CHAPTER 5

SUMMARY AND CONCLUSIONS

Despite the considerable efforts to control malaria, malaria remains among the major public health problems in Sri Lanka. A considerable portion of the total health budget varying from 7.9- 17.9 percent from the years 1985-1991 is spent on malaria control activities. However, the actual expenditure for malaria is higher than this value because this figure does not show the hospital cost for malaria treatment and case management. The hospital cost for malaria treatment and case management is considerable because malaria constitutes a major proportion of outpatient department and is a major causes of hospitalisation (MOH 1993).

The malaria outbreaks in traditionally non-malarious areas, the occurrence of malaria epidemics, and the emergence of drug resistance falciparum malaria are among the major problems of malaria control in Sri Lanka. These requires special malaria control activities which results in a high cost to the malaria control programme.

The introduction of malaria to the areas which were previously non malarious, the occurrence of malaria epidemics and the development of drug resistance and the resulted morbidity time of the patients can be reduced to a greater extent by providing early diagnosis and treatment to the malaria patients. But, due to resource constraints with the NMCP, non availability of microscopists at the medical institutions where there is low output of blood slides, especially in traditionally non malarious areas and the patients behaviour of visiting private health facilities where there is no microscopy prevents on-site diagnosis in order to provide appropriate treatment. Because microscopy can not provide a satisfactory level of on-site diagnosis of malaria a diagnostic method that can improve early on-site diagnosis is preferred for malaria control in Sri lanka. By the nature of the ParaSight–F test, it may improve the on-site diagnosis because the test it simple, less time consuming, requires no electricity and sophisticated equipment, and the well trained manpower. Because of these facts it may be preferred in private sector too. But, for consideration of implementing dipstick in Sri Lanka, it needs an analysis of cost-effectiveness of dipstick as compared to microscopy. Therefore, this study has developed a methodology to analyse the cost-effectiveness of microscopy and dipstick in Sri Lanka.

The methodology developed in this study describes how costs and effectiveness of microscopy and dipstick is determined. The costs for microscopy and dipstick is determined by using the malaria control models 1 and 2 developed by Kaewsonthi and others (1996). The models are used to determine the costs of microscopy and dipstick by

calculating costs of activities related to microscopy and dipstick. The effectiveness of microscopy and dipstick are explained by four indicators, i.e. accuracy, percentage on-site diagnosis, percentage accurate on-site diagnosis and the coverage. The determination of accuracy is based on the previous research findings which have been carried out in Sri Lanka and in other countries. Percentage of on-site diagnosis is determined by surveys and by using existing records. By using data on accuracy and percentage on-site diagnosis, the percentage accurate on-site diagnosis has been estimated. Coverage is obtained by collecting information from both public and private sectors about what level of coverage that can be provided by microscopy and dipstick. This information is collected by personnel interviews and questionnaires.

The methodology has been simulated by using both actual and estimated data. The actual data, however, does not represent the whole island because this data is collected only from the traditionally non-malarious area in Sri Lanka. Therefore, the interpretation of results are mainly based on estimated data. The analysis of these data shows that if dipstick gives the same level of accuracy as microscopy, the microscopy is more cost-effective, as compared to dipstick. But, in the private sector dipstick is more cost-effective in terms of percentage on-site diagnosis and percentage accurate on-site diagnosis even though the dipstick and microscopy have the same accuracy. This can be explained that the private sector can improve the percentage of on-site diagnosis if it uses dipstick. Besides, in field situations the accuracy of microscopy depends on the competence of the microscopist (Indaratna and Kidson 1995), quality of staining and staining procedures and the standards of microscope. Dietz and others (1995) have shown that the sensitivity and specificity of microscopy are 78% and 84% respectively when microscopy in the field situations are compared with dipstick. Therefore, it is reasonable to assume that the accuracy of microscopy under field situations is 80%. When it is assumed that the accuracy of microscopy under field situation is 80%, dipstick is more cost-effective in the private sector and when both public and private sectors are considered together.

The calculation of cost-effectiveness of microscopy and dipstick was made by assuming the cost of dipstick is Rs. 50 and the number of blood slides taken per year is 685303. There is a possibility of lowering the price of dipstick for the countries where malaria is endemic. Also, when the market for dipstick is larger, the unit cost will be cheaper in the long term (Indaratna and Kidson 1995). Therefore, it is worthwhile to do a sensitivity analysis to see at what price of dipstick, dipstick and microscopy give the same cost-effectiveness. Such an analysis shows that if dipstick is available at the price Rs. 17, the cost-effectiveness of microscopy and dipstick is the same.

The second assumption is the number of blood slides per year is 685303, i.e. the average number of blood slides per microscopist is 6853 (685303/100, the number of microscopists is 100). But, the number of blood slides collected by different medical institutions are different. Some institutions collect fewer blood slides and some

collect more blood slides per day. The maximum number of blood slides examined by a microscopist per day is 65. Therefore, it is worthwhile to see at what level of blood slides the microscopy and dipstick will give equal level of cost-effectiveness. It is shown that at the level of 5830 blood slides per year (= 5830/265 = 22 blood slides per day) the cost of providing microscopy and dipstick is the same. So it is cost-effective to have dipstick at the medical institutions where 22 or less blood slides are collected per day and to have microscopy at the institutions where more than 22 blood slides are collected. This is important because many of the medical institutions, especially in the traditionally non-malarious area collect less than 22 slides per day. Provision of diagnosis of malaria by dipstick in this area can improve early diagnosis and treatment and thus prevent/control malaria outbreaks/epidemics resulting in cost saving by way of not necessitating special malaria control activities.

When the effectiveness of microscopy and dipstick in terms of coverage is considered, the coverage that can be given by dipstick is larger. This is because that the dipstick can be handled by less trained personnel at the peripheral public health facilities and by private health facilities. This helps to reduce morbidity and mortality of malaria by treating the disease more effectively and more quickly. Indaratna and Kidson (1995) also stated that the coverage can be given by dipstick would be higher because of the possibility of handling dipstick by less well trained people in the periphery and even by the volunteers at the village level. However, use of dipstick for on-site diagnosis and treatment of malaria by less well trained people requires extension of drug distribution networks, more extensive quality assurance systems, careful monitoring of drug usage and of outcomes (Indaratna and Kidson 1995)

When the cost-effectiveness of microscopy and dipstick is considered in patient perspective, it is shown that dipstick is more cost-effective. This is because the indicator used to calculate effectiveness was the percentage of patients who receive accurate on-site diagnosis by each technology. Dipstick has increased the on-site diagnosis, so that the dipstick is more cost-effective. These calculations have been made by assuming microscopy and dipstick are equally accurate. But, since microscopy under field situations is less accurate, the cost-effectiveness of dipstick will be even higher than that of microscopy.

Even though dipstick is cost-effective under some conditions mentioned earlier, the cost-effectiveness of dipstick will depend on the shelf life. The shelf life of dipstick is one year from the date of production. If it happens that a large stock of dipstick expired per year the cost-effectiveness of dipstick will fall to a greater extent. Again, the dipstick has to be imported. The cost of importation has to be considered in making a decision for implementing dipstick in Sri Lanka.

The analysis of costs for providing microscopic diagnosis at the services where there are no microscopists at the point of service shows

that it costs Rs 23 per blood slide examination for both public and private provider. The costs per blood slide examination at the point of service were Rs 25 and Rs 23 for public and private provider respectively. Since the difference in cost of providing microscopy at the point of service or not providing microscopy at the point of service is very small, the NMCP should consider expansion of its diagnostic facilities further.

The analysis of treatment seeking pattern of patients shows that of the total visits to a health facility, 26% was to private health facilities. The major portion of these visits were due to the perceived quality of the service in the private sector. If the quality of service can be improved by using a diagnostic test for malaria it will be helpful to encourage the use of private health facilities by patients. Twenty three percent of the visits to public health facilities was due to failure of cure at other services attended previously. This percentage of attendance at the government hospitals could be prevented if they had been treated appropriately at their previous visits to health facilities. This will help to reduce the hospital cost for treatment and case management of malaria. Also, since the private sector treats a considerable portion of malaria cases, it is advisable to consider the private sector as an integral part of the malaria control programme in order to achieve the objective of the NMCP, i.e. to reduce the incidence of malaria to a level that is no longer a major public health problem in Sri Lanka (MOH 1991).

The patients incur an average cost of Rs. 267 per visit per patient at private health services before attending a public health service. Even though they spent such a high cost the patient has not been cured. If the patient had been diagnosed accurately at the private health service, the cost per patient can be reduced. On the other hand, since the patients visits the private health facilities mainly because of perceived quality of service, the quality of government health facilities can be improved by providing accurate diagnosis using dipstick, with the introduction of user charges at the government health facilities in order to recover the cost of diagnosis of malaria. In order to consider this issue, further research on willingness to pay for service is needed. However, at present, this is a very sensitive point as the medical facilities in government sector are provided free of charge.

The dipstick also improves the public-private mix in provision and financing of diagnosis of malaria, the efficient use of scarce resources, equity, and provision of a good quality-service. Therefore, implementation of dipstick in Sri Lanka helps to achieve the objectives of health care financing reform which have been discussed in section 4.5.

There are many limitations of this study. First, the costs of dipstick are estimates. Second, the study emphasises only on the diagnosis which is an intermediate outcome of malaria control. The treatment is based on the accurate diagnosis. Also, this study does not include the cost saving by way of providing appropriate treatment,

reduced morbidity time and the cost saving of both patient and accompanying persons. Third, the delay in detection and treatment of malaria cases may result in malaria outbreaks and costs a lot of money to control such epidemics (Indaratna and Kidson (1995). If early diagnosis and appropriate treatment can be improved by dipstick, such outbreaks /epidemics can be prevented/ controlled and public expenditure spent on special malaria control activities will be saved. This cost savings should also be taken into consideration but this study does not cover this area.