

CHAPTER 6

CONCLUSION AND RECOMMENDATION

6.1 Conclusion

Malaria is still a major global health problem on the world and in Vietnam. It is a disease among people from low socioeconomic class living in forest and mountainous areas. The serious problem in national malaria control programme in Vietnam is falciparum malaria is resistant to such antimalarial drugs as chloroquine, amodiaquine, sulfadoxine-pyrimethamine combination, quinine and low rate of resistance to mefloquine, and multiple drug resistant falciparum malaria is common.

The field of research on chemotherapy of malaria by new drugs with high effectiveness is important and it is encouraged by national malaria control programme and ministry of health. Many studies on efficacy and effectiveness of artemisinin confirmed its effective in use alone or in combination with another antimalarial drugs.

A significant barrier in the malaria control programme and in malaria treatment is cost. With limited finance available artemisinin- a new antimalarial drug, is has potential as a main drug for resistant falciparum malaria treatment. The study of cost-effectiveness of two the regimens artemisinin + doxycycline and quinine + doxycycline was carried out to identify, measure the costs, effectiveness and cost-effectiveness ratio of these drug regimens with study objectives as in Chapter 1 (section 1.4).

The cost-effectiveness analysis of two drug regimens of Art + Dox and Qui + Dox drug regimens was carried out in Lamha district hospital, Lamdong province in Vietnam. The study involved 131 falciparum malaria inpatients which were followed up 28 days in hospital. Patients after chosen being randomized into two groups.

66 patients were treated by Art + Dox drug regimen:

- Artemisinin 40 mg/kg/day for 5 days.
- Doxycycline 2 mg/kg/day for 5 days.

65 patients were treated by Qui + Dox drug regimen:

- Quinine 30 mg/kg/day for 5 days.
- Doxycycline 2 mg/kg/day for 5 days.

The study not only observed effectiveness of drug regimen in clinical 28 days follow up period but also interviewed patients and

accompanying person, hospital's managers and related persons in district health center for economics data.

Average provider costs per malaria patient in vivo test 28 days were 232,381.16 Vn dong (\$22.1) in the Art + Dox compared with 231,089 VN dong (\$22.) in the Qui + Dox drug regimen group.

Average costs incurred by patient were 246,352 VN dong (\$23.4) in the Art + Dox drug regimen group compared with 252,019 VN dong (\$24.) in the Qui + Dox Drug regimen group.

The effectiveness of Art + Dox drug regimen was 95.45% significantly higher than 83.08% in Qui + Dox drug regimen ($p < 0.05$).

The cost-effectiveness ratio to provider in the Art + Dox drug regimen was 160,766 VN dong (\$15.3) lower than 180,755 VN dong (\$17.2) in the Qui + Dox drug regimen. The cost-effectiveness ratio to patient in Art + Dox group was 170,432 VN dong (\$16.2) also lower than 197,127 VN dong (\$18.7) in the Qui + Dox group. In different conditions of normal treatment practice, the Art + Dox drug regimen is also more cost-effectiveness than Qui + Dox drug regimen.

The study suggests that the Art + Dox drug regimen was more costs-effective to both of provider and patients perspectives. It should be chosen for treatment of resistant falciparum malaria at district hospital level. The Art + Dox drug regimen can be used at community hospital to reduce the costs for both of the provider and patients perspective and prevent development from uncomplicated malaria to severe and complicated malaria.

6.2 The Limitation of Study

The most appropriate design for assessing the effectiveness of intervention is an randomized double-blind clinical trial. In this study it was not used because shortage of the same capsules for both drugs and malarial patients knew already that quinine and artemisinin were being antimalarial drug for resistant malaria treatment, Therefore they accepted to stay in hospital 28 days follow up.

Study did not measure level of antimalarial drug in patient's blood because of shortage of equipment and technology.

One thing to consider when using doxycycline is the danger in pregnant women or in children under 8 years of age, since doxycycline may produce ossification disorders and discoloration of developing teeth of children. Therefore the study did not measure the cost-effectiveness in pregnant women and children under 8 years.

6.3 The Merit of Study

Study showed how to identify and measure the cost components

and effectiveness of drug regimen in hospital in falciparum malaria. Between quinine, a main antimalarial drug for resistant falciparum malaria, and artemisinin, a new antimalarial drug, highly active but more expensive, the study was showed that Art + Dox was more cost-effectiveness from both provider and patient perspectives.

The study also confirmed the role of artemisinin in combination with doxycycline in resistant falciparum malaria treatment. It is of concern to drug policy of national malaria control programme in Vietnam with important characteristics below.

- The rapid action on malaria parasite. This can avoid severe and complicated malaria cases, which develop from uncomplicated malaria if patient is not early treated.
- The more cost-effectiveness regimen and safety.
- Resource of artemisinin is available.
- It should be used instead of quinine in resistant falciparum malaria treatment, and to reduce quantities of quinine imported.

The study provided information to drug policy makers and national malaria control programme to select the more cost-effective, safe drug regimen, which is easy accepted by consumer and provider to apply commonly at district hospital level.

The study also provided an analytic method of estimating cost-effectiveness as an example to select the more cost-effectiveness drug regimen for drug policy of national malaria control programme in Vietnam.

6.4 Recommendation

6.4.1 Recommendation for Further Study

Artemisinin in combination with another antimalarial drug are among the most effective of all antimalarial drugs and they offer particular advantage in the management of severe malaria and multiple-drug resistant malaria. The study on pharmacokinetics and pharmacodynamics of artemisinin, in malarial patients is very important to decide the dose of drug and duration of treatment. This is not only concern to the costs of treatment but also concern to the time costs of patients.

Study on cost-effectiveness analyses of the Art + Dox and Qui + Dox drug regimens for falciparum treatment with 5 days in normal practice condition are necessary to measure the cost-effectiveness ratio of these drug regimens in normal treatment practice condition.

6.4.2 Recommendation for Drug Policy.

1) Although the effectiveness of artemisinin + doxycycline is high. it is a more cost-effective drug regimen.

2) Artemisinin should be restricted to areas where multiple drug resistance is prevalent, where chloroquine, sulfadoxine-pyrimethamine combination and quinine are resisted by falciparum malaria with the rate of resistance over 40%. In areas, where resistance of falciparum malaria to antimalarial drug is low, quinine can be used if this drug remains effective.

3) In order to control commonly use of artemisinin in the community and to limit as far as possible the development of resistance of falciparum malaria to artemisinin in community, national malaria control programme should have policy to control , distribute and guide the use of artemisinin correctly. It should be used for resistant falciparum malaria treatment in hospital level.

4) In the future, if artemisinin is available, it can be used at community hospital level to reduce costs incurred by provider and incurred by malaria patient. This early diagnosis and early treatment will avoid or prevent development from uncomplicated malaria case to severe and complicated malaria, the mortality rate due to malaria will be reduced to achieve objective of national malaria control programme in Vietnam.