makunike B. The knowledge and practice on malaria among community members in Zimbabwe. *Cent Afr J Med* 2001; 47: 14–7.
13. Nyamongo IK. Health care switching behaviour of malaria patients in a Kenyan rural community. *Soc Sci Med* 2002; 54: 377–86.
14. Lewin SA, Dick J, Pond P, Zwarenstein M, Aja G, vanWyk B, et al. Lay health workers in primary and community health care (review). *Cochrane Database Syst Rev* 2005; 25(1): CD004015.
15. Ali M, Asefaw T, Byass P, Beyene H, Pedersen FK. Helping northern Ethiopian communities reduce childhood mortality: population-based intervention trial. *Bull World Health Organ* 2005; 83: 27–33.

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