KAP SURVEYS AND MALARIA CONTROL IN VIETNAM: FINDINGS AND CAUTIONS ABOUT COMMUNITY RESEARCH

Nguyen Quy Anh[1], Le Xuan Hung[1], Hoang Ngoc Thuy[1], Tran Quoc Tuy[1], Sonia R Caruana[2], Beverley-Ann Biggs[2] and Martha Morrow[3]

[1]National Institute of Malariology, Parasitology and Entomology Tu Liem, Hanoi, Vietnam; [2]Department of Medicine, The University of Melbourne, Royal Melbourne Hospital, Victoria, Australia; [3]Australian International Health Institute, The University of Melbourne Victoria, Australia

Abstract. The malaria disease burden is increasing in many countries despite the existence of effective preventative strategies and antimalarial drugs. An understanding of community perspectives and practices is one of the essential components of a successful malaria control program. This paper reports on a KAP (Knowledge, Attitudes and Practices) survey among the Raglai ethnic minority population in Ninh Thuan Province, Vietnam, which in 2003 had one of the country's highest confirmed rates of malaria. We found high levels of correct knowledge about malaria's transmission and symptoms, and self-reports of adequate bed net usage and appropriate health-seeking behavior. While the survey generated useful findings, an initial, qualitative investigation (*eg*, observation and focus group discussions) to explore the large numbers of potential influences on behavior and exposure risk would have provided a more robust underpinning for the design of survey questions. This would have strengthened its validity and generated additional information. The adoption of rigorous, multi-disciplinary research methods offers the best chance of contributing to the development of successful malaria control programs and effective policies.

INTRODUCTION

Global health initiatives and the increasing availability of resources from donors should lead to a reduction in the high morbidity and mortality of malaria (Yamey, 2004). However, malaria exists in the context of complicated human systems, behaviors and environments, and a lack of consideration of any one component can influence what is achieved (Heggenhougen *et al*, 2003). In the past, malaria control (MC) programs have mainly focused on microbiology at the expense of the human element, or have relied on simplistic campaigns based on assumptions that community ignorance is the primary explanation for risk behaviors. Gender norms, poverty, harmful customs, isolation, joblessness, mobility, occupation, environmental degradation, and marginalization can lead to sub-optimal community practices, while uneven policy implementation and poorly-trained or unmotivated health staff, as well as increasing use of the private sector for health services can compromise treatment programs (Foster, 1995; White *et al*, 1999; Breman, 2001). MC programs must consider the broad, complex and interrelated factors that influence human behavior, especially now that malaria control is theoretically within reach of even the poorest countries through the availability of insecticide treated bednets and highly effective antimalarial drug combinations (White *et al*, 1999), with the assistance of The Global Fund to Fight Aids, Tuberculosis and Malaria (http://www.theglobalfund.org).

Having effective tools for malaria control means nothing unless they are embraced and fully understood by both community and health providers. Bednets may not be used, for example, if they interfere with traditional sleeping customs, or cannot easily be hung in outdoor settings where farmers stay on a seasonal basis. Regular insecticide treatment of nets requires multi-sectoral collaboration and reliable distribution systems that stretch the capacity of some communities. Population mobility, control of household expenditures, as well as poverty itself, have clear implications for bednet and dip-

Correspondence: Dr Martha Morrow, Australian International Health Institute, The University of Melbourne Victoria 3010, Australia.
Tel: +613-8344-9115; Fax: +613-8344-9130
E-mail: martham@unimelb.edu.au

ping programs (Heggenhougen *et al*, 2003). As noted in a recent review of social science contributions in malaria control behavioral research (Williams and Jones, 2004), there is still little understanding of community or provider rationales for drug use. Many studies are developed without a trained social scientist and many lack methodological rigor, but there is a growing literature that illuminates the influence of structural and sociocultural factors. Flexible research approaches are needed to investigate a range of possible explanations for risk factors. Policy and practice need to be informed by robust, multidisciplinary investigations that bring together complex, often inter-connected, dynamics (Heggenhougen *et al*, 2003; Williams and Jones, 2004).

In 1991 a peak in malaria incidence, with around 5,000 deaths, accompanied by widespread multi-drug resistance (Schuftan, 2000; Ettling, 2002), led Vietnam's National Malaria Control Program to launch a new approach. This comprised national distribution of free antimalarials – especially artemisinin – and bed-nets, twice-yearly home insecticide spraying, local microscopic diagnosis, treatment and community education (Hung *et al*, 2002). The program's implementation coincided with the transition to a more decentralized health system and a modified market economy, with important implications for malaria control. Decentralization offers new opportunities for communities to contribute actively to the solution of health and development concerns, but it puts pressure on provinces with low levels of human and financial resources. New user fees led many Vietnamese to self-treat or consult local drug vendors, creating a cycle of declining revenues in poor provinces, resulting in staff absences and over-reliance on drug sales for profit (World Bank, 2002). Declines of 60% in malaria cases and in deaths/case by 90% from 1990-1997 (World Bank, 2002) are attributed partly to the massive private sector production and widespread availability of artemisinin and its derivatives. Although apparently effective in reducing the malaria burden of disease, the artemisinin drugs were often of uncertain quality and used in insufficient doses to completely eradicate malaria parasites (Cong *et al*, 1998; WHO, 2000; Bloland, 2001). This situation, together with weaknesses in compliance by public providers with the National Malaria Treatment Guidelines, has undermined rational antimalarial therapy and poses risks for malaria persistence and drug resistance (Bloland, 2001; World Bank, 2002).

About 35 million people live in malaria endemic areas in Vietnam, where vectors flourish amid the greatest poverty, worst services and lowest health status, *ie*, among remote populations, ethnic minorities, unregistered migrants fearful of official sanctions, and the along borders with Cambodia and Lao PDR. Little is known about community beliefs and behaviors, particularly in ethnically-diverse settings. A descriptive cross-sectional study in Son La and Nghe An Provinces, along the border with Lao PDR (Khai *et al,* 2000), found that over half of village-level personnel involved in malaria control had mistaken concepts about environmental conditions for malarial mosquitos, nearly one-quarter did not know mosquitos transmit malaria, and only 72% knew that patients are sources of disease transmission. Most also made mistakes in diagnosis and treatment. Among the community members interviewed, 59% did not know the causes of malaria. Only 69% of adults regularly slept under mosquito nets, 68% had purchased medicine to cure malaria (25% used forest herbs) and just 40% referred patients to health facilities for cure.

An understanding of the specific circumstances of each endemic zone with appropriate documentation could be used to modify the standard national MC program in order to reduce malaria incidence, and to prevent the emergence and spread of multi-drug resistant malaria (Ridley, 1997; Bloland, 2001; Yang *et al,* 2003; Heggenhougen *et al*, 2003). Epidemic multi-drug resistant malaria threatens isolated communities and the wider population in a country facing many health and development challenges.

In 2002-2003, the central province of Ninh Thuan had one of the country's highest rates of confirmed cases of malaria. The population of 549,000 includes several ethnic minorities, one of whom (Raglai) inhabits zones at particular risk for malaria. The National Institute of Malariology, Parasitology and Entomology (NIMPE), Hanoi, in collaboration with the University of Melbourne, Australia, and the Walter and Eliza Hall Institute of Medical Research (Melbourne), undertook a 3-pronged investigation. This consisted of 1) the

evaluation of drug resistance (*in vivo* and *in vitro*), 2) evaluation of the use of new malaria guidelines (through pre- and post-test training of health workers and private drug sellers), and 3) community knowledge and health-seeking behaviors [through a 'Knowledge, Attitudes and Practices' (KAP) survey]. This paper reports on the community KAP survey.

MATERIALS AND METHODS

This cross-sectional study, undertaken from June - December 2003, aimed to contribute to the development of culturally-appropriate information materials for the Raglai ethnic minority population by assessing KAP related to malaria and its treatment. It utilized a face-to-face structured questionnaire with 29 questions. The sample was drawn from two of Ninh Thuan Province's four districts, selected because their population is predominantly Raglai. The same rationale explained the choice of 3 communes per district (typically comprising about 6 communes) and 2 villages per commune (typically comprising 6-10 villages). In each of the 12 selected villages, comprising 40-80 households per village, 30 households were chosen randomly from lists by starting at a point marked with eyes closed, and identifying successive names according to an interval (*eg*, every 2nd or 3rd) derived from the ratio between 30 and the total number of households.

For each household, 3 individuals were invited from among those present during late afternoon and evening, and included: head of household, one other adult, and a teenager (aged 10-19 years). Everyone invited agreed to participate, as is normal in Vietnam. While an open method of questioning was used for most questions, the six field researchers also urged respondents to answer in full by asking, "is there anything else?" For questions about preferred education methods, researchers showed real materials and/or described a series of alternatives. All respondents were able to speak the Vietnamese language sufficiently to answer questions. Data were entered into a computer and descriptive statistics were used for tabular presentation of the findings. The study design was approved by NIMPE's Human Research Ethics Committee for Medical-Biological Research, and the Human Research Ethics Committee of the Walter and Eliza Hall Institute of Medical Research. The study was funded by The Atlantic Philanthropies, an independent not-for-profit organization.

RESULTS

A total of 1,080 individuals from 360 households completed the survey, with a mean age of 33 (range 10-68 years), and sex ratio of 44% male to 56% female.

Knowledge about transmission, symptoms, prevention and treatment

As can be seen in Table 1, nearly 73% correctly identified that malaria is transmitted by mosquito bites, though wrong answers were also recorded. Most people correctly identified fever as a symptom of malaria infection, though there was some ambiguity about other symptoms. It should be noted that the word for "malaria" in Vietnamese includes the word for "fever".

Responses about malaria prevention and treatment are found in Table 2. Most participants correctly identified at least one effective preventive measure, though a substantial number mentioned less or ineffective ways. Over 84% claimed

Table 1
Knowledge about transmission and symptoms of malaria (more than one answer permitted).

Cause/s	No. (%)	Symptoms	No. (%)
Mosquitoes	784 (72.6)	Fever	891 (82.5)
Flies	8 (0.7)	Chills	696 (64)
Dirty water	54 (5)	Sweating	255 (23.6)
Ghosts	1 (0.09)	Head/body ache	681 (63.1)
Weather	55 (5.1)	Vomiting	78 (7.2)
Other	17 (1.6)	Other	27 (2.5)

to sleep under a bed-net regularly, but in fact just 66% resided in households with the minimum recommended number of nets (1 net per 2 people). When asked what they would do *first* when they get malaria, most stated they would go to the public commune health center. Others said they would self-treat by purchasing drugs from private vendors.

Perceptions and preferences for malaria education

Respondents cited a number of sources of malaria education, including health staff (71%), television and radio (over 33% each), mass organizations, such as the Vietnam Women's Union (26%), and teachers (9.5%). Although most speak Vietnamese, many are not literate, and 73% said they preferred malaria education to utilize the Raglai language. In answer to which education method made it easiest to understand malaria control, respondents identified posters (28%), videos (21%), radio (18%), public meetings with health staff (17%), and home visits (12%). Table 3 summaries preferences among the 5 types of educational materials shown to them, and opinions about which type of community campaign is most effective for malaria education (from a list of possible approaches).

DISCUSSION

Ninh Thuan Province, where the study was conducted, continues to experience relatively high rates of malaria, with confirmed cases among the highest in Vietnam over the past two years. These high rates led the research team to expect the KAP survey to reveal poor community knowledge and sub-optimal practices. This was not borne out by the findings. By comparison to results from an earlier study in Son La and Nghe An Provinces (Khai *et al,* 2000), respondents overwhelmingly answered know-

Table 2
Knowledge about prevention and self-reported treatment practices.

Malaria prevention	No. (%)	First action for illness (malaria)	No. (%)
Use bed-net	814 (75.4)	Go to commune health center	866 (80.2)
Use insecticide-treated net	515 (47.7)	Self-treat (buy drugs)	201 (18.6)
Take drugs as prophylaxis	231 (21.4)		
Use repellent	39 (3.6)		
Use cream	8 (0.7)		
Make a smoky fire	86 (8)		
Other	53 (4.9)		

Table 3
Views on educational materials and effective education campaigns.

Preferred educational material	No. (%)	Most effective community campaign	No. (%)
Leaflet	139 (13)	IEC campaign[a]	18 (1.7)
Poster	347 (32)	Billboard	25 (2.3)
Flipchart	81 (8)	Distribution of leaflets	173 (16)
Video tape	265 (25)	Posters	79 (7.3)
Radio	225 (21)	Meetings	215 (20)
Other	12 (1)	Home visits	103 (9.5)
No response	11 (1)	Loudspeakers	183 (17)
		Public film	274 (25)
		No response	10 (0.9)

[a]Information, Education and Communication (not described to respondents)

ledge questions correctly, and reported very high levels of adherence to recommended practices, including sleeping under bed-nets and seeking treatment from the health center for suspected malarial disease. Although nearly one-fifth reported purchasing drugs from vendors for self-treatment of malaria, it is questionable whether this (admittedly risky) practice could explain malaria persistence. It is useful to know about this specific practice, as well as the fact that this community has been exposed sufficiently to previous campaigns to have acquired basic knowledge, though it might prefer future campaigns to be conducted somewhat differently in terms of materials, approaches, and language content.

In our view, the findings are of limited value because of the lack of detail about and corroboration of self-reported adherence to preventive actions and health-seeking behaviors. Anecdotal evidence suggests there are deficiencies in these important practices, but the study design did not permit us to explore these.

The KAP survey is typically used for documenting community characteristics that explain health risks, particularly in order to illuminate a lack of knowledge leading to risky or sub-optimal practices that theoretically can be addressed by "Information, Education and Communication" (IEC) campaigns. They are of limited validity if not grounded upon an initial, qualitative phase, and corroborated through other methods. If the wrong questions were asked, results may be misinterpreted, leading to inappropriate programmatic responses. This survey did not comprehensively cover potential influences on malaria risk and we are left with important questions.

First, are people reporting what they *actually do* when they (think they) have malaria, or what they know they *should do*? Indeed, given that individuals cannot know they have malaria before diagnosis by a health worker, the question itself may be problematic. Second, even if they do seek care at a health center, we are not told whether they *completed* the treatment. Ambulatory patients are required to visit the health center in person to be observed taking medication by mouth, which obviously imposes time and transport burdens, unless the center is near-by. Anecdotal evidence suggests a substantial proportion fail to complete the full course, let alone return for follow-up monitoring. Review of treatment cards, and interviews with village and commune health staff, would have provided a means of triangulating this information. Third, although the national program provides free drugs, does the community realize this, and do they receive the drugs free? Fourth, do people regularly use intact insecticide impregnated bednets, including when sleeping in the open (a regular practice in this region where families may work away from home for prolonged periods, often residing in forested malarious areas)?

A more flexible research model would be particularly appropriate in this situation where data are lacking; a less structured tool also stands a better chance of illuminating the social context (Yach, 1992; Milburn, 1996). It is often wrongly assumed that KAP surveys are qualitative; they are not. The development of these structured tools is too often based upon untested assumptions, rather than evidence about the possible range of community beliefs and practices. Agyepong and Manderson (1999) argue that truly qualitative methods, such as observation, individual semi-structured interviews, or focus group discussions, are vital foundations for exploratory investigations at the community level, and should precede and underpin population-level approaches, such as KAP surveys. Qualitative tools clarify local terminology, assumptions, practices and health beliefs. They reveal the individual experiences of illness and health-seeking practices, as well as the perceived obstacles to recommended practices (such as completion of treatment), which broaden the understanding of outside researchers. Analysis of this qualitative information enables decisions to be made about the question content, range and phraseology for the structured survey. The KAP survey reported here would have been strengthened if this approach had been taken, thus permitting additional, carefully constructed questions about individual practices and perceptions.

The great advantage of a KAP survey with a representative sample is its capacity to document the proportion who believe or act in particular ways *on a population basis*. However, KAP results will be useless for health programming unless the right questions have been asked. Given the complexities of malaria control, and

the large number of potential influences on behavior and exposure, multi-disciplinary methods, including situation analyses (Agyepong *et al,* 1995; WHO 2003), that collect biomedical data as well as information about health providers and the community, are more likely to produce findings that can inform policy and program development in Vietnam and elsewhere (Williams, Jones, 2004). Implementation of strategies for early malaria diagnosis and utilization of effective malaria treatment regimes will require a greater understanding of, and engagement with, the communities at risk.

ACKNOWLEDGEMENTS

The authors are grateful to the Atlantic Philanthropies for supporting this research, to the local officials who facilitated the project, and to community members for taking time to respond to the survey.

REFERENCES

Agyepong IA, Aryee B, Dzikunu H, Manderson L. The malaria manual: guidelines for the rapid assessment of social, economic and cultural aspects of malaria. UNDP; World Bank / Special Programme for Research and Training in Tropical Diseases (TDR). Geneva: World Health Organization, 1995.

Agyepong IA, Manderson L. Mosquito avoidance and bed net use in the Greater Accra region, Ghana. *J Biosoc Sci* 1999; 31: 79-92.

Bloland PB. Drug resistance in malaria. *WHO/CDS/CSR/DRS/2001.4*, 2001.

Breman JG. The ears of the hippopotamus: manifestations, determinants, and estimates of the malaria burden. *Am J Trop Med Hyg* 2001; 64 (suppl): 1-11.

Cong LD, Yen PT, Nhu TV, Binh LN. Use and quality of antimalarial drugs in the private sector in Viet Nam. *Bull WHO* 1998; 76 (suppl 1): 51-8.

Ettling MB. The control of malaria in Vietnam from 1980 to 2000: What went right? Manila: World Health Organization Regional Office for the Western Pacific Region, 2002. Available at: URL: http://rbm.who.int/cmc_upload/0/000/017/025/vietnam-ettling.pdf

Foster S. Treatment of malaria outside the formal health services. *J Trop Med Hyg* 1995; 98: 29-34.

Heggenhougen HK, Hackethal V, Vivek P. The behavioural and social aspects of malaria and its control. UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR). *TDR/STR/SEB/VOL/03.1.* 2003.

Hung LQ, de Vries PJ, Giao PT, *et al*. Control of malaria: a successful experience from Viet Nam. *Bull WHO* 2002; 80: 660-6.

Khai PN, Van NT, Lua TT, *et al.* The situation of malaria along the Vietnam-Lao PDR border and some related factors. *Southeast Asian J Trop Med Public Health* 2000; 31 (suppl 1): 99-105.

Milburn K. The importance of lay theorising for health promotion research and practice. *Health Promot Int* 1996; 11: 41-6.

Ridley RG. Plasmodium: Drug discovery and development-an industrial perspective. *Exp Parasitol* 1997; 87: 293-304.

Schuftan C. A story to be shared: The successful fight against malaria in Vietnam. WHO WPRO, 11/6/2000. Geneva: World Health Organization, 2000.

White NJ, Nosten F, Looareesuwan S, *et al*. Averting a malaria disaster. *Lancet* 1999; 353: 1965-7.

WHO. Implementation of Roll Back Malaria in the Six Mekong countries. A report of the Planning meeting. Ho Chi Minh City, Vietnam, 2-4 March, 1999. WHO/CDS/RBM/2000.15, 2000.

WHO. WHO/HTM/RBM. Protocols and methods for malaria situation analysis. 2003. Trial ed. Available at: URL: http://whqlibdoc.who.int/hq/2003/WHO_HTM_RBM_2003.47.pdf

Williams HA, Jones COH. A critical review of behavioural issues related to malaria control in sub-Saharan Africa: what contributions have social scientists made? *Soc Sci Med* 2004; 59, 501-23.

World Bank. Vietnam delivering on its promise: Development Report 2003 Report No. 25050-VN. Poverty reduction and economic management. Hanoi: Unit East Asia and Pacific Region, World Bank, 2002.

Yach D. The use and value of qualitative methods in health research in developing countries. *Soc Sci Med* 1992; 35: 603-12.

Yamey G. Roll Back Malaria: a failling global health campaign [Editorial]. 2004; 328: 1086-7.

Yang H, Liu D, Yang Y, *et al*. Changes in susceptibility of *Plasmodium falciparum* to artesunate in vitro in Yunnan Province, China. *Trans R Soc Trop Med Hyg* 2003; 97: 226-8.