Original article

Assessment of Health Systems in Relation to Interface Between Malaria Control Programs and Health System Strengthening: Comparative Study Between Nepal and Viet Nam

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Abstract

Introduction: Malaria control has been a major health issue with high priority in endemic countries and various efforts have been made with the support of foreign assistant partners. In order to implement efficient and sustainable control, integration of the control program into general health system or effective interactions between them is one of the important strategies.

Methods: Studies were conducted in Nepal and Viet Nam. Information obtained from document reviews, interviews, and field surveys were analyzed from the viewpoint of interface between malaria control program and the health system in accordance with six building blocks of a health system, with special emphasis on good practices and challenges in the implementation of the malaria control program.

Results: Among good practices, strong government commitment towards the control programs to strengthen facilities and capacity of health workers at the primary level, utilization of health volunteers, setting up mobile team and intensified education for residents were noteworthy. Key challenges mainly involved remote areas. Introduction of malaria due to population movement and the emergence of new endemic areas have become growing issues. While strengthening of the vertical health program appeared to have some impact on the general health system, particularly at the primary level, dissociation between the vertical control program and horizontal general health system still remains.

Conclusion: It is crucial to implement an effective and equitable malaria control program that responds to these existing challenges and can create a sustainable health system. Addressing these issues will lead to further strengthening of the health system there and eventually lead to the effective implementation of various health programs.

Key words: Malaria control, Health system, Nepal, Viet Nam

Introduction

Over the past decades malaria control has been implemented intensively with the support of Global Fund against AIDS, Tuberculosis and Malaria (GFATM)and other assistant partners as one of the most important disease control programs, and good results have been obtained in some endemic countries.[1-3] Malaria control programs have been implemented under global malaria control strategies although key strategies have varied over times: spraying

of pesticide, community-based control, school health-based control, Roll Back Malaria etc. In recent years, the importance of disease control measures in relation to health system strengthening (HSS), particularly the integration of a control program (vertical health system) into the general health system (horizontal health system) with the aim of achieving a synergic effect among health programs, has been stressed as an important strategy.[4-6]

In the process of disease control, good practices have been recognized, but interaction between disease specific control programs and HSS has been debated, namely whether disease specific programs have actually contributed to the strengthening of the general health system and whether disease control programs are well integrated into the general health system.[7, 8]

In the program implementation process, smooth implementation of the disease specific control program has often been hindered by challenges or bottle necks that exist in the health system. Through the effective intervention to these challenges/bottlenecks,expansion of the health programs and strengthening of the general health system are expected, bringing a synergistic effect on other disease specific programs and furthermore general health system.

This study was undertaken in order to assess the interface between disease specific programs supported by GFATM and HSS, with special reference to interaction between malaria control programs and general health systems.

Methods

The primary surveys were conducted for Viet Nam (2009) and Nepal (2012), by setting the National Malaria Control Programs supported by GFATM as entry points with special emphasis on good practices and challenges/bottlenecks in implementing malaria control program in relation to the components of health system. Data from the two countries was updated as long as possible, based on information obtained by the supplemental survey during 2012-14 and by documents. In each country, the survey was conducted at various levels (from central to primary level) by document reviews, key informant interviews, and observation of facilities. The results of the primary surveys were analyzed, summarized in reports and submitted to WHO Western Pacific Regional Office.[9]

Document reviews

Documents related to health systems, National Malaria Control Programs (NMCP), health statistics, GFATM supports, etc. were collected and reviewed.[10-15]

Key informant interviews

Key informant interviews were conducted with the health staff at each level (central, regional, district, and community level) of the health facility, health managers at the district and provincial levels, and program managers of Ministry of Health (MOH in Viet Nam) or Ministry of Health and Population (MOHP in Nepal),WHO, NGOs, and other partner agencies. Leading contents of the interview included an outline of the health system, general information on malaria control programs in relation to the health system. Good practices and strengths to overcome challenges/bottlenecks, and on-going interventions for existing bottlenecks, integration between NMCP and general health system, etc., were also considered

Field surveys

In addition to surveying the capital cities of each country, malaria endemic areas, where Malaria Control Programs have been implemented with the support of GFATM, were selected (Thanh Hoa and Dien Bien Provinces in Viet Nam, and Dhanusha District and Hetauda City in Nepal). General information on health and medical care, information on health system and health program implementation, etc. were collected at Provincial Health Offices and District Health Offices, followed by surveys at health facilities at the primary level (or community level).

Analysis

Information obtained from the interviews, field surveys, and documents were summarized from the viewpoint of interface between malaria control programs and the general health system in accordance with the six building blocks (components) of a health system (Leadership and governance, Service delivery, Workforce, Information system, Medical products and technology, and Financing) proposed by WHO.[16]Good practices and bottlenecks/challenges in the implementation of the control programs were identified, and possible solutions for the challenges/bottlenecks were discussed.

Results

1. Overview of malaria conditions in Nepal and Viet Nam

In the two countries in this survey, Viet Nam and Nepal, malaria morbidity and mortality rates were considerably high in the past and malaria was given the highest priority in the health policy by the governments. Since the mid-1990s, malaria controls were actively implemented in these countries based on the National Malaria Control Programs (NMCPs) and the principles of Roll Back Malaria, which

consisted of strategic priorities including vector control and personal protection through the distribution of bednets (insecticide-treated bed nets; ITNs and long lasting insecticidal nets; LLINs), early diagnosis and prompt treatment (EDPT)including rapid diagnosis tests (RDTs) and artemis in combination therapies (ACTs), malaria surveillance and epidemic preparedness, behavioral change communication (BCC), and improvement in program management along with setting up targets for control. In particular, since the early 2000s, GFATM has contributed a large budget to malaria control programs (60-65% in Viet Namand70-78% in Nepal of the total malaria control budget). As a result, malaria in these countries has decreased remarkably in recent years, reaching pre-elimination levels.

2. Outline of general health systems in Nepal and Viet Nam

Health networks in the two target countries have been created at the central to commune level in accordance with the administrative strata (e.g. in Nepal; central－regional－district－commune levels,in Viet Nam; central－provincial－district－commune levels). Treatment care systems as well as preventive care systems have also been basically constructed in accordance with the administrative strata. (i.e. central, provincial (or regional) and district hospitals and commune health stations, etc.).A referral system, as well as health information and supply systems, function based on this network. In addition, some health control programs have their own systems (e.g. national institutes, provincial or regional control centers, district control centers).

Commune Health Stations (CHSs) provide health care at the primary level and under the CHSs, there are health posts (HPs) and sub-health posts (SHPs). These CHSs along with HPs and SHPs have the tasks of providing primary health care services, first-aid and treatment, implementation of national health programs, assisting in normal deliveries, family planning practices, health promotion, etc. There are commune (village) health workers in each commune, under the direct management and direction of the CHSs and commune leaders.

3. Characteristics of malaria control in relation to the health system

A: Characteristics of general health system (horizontal health system)

B: Characteristics of malaria control (vertical health system)

3-1 Nepal

Leadership and governance

A: The current long-term health plan (1997-2017) aims to provide health services throughout the country, particularly extending the primary health care system to the rural population and improving the health status of vulnerable populations, such as women and children, the rural population, the poor, the underprivileged and the marginalized. In recent years, the government has attached high importance to the promotion of education among residents and many primary schools have been constructed.

B: Since the launch of the Insect Borne Disease Control Program in 1954, the government has given malaria control high priority, and since 1993, the Epidemiology and Disease Control Division (EDCD) under MOHP has taken the lead in the malaria control program. Currently, the control program is basically implemented using the existing health system.

Service delivery

A: Efforts have been made to design a health system hierarchy from MOPH to the primary level, in order to ensure that the majority of the population has access to public health care facilities and can receive minor treatment at affordable prices. The government has strengthened the HPs and SHPs, which serve as first contact to basic health services and the venue for community-based activities with the support of GFATM. The pull system for essential drug supply was expanded to all 75 districts in 2010.

B: Delivery of LLINs is managed by the Population Service International (PSI).At local level, distribution is managed by NGOs/other partners and implementation is carried out by a broad range of community based organizations. Monitoring teams for ITNs and LLINs were organized at the district level. Mobile teams were organized, and are responsible for prevention, diagnosis and treatment, in endemic areas. RDTs and microscopy have become available as diagnostic tools for malaria by HPs due to the support of GFATM, anda cold chain for vaccination was used for storage of RDTs.

Workforce

A: Since the establishment of the first school of medicine in 1980, the number has markedly increased (22 schools of medicine in 2014). The increased number of medical doctors, nurses, and other co-medical staff has contributed to increased health and medical care of the Nepalese people.

B: Female Community Health Volunteers (FCHVs) were organized at the commune level for integration activities including malaria control. Training on malaria control for the health staff has been integrated with other disease control and training has been conducted with the support of GFATM at the peripheral level.

Information system

A: The routine monitoring system has been improved over the years. The Health Management Information System (HMIS), Logistics Management Information System (LMIS) and Fiscal Management Information System (FMIS) have also been well developed over the last 10 years. Health related activities are recorded and reported from the lowest health unit right on up to the district hospitals. In addition to HMIS, other individual programs are also providers of information.

B: Sentinel sites were set up for malaria outbreak surveillance. Reporting and monitoring systems in the public sector, from the peripheral level up to MOHP level, have been strengthened.

Medical products and technologies

A: In 2007, the National Drug Strategy was revised and the National Essential Drug List was established. In order to manage the above processes effectively,HMIS is used.

B: A considerable amount of ITNs, LLINs, RDTs, ACTs, and slide glasses for microscopic testing were provided at the peripheral level with the support of GFATM.

Financing

A: The amount of the budget for health programs funded by the government, and the percentage of the health budget within the total budget, were increased (from 5.1% in 1998 to 6.3% in 2013).

B: Since 2004, GFATM has greatly contributed to the prevention and treatment of malaria, particularly through the distribution of LLINs, ACTs and RDTs in high risk areas, along with the training of health workers and BCC activities for the residents. Treatment drugs are administered to patients free of charge at public medical facilities nationwide and diagnostic services for malaria are provided free of charge at all public sector health facilities in high endemic areas.

3-2Viet Nam

Leadership and governance

A: Since the 1990s the government has worked hard to strengthen the general health system. The international community has also cooperated with policy implementation at various levels. For National Health Programs, National Steering Committees are organized and programs are managed more intensively and efficiently with strong leadership and inter sectoral collaboration. Related major national institutes are responsible for the executive centers of the respective health programs, as well as the provision of technical advice, operational research and staff training.

B: The government attached highest priority to malaria control in all health programs. NMCP, which began in 1991, has been reinforced by the strong leadership of the Government and National Steering Committee, which consists of multi-sector members,utilizing the vertical malaria control system along with general health system. The general health system has also been strengthened and used as a malaria control program. Recently, high priority has been attached to control in frontier areas. A high literacy rate, effective use of school health education, education for residents in endemic areas, and preparation of guidelines have also facilitated the smooth implementation of the program.

Service delivery

A: The local administration is organized into provincial, district and communal political units which are responsible for the implementation of the health programs. All medicines and medical equipment are supplied by the government through the administrative strata. Participation by health facilities under the military, police and other sectors providing medical services to the population has helped increase health care coverage. The referral system among medical institutions was strengthened in collaboration with foreign assistant partners.

B: Service delivery in malaria control was basically carried out utilizing the general health system. The Army Medicine, People's Committee, Women's Union and other local organizations helped deliver bed nets and other services in the control program.

Workforce

A: Since the 1990s, human resources in health care have been trained both quantitatively and qualitatively. Improvement in training capacity to increase human resources has been observed. Commune health workers have participated in various programs.

B: The government has implemented a policy to train health workers for malaria control with the cooperation of foreign donors. The role of public organizations, such as women's unions and youth unions, in the

implementation of malaria control programs and collaboration with the military in hard-to-reach areas, are also noteworthy.

Information system

A: The reporting and information system functions efficiently, and reports from the primary level are transmitted to upper levels. The role of the mobile team is outstanding in information transmission and guidance in program implementation.

B: Reports on malaria from the primary level are transmitted to upper levels and then feedback is provided. Currently, considerable parts of these systems are integrated into the general health system. There are many examples of prompt and appropriate responses in cases of disease outbreak. The role of the mobile team is outstanding in the transmission of information and in the provision of guidance for program implementation.

Medical products and technologies

A: Development of the pharmaceutical industry has contributed considerably to the implementation of essential drug policies targeting primary health care. Drug quality is managed following the good practice criteria based on standards and guidelines for drug production, quality control, storage and distribution. Currently, all facilities are to follow the standards of Good Manufacturing Practice (GMP)-WHO.

B: Production of drugs used for malaria treatment, insecticides, and bed nets within the control program has gradually shifted to local sources and the drugs are supplied to the peripheral level under the proper guidance of the government. Widespread distribution of artemis in suppositories at the primary level has greatly contributed to a lower mortality rate.

Financing

A: A broad orientation of health financing was set in the 1990s through the development of health insurance, the partial user fee policy, and the Government's resolution on "social mobilization" in areas of education, health and culture. The government also focused on subsidies to users of health services, such as health care for the poor and children under 6 years of age. The health budget has continued to increase in line with the economic development of the country.

B: Initially, the governments ought to increase the malaria program budget, and the People's Committee of Viet Nam and international community financially supported the program. GFATM has greatly contributed to the expansion of the malaria program by strengthening activities for high risk groups.

4. Good practices in malaria control

Table 1 summarizes the good practices in the general health system which are regarded as having a good effect on malaria control as shown in table. Table 2 summarizes the good practices in the malaria control programs.

5. Bottlenecks/challenges

Table 1 Good practices in the general health system (Strengthening of General Health System), which contributed to malaria control

	Leadership and governance
1	Effort of the government to strengthen the general health system
2	Efficient management of the National Health Programs with strong leadership (V)
3	High priority given to the promotion of education
	Service delivery
4	Strengthening of health posts and sub-health posts
5	Effective service delivery in accordance with the administrative strata (V)
6	Support of military and police to service delivery (V)
7	Contribution of the mobile teams
8	Expansion of the pull system for essential drug supply
	Workforce
9	Increased training opportunities for health workers.
10	Marked increase of the number of doctors and nurses (N)
11	Improved skills by commune health workers conducting various programs
	Information system
12	Improvement in the routine monitoring system
13	Contribution by the mobile teams (V)
	Medical products and technologies
14	Management of drug quality based on the standards and guidelines (V)
15	Development of the pharmaceutical industry and its contribution to the essential drug policy (V)
16	Revision of the National Drug Strategy (N)
	Health financing
17	Substantial support from the GFATM
18	Increase funding of the health budget by the government
19	Development of the health insurance, partial user fee policy, subsidies to users of health services (V)

(V): Outstanding in Viet Nam, (N): Outstanding in Nepal

Table 2 Good practices in malaria control

	Leadership and governance
1	High priority of malaria control by the government
2	Strong leadership of the government and the National Steering Committee (V)
3	Utilization of the general health system in the malaria control program
	Service delivery
4	Participation by the Army Medicine, People's Committee, Women's Union and other local organizations(V)
5	Monitoring teams for ITNs and LLINs at the district level (N)
6	Contribution by the mobile teams
	Workforce
7	Increased training opportunities for health workers
8	Contribution bywomen's unions, youth unions and military in hard-to-reach areas(V)
9	Contribution by Female Community Health Workers (N)
	Information system
10	Monitoring visits and periodical submission of reports
11	Setting up the sentinel sites for malaria outbreak surveillance(N)
12	Appropriate transmission of the information and feedback to primary level (V)
	Medical products and technologies
13	Provision of considerable amount of ITNs, LLINs, RDTs, ACTs
14	Domestic production of treatment drugs, insecticides and bed nets(V)
	Health financing
15	Considerable financial supportfor malaria control by GFATM
16	Treatment drugs provided free of charge at public facilities
(V): Outstanding in Viet Nam, (N): Outstanding in Nepal ITNs: insecticide-treated bed nets, LLINs: long lasting insecticidal nets, RDTs: rapid diagnosis tests, ACTs: artemisinin combination therapies	

Table 3 Existing challenges and bottlenecks in malaria control

	A. Leadership and governance	Viet Nam	Nepal
1	Weak program management capacity		++
2	Introduction of malaria associated with population movement	++	++
3	Weak health system in remote (frontier & border) areas	+	++
4	Weak coordinationbetween medical institutions, public-private sectors and laboratories	+	++
	B. Service delivery	**Viet Nam**	**Nepal**
5	Inequality in the distribution of bed nets (to vulnerable people)		++
6	Many hard-to-reach areas		++
7	Weak coordination between local government and GFATM in the distribution of bed nets	+	++
	C. Workforce	**Viet Nam**	**Nepal**
8	Shortage of health workers and manpower in remote areas		++
9	Low skill level of health workers in remote areas	++	+
10	Frequent changes in health workers and manpower in remote areas	+	++
11	Limited number of entomologists	+	++
	D. Information system	**Viet Nam**	**Nepal**
12	Weak private health sector		+
13	Poorly developed reporting system from the private health sector	+	++
14	Inadequate disease surveillance system	++	+
	E. Medical products and technologies	**Viet Nam**	**Nepal**
15	Inadequate quality assurance system for malaria testing	+	++
16	Weak function of the National Reference Laboratory		++
17	Difficulty in treatment due to increasing anti-malaria drug resistance ofP. Falciparum	++	++
	F. Health financing	**Viet Nam**	**Nepal**
18	Sustainable supply of health products (ACT, RDT, LLIN)	+	++
19	Low incentive for health workers	++	++
20	Heavy dependence on GFATM (sustainability is a challenge)	+	++
	Other	**Viet Nam**	**Nepal**
21	New endemic areas have been reported (environmental and social factors are suspect)	++	++
22	Increased number of cases of imported malaria	+	++
++: major challenges/bottlenecks, +: intermediate, No mark: minor			

Discussion

The general health system in Nepal used to be fragile in the past, but has gradually been strengthened and has been utilized in greater part in the malaria control program.[17]During the period of political instability (1996-2006), health systems were affected, but malaria control was minimally affected compared to other disease control programs due to its high governmental priority and the continuous support of the international community.

The Vietnamese government has worked hard to strengthen the existing health systems since the 1990s (both malaria specific and general health systems). The international community has also cooperated with policy implementation of Viet Nam at various health system levels.[18]Malaria control measures were effectively implemented under the strong leadership of the National Steering Committee, which has further strengthened and utilized the existing health system and mobilized public organizations.

Generally, collaboration among disease specific programs at upper levels is limited, and a health staff, as well as an infrastructure, is dedicated to each program. However, health care at lower levels has greater integration(both in Nepal and Viet Nam). By coordinating with community and social organizations, health workers carry out various tasks, such as primary health care, implementation of national health programs, preventive medicine, IEC activities, etc. GFATM and other assistant partners provide support by promoting training and supplying essential medicine and equipment. Malaria control has gradually become integrated with the primary health care system.

Best practices were identified from survey results. Among these, intensified education for residents focusing on disease prevention, strengthening of facilities at the primary level such as health posts and training health workers, utilization of health volunteers at the primary level, giving frontier areas high priority, and setting up mobile teams, were noteworthy and were held in in common by both countries. In addition, effective implementation under the strong leadership of the National Steering Committee could be seen in Viet Nam, utilization of the existing heath system was outstanding.

A synergetic effect of disease specific programs(vertical health programs) such as malaria control on the general health system could be seen to some degree, particularly at the primary level. The management system of vertical health programs appeared to have a good impact on the general health system at various levels. However, dissociation between vertical malaria control program and horizontal general health system also seems to exist. In addition, similar to other reports,coordination between malaria control programs and other disease specific programs is limited in many cases.[5,6] It is true that carrying out a vertical health system is important in implementing a malaria control program, but intensification of the malaria control program does not automatically lead to strengthening of the general health system.[19]More effort is needed to realize maximum synergy between disease specific programs and the general health system, as well as among different health programs.

As seen in the results of a similar study in Laos, if the general health system appears weak, a strong vertical health system supported by GFATM can function separately from the general health system.[20,21] These findings were also observed in Nepal and Viet Nam, particularly at the early stage of support by GFATM, where disease specific programs utilized procurement, information, monitoring systems, etc., outside of the MOH (MOHP), with varying levels of support and input provided by the disease specific divisions.

One of the current leading challenges/bottle necks is the limited coverage and quality of malaria control measures among populations living in remote areas. Most health workers are concentrated in large cities and towns, while the health personnel and/or medical supplies of many health facilities at the primary level and at some district hospitals are still insufficient. A poorly developed reporting system from the private health sector, inadequate quality assurance system for malaria testing, and weak coordination between the local government and GFATM in the distribution of bed nets were also pointed out (particularly in Nepal). In Nepal it was suggested that bed nets are not always distributed to the vulnerable populations, as similarly reported in some African countries.[22, 23]In addition, the current heavy dependence on GFATM undermines the assurance of sustainable malaria control.

Introduction of malaria due to population movement, increased drug resistant malaria, and the emergence of new endemic areas have become growing issues in malaria control in recent years in many endemic countries. Although not always health system related, these issues do affect health systems and active health system strengthening seems to be crucial for their control. Such growing challenges are often related to political issues, poverty, and a changing environment due to indiscriminate development, global warming, etc.[24,25] In order to address these growing challenges, strong government leadership, a sector-wide approach, and inter sectoral collaboration are required.

It is crucial to implement effective malaria control programs which address these challenges and bottlenecks, seeking their elimination. Particularly, emphasis on strengthening the health systems in remote areas, training of the health staff at the peripheral level, diagnosis based on accurate quality assurance, promotion of public-private relationship and addressing the issue of imported malaria, are desired. To create sustainable health systems, serious consideration of issues regarding the availability of domestic resources, including workers, supplies and local participation, as well as budgetary resources, are needed. Moreover, good practices which have been identified in this survey are expected to provide useful lessons in the effective implementation of malaria control in endemic countries. Addressing these issues will directly lead to further strengthening of the health systems and eventually to the effective implementation of various health programs.

Acknowledgements

This assessment, and the primary surveys in Nepal and Viet Nam were conducted by the National Center for Global Health and Medicine, as the WHO Collaborating Center for Health System Research, with the Grants for International Health Research (22-3, 24-5) from the Ministry of Health, Labour and Welfare, Japan. We wish to express our sincere gratitude to all the interviewees who took part in these assessments and surveys.

Conflict of interest: None declared

References

1. Murray CJL, Rosenfeld L, Lim SS, Andrews KG, Foreman KJ, Haring D, Fullman N, Naghavi M, Lozano R, Lopes AD. Global malaria mortality between 1980 and 2010: a systematic analysis. Lancet 2012 (February 4); 379: 413–31.www.thelancet.com
2. GFATM, Geneva. Final report: Global fund five-year evaluation study area 3. The impact of collective efforts on the reduction of the disease burden of AIDS, Tuberculosis and Malaria. May 2009; pp 1-511.
3. Hanefeld J. The global fund to fight AIDS, Tuberculosis and malaria: 10 years on. Clinical Medicine 2014; 14(1): 54-57.
4. Hafner T, Shiffman J. The emergence of global attention to health systems strengthening.Health Policy and Planning 2013; 28: 41-50.
5. Coker R. Balen J, Mounier-Jack S, Shigayeva A, Lazarus JV, Rudge JW, Naik N, Atun R. A conceptual and analytical approach to comparative analysis of country case studies: HIV and TB control programmes and health systems integration. Health Policy and Planning 2010; 25: i21-i31. doi: 10.1093/heapol/czq054
6. Conseil A, Mounier-Jack S, Coker R. Integration of health systems and priority health investigation: a case study of the integration of HIV and TB control programmes into the general system in Vietnam. Health Policy and Planning 2010;25: i32-i36. doi:10.1093/heapol/ czq055
7. Rao KD, Ramani S, Hazarika I, George S. When do vertical programmes strengthen health systems? A comparative assessment of disease-specific interventions in India.Health Policy and Planning 2014; 29: 495-505.
8. Car J, Raljarvi T, Car M, Kazeem A, Majeed A, Atun R. Negative health system effects of global fund's investment in AIDS, tuberculosis and malaria from 2002 to 2009: systematic reviews. JRSM Short Reports 2012; 3: 1-15.
9. Ohara H, Noda S, Matsumoto Y, Hirayama T, Fujita N, Egami Y, Murakami H, Akashi H, Nakasa T. Assessment of health systems in relations to interface between malaria control programs and health system strengthening: Comparative study among Lao PDR, Nepal and Viet Nam. NCGM Report October 2013; pp.1-56.
10. Hung LQ, de Vries PJ, Giao PT et al. Control of malaria: a successful experience from Viet Nam. Bulletin WHO. 2002; 80: 660-666.
11. Ministry of Health, Vietnam. Joint Annual Health Review 2008: Health financing in Vietnam. 2008; pp 1-147.
12. Ministry of Health, Vietnam. Five-year health sector development plan 2011-2015.2010; pp 1-56.
13. Ministry of Health and Population, Nepal. National Malaria Control Strategic Plan: Nepal (2007/008-2011/012). 2007; pp 1-23.
14. WHO Country Office for Nepal. Health system in Nepal: Challenges and strategic options. November 2007, pp.1-76.
15. WHO Regional Office for South-East Asia.Nepal malaria program review. June 2010, pp 1-68.
16. World Health Org. Monitoring the building blocks of health systems: A handbook of indicators and their measurement strategies. 2010; pp 1-93.

17. Tragard A, Shrestha IB. System-wide effects of global fund investment in Nepal. Health Policy Planning 2010; 25: i58-62.

18. Report from National institute of malariology, parasitology and entomology, Vietnam.2014, pp1-27.

19. Egami Y, Fujita N, Akashi H et al. Can health systems be enhanced for optimal health services through disease-specific programs? – Results of field studies in Viet Nam and Cambodia. BioScience Trends. 2012; 6(1):1-6.

20. Mounier-Jack S, Rudge JW, Phetsouvanh R, Chanthapadith C, Coker R. Critical interactions between global fund-supported programmes and health systems: a case study in Lao People's Democratic Republic. Health Policy and Planning 2010; 25: i37-i42. doi:10.1093/heapol/czq056

21. Matsumoto Y, Noda S. Assessment of synergy between vertical programs and the national health system in the Lao PDR. NCGM Report March 2012; pp.1-34.

22. Noor AM, Amin AA.,Akhwale W.S,. Increasing Coverage and decreasing Inequality in Insecticide-treated Bed Net Use among Rural Kenyan Children. Plos Medicine. 2007; 4 (8): 255. Available atwww. plosmedicinne.org

23. Barat LM, Palmer N, Basu S. Do Malaria Control Interventions Reach the Poor? A View through the Equity Lens.Am J Trop Med Hyg. 2004; 71 (suppl 2):174-178.

24. Manh BH, Clements ACA, Thieu NQ. Social and environmental determinants of malaria in space andtime in Viet Nam. Int J Parasitol. 2011; 41(1): 109–116.

25. Bortel WV, Trung HD, Hoi LX. Malaria transmission and vector behavior in aforested malaria focus in central Vietnam andthe implications for vector control. Malaria Journal. 2010; 9:373-381.