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Utilization of basic health staff by rural community in disease management of malaria

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This study aimed to assess the utilization of basic health staff (BHS) by rural community in disease management of malaria. A community-based cross-sectional analytic study was conducted from September 2007 to September 2008 at selected malaria endemic areas of five townships in Mandalay Division. A total of randomly selected 1500 heads of household or family members aged over eighteen years and 153 BHS were included in this study. Among 153 malaria cases, 33.3% of patients utilized BHS. Only 18.3% knew the availability of proper anti-malarial treatment with BHS. In multivariate analysis, locally contracted malaria, affordable traveling cost, reasonable treatment cost, domiciliary treatment service, shorter duration of treatment and knowledge on availability of anti-malaria treatment at BHS are significantly associated with utilization ($p<0.05$). Parallel to maintenance and strengthening BHS services including domiciliary care, information on availability of anti-malaria treatment with BHS should be given to community.

INTRODUCTION

Malaria is the third leading cause of morbidity and first leading cause of mortality in Myanmar [1]. The malaria control program aimed for early diagnosis as well as prompt and adequate treatment in the community since September 2002. The national anti-malarial treatment policy introduced rapid diagnostic test (RDT) and artemisinin-based combination therapy (ACT) for confirmed uncomplicated *Plasmodium falciparum* malaria.

In 2004, malaria control program gave on-job training according to latest anti-malaria treatment guideline to all BHS in Upper Myanmar. RDT and ACT were made available free of charge down to sub-centers (SCs) level where midwives (MWs) are working. Township medical officer (TMO) delegates the authority of distribution to township health nurses (THN) or health assistant grade-1 (HA-1) of township health department. THN and HA-1 issue rural health center (RHC) allotments to health assistants (HA). HA and public health supervisor grade 1 (PHS-1) manage the allocation of RDT and ACT to SCs within their jurisdiction.

Although BHS were trained and routinely supplied by program, BHS utilization by community has not been investigated in Upper Myanmar. In 2008, we conducted a cross-sectional survey in malaria endemic areas of Mandalay Division, Upper Myanmar. This study described information on BHS utilization and factors influencing utilization from both consumer and provider sides.

MATERIALS AND METHODS

A community-based, cross-sectional analytic study was conducted from September 2007 to September 2008 at PyinOoLwin, Patheingyi, Singu, Madayar and Thabeikkyin Townships in Mandalay Division where all BHS were trained for disease management of malaria with regular RDT and ACT supply. Using multi-staged sampling method, firstly, five townships

of malaria endemic area were selected from Mandalay Division. Next, 19 RHCs were identified as malaria endemic areas from existing list of 31 RHCs in selected townships.

Of them, 10 RHCs were randomly selected using lottery method. Then, from each RHC, five SCs were selected randomly, totaling 50 SCs. After that, from each SC, two villages (one where SC situated and the other, the most remote area furthest away from respective SC to elicit the effect of distance on utilization) were selected, totaling 100 rural villages. Finally, in each village, 15 heads of household (or family members aged over 18 years) were selected using systematic random sampling method with sampling interval of 5 achieving 1500 households. Face-to-face interview with heads of household was conducted using pre-tested, structured questionnaires. Information on socio-demographic characteristics, knowledge on malaria, healthcare seeking behavior during most recent episode of malaria attack among family members, accessibility to healthcare services, attitude and utilization of BHS were investigated through interview.

In each RHC, one focus group discussion (FGD) session with six to eight rural people of both sex and aged over 18 years was conducted at suitable SC. A total of 10 FGD sessions were conducted to get further information regarding attitude towards BHS by rural community. In-depth interviews (IDI) with 50 MWs and 10 HAs who were actually facing with problems regarding disease management of malaria were also conducted to reveal the constraints on the provider side.

Data management

Data were entered into computer using Epi-data version 3.02-software. Double data entry was done to check completeness and accuracy. Any discrepancy was corrected by reviewing the raw data. Data analysis was performed by using R-Gui statistical software.

Ethical consideration

This study was approved by the Institutional Ethical Committee of Department of Medical Research (Upper Myanmar) and written informed consent was taken from each and every participant.

RESULTS

Malaria prevalence

Out of 7974 household members, 153 people reported malaria-like fever one year before survey. Among them, malaria was confirmed by RDT (61.4%) and microscopy (7.2%). Prevalence of confirmed malaria in study population was 13.2 per 1000 population.

Background characteristics of malaria patients

Median family size of households with malaria patient was five ranging from one to twelve members. Among 153 malaria patients, mean age was 37.2±9.8 years with a range of 18 to 64. Females accounted for 53.1% and 46.9% were males. Majority were laborers (75.3%) followed by land-owned farmers (10.0%), semi-skilled workers (8.7%), sellers (3.5%) and dependents (2.4%). Most of the patients were at middle school level (50.3%) followed by primary school level (37.7%), high school level (7.3%), illiterates (3.5%) and university or graduates (1.1%). Mean family income per month was 42036±33257 kyats ranging from 10,000 to 300,000 kyats.

Background characteristics of BHS

A total of 153 BHS including four THNs, one HA-1, seventeen HAs, seventeen lady health visitors, eight PHS-1s, eighty-nine MWs, and seventeen public health supervisor grade 2 (PHS-2) participated in this study. Among them, 79.1% were females and 20.9% were males. Mean age was 36.1 ± 10.9 years with a range of 22 to 59 years. Of them, 45.1% were university level followed by high school (43.1%), and graduates (11.8%). Mean duration of service

was 13.5±10.5 years ranging from 1 to 35 years. Approximately half (49.7%) of BHS received training on the latest anti-malarial treatment guideline for 2 times, 22.9% for 1 time, 27.4% for 3 or 4 times.

Accessibility to BHS

Most of families (64.5%) reside within 1.5 kilometers (km) away from RHC or SC with a range of 0.2 km to 7.5 km. Among people who reported malaria-like fever within one year (n=153), BHS treated 3.3% of patients. Of them, 41% received domiciliary care by BHS. The rest came to RHC or SC by motorcycle (22%), by cart (16%), on bicycle (14%) and on foot (7%). The average traveling cost was 476±293 kyats which ranged from 200 to 1000 kyats. Approximately half (52.9%) of patients could afford traveling cost. Although diagnosis by RDT and treatment with ACT were given free of charge, they had to pay for other ancillary treatments like vitamins, anti-pyretics and injection glucose etc. The average treatment cost for each visit was 1098±387 kyats with a range of 500 to 1500 kyats. Concerning with treatment cost, 61% stated 'it is expensive' but remaining 39% stated 'it is reasonable'. The mean duration of treatment was 2.9±1.1 days. The majority of respondents (82.7%) knew the name of BHS assigned in their locality. However, only 18.3% of respondents knew that proper antimalarial treatment could get from BHS with free-of-charge or at a reasonable price.

Accessibility to other non-BHS healthcare providers

The non-BHS healthcare providers from whom malaria patients sought treatment were general practitioners (GP) (46.4%), clinics opened by non-governmental organizations (NGOs) (6.5%) and township hospitals (3.3%). Mean distance between home and non-BHS healthcare provider was 2.7±1.9 km ranged from 1.0 km to 8.0 km. Only 3.9% received domiciliary care. The transportation included cart (53.9%), motorized vehicles (23.5%), bicycle (9.8%) and foot (8.8%). The average traveling cost was 1622±677 kyats which ranged from 1000 to 4000 kyats. The majority of non-BHS users (83.3%) can afford traveling cost. The treatment cost was 5873±1397 kyats with a range of 1500 to 10,000 kyats. Most of the non-BHS users (77.5%) can afford the treatment cost. The mean duration of treatment was 3.8±0.7 days.

Healthcare seeking behavior regarding malaria among rural people

Among 153 reported malaria cases, the sources of initial treatment were self-treatment (34%), malaria drugs from drug shops (32%), visit to BHS (16.3%), traditional practitioners (10.5%), GPs (4.6%) and NGO clinics (2.6%). The initial treatment cured 20.9% of the cases. The uncured cases (n=121) sought for second providers. The second providers included GPs (37.2%), BHS (20.7%) and others (42.1%). Approximately half (47.1%) were cured with second treatment. The third treatment included GPs (65.3%) and BHS (10.2%). In total, 16.3% were admitted to hospital.

Attitude of rural people on BHS with regards to malaria treatment

Only 18% of rural people accepted that BHS could treat malaria properly and 68.6% did not regard BHS as health care provider for malaria. The majority (82.7%) knew the name of BHS and 81.4% stated that BHS had good social dealing.

Qualitative findings revealed that rural people appreciated good social dealing and domiciliary care.

"Midwife is very kind-hearted. She is ever-smiling. She visited our house whenever we call her (whenever someone in our family get ill)".

A villager in Thabeikkyin

The obstacles and constraints of BHS in disease management of malaria

IDI with BHS revealed the shortage of RDT especially in malaria season. The median allotment of RDT for each MW was five ranging from two to fifteen and that of ACT was two strips ranging from one to fifteen despite the average number of clinically

Table 1. Factors influencing utilization of BHS by rural community

Factor	Total no.	Utilization of BHS No (%)	Utilization of BHS Yes (%)	Crude odds ratio (95%CI)	Adjusted odds ratio (95%CI)
Age (years)					
Old (>40)	58	37 (63.8)	21 (36.2)	1	-
Young (≤ 40)	95	65 (68.4)	30 (31.6)	0.8 (0.4-1.6) p=0.556	-
Gender					
Male	70	46 (65.7)	(34.3)	1	-
Female	83	56 (67.5)	27 (32.5)	0.9 (0.5-1.8) p=0.818	-
Education					
≥university	67	45 (67.2)	22 (32.8)	1	-
≤high school	86	57 (66.3)	29 (33.7)	1.0 (0.5-2.1) p=0.908	-
Marital status					
Single	38	29 (76.3)	9 (23.7)	1	-
Married	115	73 (63.5)	42 (36.5)	1.9 (0.8- 4.3) p=0.146	-
Household size					
≤5	86	54 (62.8)	32 (37.2)	1	-
>5	67	48 (71.6)	19 (28.4)	0.7 (0.4-1.3) p=0.249	-
Family income (Kyats)					
>50000	30	20 (66.7)	10 (33.3)	1	-
≤50000	123	82 (66.7)	41 (33.3)	1.0 (0.4- 2.3) p=1.000	-
Type of malaria					
Imported	97	73 (75.3)	24 (24.7)	1	-
Local	56	29 (51.8)	27 (48.2)	2.8 (1.4-5.7) p=0.003	3.6 (1.1-11.7)
Treatment available at BHS					
Not know	92	77 (83.7)	15 (16.3)	1	-
Know	61	25 (41)	36 (59)	7.4 (3.5-5.7) p=0.000	9.7 (3.1-30)
Place of service					
At facility	132	98 (74.2)	34 (25.8)	1	-
Domiciliary	21	4 (19)	17 (81)	12.3(3.9-8.9) p=0.000	28.1 (3.8 - 29.7)
Treatment duration (Days)					
>3	78	67 (85.9)	11 (14.1)	1	-
≤3	75	35 (46.7)	40 (53.3)	7 (3.2 -15.2) p=0.000	14.9 (4.2- 52.5)
Traveling cost					
Can afford	112	85 (75.9)	27 (24.1)	1	-
Can't afford	41	17 (41.5)	24 (58.5)	4.4 (2.1-9.5) p=0.000	14.1 (3.8- 52.6)
Treatment cost					
Can afford	110	79 (71.8)	31 (28.2)	1	-
Can't afford	43	23 (53.5)	20 (46.5)	2.2 (1.1-4.6) p=0.031	3.9 (1.3-12.6)

suspected malaria cases per month was around 15. The RDT being distributed by malaria program was only for *Plasmodium falciparum*. BHS preferred multi-species RDT for better diagnosis and they would like to do microscopic diagnosis if program supplies stains, slides and some refresher course on malaria microscopy.

Factors influencing utilization of BHS

Table 1 shows factors influencing utilization of BHS by the community. There was no significant difference in background characteristics such as age, sex, education, marital status, household size and family income for choosing type of health service provider. Good knowledge on symptoms and complications of malaria had no significant effect on choice of provider. The patients were more likely to seek care from BHS if they knew malaria season (OR=2.7, 95% CI 1.1 to 6.4). The odds of being a BHS user was higher for closer distance between the patient's residence and the public health facility (OR=2.1, 95% CI 1.1 to 4.3), good social-dealing of the assigned BHS (OR=3.6, 95% CI 1.2 to 11.1) locally contracted malaria, aware-ness on availability of anti-malaria treatment with BHS, acceptance of BHS as malaria treatment provider (OR=7.2, 95% CI 3.3 to 15.7) and domiciliary treatment service, affordable traveling cost and reasonable treatment cost.

In the binary logistic model, the use of BHS service was associated with awareness on availability of anti-malaria treatment with BHS, domiciliary treatment service, shorter duration of treatment, locally contracted malaria, affordable traveling cost and reasonable treatment cost.

DISCUSSION

The prevalence of confirmed malaria in our study was 13.2 per 1000 population which is slightly higher than nationwide malaria morbidity rate in Myanmar i.e. 10 per 1000 population [1] reflecting the endemicity of our study area.

One-third of malaria patients utilized BHS which was higher than previous studies such as 12.8% at Mudon Township in 1993 and 10.4% in Bago Division, Mandalay Division, and Mon State in 1999 [2, 3]. However, the utilization rate was still low. Globally, the use of official sector by malaria patients ranged from 10 to 99% worldwide [4].

In this study, there was no significant difference in background characteristics such as age, sex, education, marital status, household size and family income for provider choice. A study on malaria treatment in Brazil reported that gender and age were unimportant in choosing between public and private healthcare [5]. Regarding factors influencing utilization of BHS, locally contracted malaria cases, shorter duration of treatment, affordable traveling cost and reasonable treatment cost are major factors. Utilization of BHS due to cheaper traveling as well as treatment cost was indicated in a study of Africa [6]. Therefore, BHS utilization should be improved by giving more attention on imported malaria cases (malaria patients acquired from outside), effort on early diagnosis, searching for new anti-malarial drugs with shorter treatment courses and effort on distribution by free-of-charge or franchise.

In our results, vicinity to health facility was associated with increased utilization. The long distance to health facility is likely to be a barrier to utilization of BHS because of traveling cost and wasting time. In the meantime, domiciliary care practiced by BHS was found to be important factor for improving utilization of BHS. It was supported by a study in Brazil [5]. Therefore, BHS utilization should be promoted through practicing domiciliary care.

The odd of being a BHS user was higher if respondents knew that proper anti-malarial treatment could get from BHS with free-of-charge or at a reasonable price. However, only 18.3% of respondents knew the availability of proper anti-malarial treatment with BHS. Moreover, most of the respondents initially started self-treatment with home-made remedies or purchased drugs from drug shops. Therefore, parallel to maintenance and strengthening BHS services including domiciliary care, information on availability of anti-malaria treatment at BHS should also be disseminated to community.

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