

CHAPTER 5

DISCUSSION



In this chapter composes of two major parts. The first part will discuss about the results of this study, the different results in this study from the prior study and the policy implication for the Congenital Hypothyroidism screening. In the second part will be the strength, limitation of this study and the recommendation for the further study.

5.1 Incidence Rate

The incidence rate of Congenital Hypothyroidism in this study is approximately around 1 per 2907 live births that bases on the actual data at Chulalongkorn Hospital from 1991 to 1999. This figure might be lower than the reality because in the non-response group might have Congenital Hypothyroidism cases. Thus, if we calculated the Congenital Hypothyroidism cases in the non-response group at the same proportion as the response group, the incidence rate might increase to 1 per 2,083 live births. The actual incidence rate at Chulalongkorn Hospital is similar to other studies reported on Ramathibodi Hospital but lower in comparison the report from Nan province 1 per 675 live births in 1994 and 1 per 2009 in 1998 after starting iodine supplement campaign in iodine deficiency area. Therefore, the actual incidence rate is probably higher than the result of this study. According to the study at Ramathidobi Hospital showed that the low maternal urinary iodine concentrations indicated borderline iodine deficiency this means Bangkok is a possible area of iodine deficiency. If this study includes the non-response group, the incidence rate is similar to Nan study. Therefore, the problem should be closely investigated and monitored.

Another factor that influence to the incidence rate calculation is the responsive-recall rate. Since the responsive recall rate is unlikely to be 100 %, the incidence rate will vary accordingly. Normally, if the recall rate is between 0.1 to 0.5%, it means that the TSH cut off level is suitable (Mahachoklertwatana, 1999). However, the higher recall rate means the higher accurate detected, it is unnecessary spending resources. At Chulalongkorn Hospital, the TSH cut off level, which is 20 mU/L, is lower than the

national proposed policy that is 25 mU/L. So, the recall rate at Chulalongkorn Hospital is only 0.24% that means the cut off level is suitable for the Chulalongkorn Hospital.

5.2 Costs

5.2.1 Provider Perspective

In this study, the provider costs have been calculated on the basis of Chulalongkorn Hospital. Probably, the figure of costs is a little bit higher than other general hospital and the proposed process is minor different from the national proposed process, for instance, the duration of the follow up that is in Chulalongkorn Hospital the frequency of the follow up is more than the general public hospital since Chulalongkorn Hospital is a teaching hospital and there are fully facilities in health services. Therefore, this might be one cause of the higher provider cost calculation and moreover in this study, the provider cost calculation includes the opportunity costs of providing outpatient department for the follow up and treatment process. Another factors that effect to the provider cost is the material for using in the program screening. In this study, the material for using for the TSH screening program is manufactured from aboard, which differs from the general hospital. The test kit at the general public hospital is produced from Medical Science Department. From the study has found when the price of the kit reduces 50%, the present value of benefit-cost ratio will increase about 20%. Thus, in the national policy that will use the test kit from the Medical Science Department, the benefit from the screening program should be higher than in this study. Although, there was a research that supported the quality of test kit from Medical Science Department, some expert opinions are still questionable about the quality of the test kit. Therefore, the government should have a policy to assure the quality of their products in order to motivate the provider to access the products that manufactured in Thailand.

Another difference of the Chulalongkorn Hospital proposed process is the transferring the specimens. At Chulalongkorn Hospital, which is the teaching hospital, has fully facilities of laboratory examination but in some general public hospitals do not have fully facilities in laboratory examination. So, they will send their specimens to the center or regional laboratory room of the Medical Science Department.

Consequently, the technical error or missing of specimens will be occurred. Holtzman *et al.* conducted his study of the problem of missed cases of Congenital Hypothyroidism. The results of his study are there was one missed case for every 120 detected cases and around 45 % occurred during the laboratory process. Therefore, the screening program will have a highly successful, if the health personnel may pay additional safeguards when practical.

5.2.2 Patient Perspective

Normally, most of people, when talk about the cost of Congenital Hypothyroidism treatment in patient perspective, usually consider the financial cost that is only the expenses of the thyroid hormone tablets and they usually think that it is very cheap when compare with the benefit that they will receive. However, in this study the economics costs in patient perspective include in the calculation since the costs of the treatment process is not only the medicine costs and analysis of laboratory but it also includes the time costs transportation costs and intangible costs. Even though, in this study does not cover the intangible costs, it has tried to include as much as possible of the opportunity costs that will burden to the patients and their family. Since, we realize that if the Congenital Hypothyroidism induces a high burden to the patients and their family, it might cause of the compliance rate of patient that will reduce the successful of the screening program. Furthermore, this study is an empirical study and the population sample in this study for the patient perspective might not be a good representative because the population in this study is very small that is only 13 cases from 18 cases and all of them are on the basis of Bangkok population.

From the interviewing parents of Congenital Hypothyroidism patient, one family complained about the extra transportation costs because this family has migrated to work in Bangkok but their hometown is in rural area and their child is with their relatives. Every follow up time, the parents have to pick the their child from other provinces that cost lot of money and they afraid that they could not afford to come to see the doctor every times although, they understand about how important of the treatment. From this example, the government should organize counseling to the parents of the patients in order to plan the treatment process. In this case, the patient may refer to treat in the hospital nearby their house.

5.2.3 Societal Perspective

In this study, the society costs are defined as the costs that occurred to the society due to the TSH screening program. In this study, some society costs exclude from the calculation because of some limitations. As well as the society benefits are defined as the cost savings from taking care and welfare for mental retarded people. Therefore, the society costs and benefits should be much more than in the study. One reason is in this study, the patient costs were assumed that came from out of pocket. Since, from the interviewing parents of Congenital Hypothyroidism patient, the payment mechanism of around 75% from the total cases was out of pocket. Another reason is the sample in the cost saving calculation for the mental retarded welfare came from only one foundation. In fact, there is several organization works for mental retarded people, so the society cost saving calculation in this study might be lower than it should be.

5.3 Benefit-Cost Ratio

The present value of benefit-cost ratio in the base case in provider perspective is 2.19 and 2.70 in the national policy that is the large difference from other studies, for instance, Rajatanavin, 1993, if the incidence rate of Congenital Hypothyroidism was 1 per 2,486, the costs per case finding was 50,415 Baht and the benefit from the screening program per case finding was 1,778,498.39 Baht. The large difference in this study may come from in this study included the opportunity costs of providing Out Patient Department for the whole life treatment in the cost calculation. Secondary, from the actual data that there are not 100% of the patient responded with the confirmatory process, so the cost calculation includes with the opportunity costs for taking care and welfare for the mental retarded children from the missing cases. Lastly, in Rajatanavin study, the opportunity costs from losing parent productivity was evaluated in a more rigid and detailed manner. For example, the patient income yearly increases by 8% from the age of 21 to 60 years and the opportunity cost loss was 100% at newborn to 5 years, 50% percent at 5 to 15 years, 25% at 16 to 60 years. In this study, the opportunity costs from losing parent productivity based on the minimum wage, which was forecasted to the future by E View program and assumed that after the age 21, the patient can find a job and work until the retirement age. Other thing made the under estimated benefit is the society cost saving calculation. It

was not the fully cost saving from the societal perspective, such as, for the cost saving from general supporting, in this study was on the basis of one foundation that we have tried to choose the big foundation in this field. Another is this calculation omitted the cost saving from mental retarded institution because of the difficulty in getting the data.

The benefit cost ratio of the national policy is higher than the base case at Chulalongkorn Hospital since, there are several different points between Chulalongkorn Hospital and general public hospital. Therefore, the benefits for the early diagnosis and treatment the Congenital Hypothyroidism are around three times higher than the costs of investment in the same monetary unit.

From the decision making in the long-term investment, normally the benefit-cost ratio should be greater than 1 for deciding the investment so the screening program should implement because even in the lowest incidence rate, the benefit-cost ratio is still higher than one. Although, the benefit-cost ratio of the lowest incidence is 1.86, that is a bit higher than one, it is proper for investing because the health investment is not the same as the wealth investment and in the sense of human right, the expense is out of the question. Therefore, this program should establish since this program can prevent brain damage in large number of infants and avoid the tragedy of mental retardation for both the patient and the family, which leads to the burden of country. Moreover, if there is no program, the negative externality will be occurred because the government has to pay the budget for taking care and welfare for the mental retarded people. As far as is possible, we should be convinced that patient outcome changes as a result of the screening program. In fact, patient may benefit from the program in many ways including reduction in mobility and improvement in the quality of life. By “quality of life” mean a person’s ability to conduct activity that he or she finds rewarding and enjoyable.

5.4 Conclusion

The expected present value of benefit-cost ratio at Chulalongkorn Hospital for provider, patient and societal perspective are 2.19, 2.11 and 1.98, respectively. For the national level, the benefit-cost ratio are 2.70, 2.50 and 2.23 for the provider,

patient and societal perspective. Although, some variables: the incidence rate, the responsive-recall rate and the patient compliance rate are adjusted, the benefit-cost ratio still remains greater than one. For example, when the responsive-recall rate increases to 100%, the provider benefit-cost ratio increase to 5.20 and 10.84 at base case and national level and when the percentage of patient compliance rate decrease to 75%, the benefit-cost ratio in both level still greater than one: 1.79 and 1.99. In the national level, when the incidence rate of Congenital Hypothyroidism is adjusted in low and high incidence rate which are 1 per 8,500 and 1 per 687 live births, the benefit-cost ratio for provider are 1.86 and 3.25, respectively. Furthermore, the TSH test is simple and acceptable test and the price of this test is reasonable because the Medical Science Department can manufacture this test. The sensitivity and specification of the test is 100% from the unpublished study at Chulalongkorn Hospital.

In conclusion, the TSH screening for Congenital Hypothyroidism program should be established because it is an useful program and moreover its can reduce the future burden from the mental retardation. Since, the mental retarded person increases a potential of using resources of taking care and welfare.

5.5 Policy Implications

From this study, the Congenital Hypothyroidism control program appears to be a feasible approach to reduce the burden of mental retardation. However, the successful of the screening program is not only the program itself but it also includes the other health policies to support to this program. For introducing a new health care screening, it is inevitably accompanied by serious questions and concerns about the efficacy, effectiveness and efficiency of the screening test. Moreover, the economic evaluation will be a major part in the decision making process. This study acts as a sample calculation in economical point of the TSH screening program in order to answer the economical worthwhile of the program.

From the literature review, there are seven criterions for deciding the national screening program. The TSH screening program relates in some criterions that are

- The screening test will detect the disease in the early stage and it can diminish the future violence of the disease or it can prevent the disease.
- The prognosis of the disease is well establishment.
- Equipment for the screening program has a high reliability, sensitivity, specificity, accuracy and repeatability or reproducibility.
- The screening test is simple and acceptable.
- Lastly, the cost of the test is reasonable.

Moreover, from the result of benefit-cost ratio, the TSH screening program should be established because the benefits is higher at least one times than costs, even though, in the sensitivity analysis of the different incidence rate, the benefits still remain higher than costs in lowest incidence rate on Congenital Hypothyroidism. In fact, the benefit-cost ratio should be higher than this study, if the benefit calculation is calculated more rigid than this study and taken intangible benefits into the calculation. Furthermore, there are several factors that effect to the benefit-cost ratio of the TSH screening program, so as the following will discuss in the policy implication that relevant with the results of this study.

According to the result of this study, the incidence rate of Congenital Hypothyroidism is around 1 per 3,000 live birth in the central area of the country, in the northern part the incidence rate increases to around 1 per 2,000 live births and according to Sukthomya *et al.* report from the southern part, the incidence rate is around 1 per 4,000 live births (Rajatanavin 1993 quoting Sukthomya 1986). And the benefit-cost ratio in the low incidence rate of the Congenital Hypothyroidism is a little bit higher than one. Therefore, in the initial step of the screening program should consider in the high-risk area or the screening plan should be a blanket plan in the high-risk area, north and northeastern part of the country. In the low risk area, southern part of the country, perhaps the screening program will selective screen in the suspected group, for example, the Hyperthyroidism mother, who takes suppressive thyroid hormone, or the Hypothyroidism or iodine deficiency mother.

Another finding is the responsive-recall rate that is the major effect to the successful of the screening program because the benefit-cost ratio increase from 2.19 to 5.20 in

the base case and from 2.90 to 10.84 in the national policy scenario after the responsive- recall rate increase to 100%, which accounted more than one time. So, when government implement the national TSH screening program, the government should emphasize in this problem. There several reasons that why the responsive-recall rate is not 100%. One is the incorrect address when the pregnant women give to the hospital, lacking of the knowledge of the severity of disease and so on. One way, to increase the responded recall rate is to put more effort campaign to rise parents' awareness in the health service centers, when the pregnancies attend in antenatal clinic. In order to motivate the parents to concern and realize about the health problem and the severity of disease that affect brain development of the children because the Congenital Hypothyroidism disease can be detected and treated.

Another finding is the compliance rate of patient. From the sensitivity analysis, the compliance rate is another major effect, which reduce the benefit-cost ratio from 2.19 to 1.79 in the base case that accounted to 18% and for the national policy scenario the benefit-cost ratio reduce from 2.70 to 1.99 accounted to 25%. Therefore, to prevent this problem the government should provide the same treatment guideline to reduce the variation therapeutic so the patient can refer to receive the service in the health service centers that nearby their house in order to increase patient convenience.

5.6 Policy Recommendations

The establishment of nationwide neonatal screening requires funding consideration a certain amount in the national budget. Cost benefit analysis in this study have proved that the direct benefit from early treatment of Congenital Hypothyroidism is significant higher than cost required for screening and treatments and the effective nationwide screening for the Congenital Hypothyroidism will be able to treat close to 400 cases annually. Therefore, the government should establish nationwide screening for the Congenital Hypothyroidism. When the national screen program begins, the government will face many critical decisions. These decisions include

- 1 Optimal number size of screening laboratory in future.
- 2 Scientific evaluation of screening methods.
- 3 Quality control system for the screening program.
- 4 Follow up system for detected cases.

Therefore, for establishment of the national screen program, the government should have a careful plan for the total screening system and the establishment of a multi-disciplinary advisor committee is an essential first step. In order to consider and prepare for facing many critical decisions, such as the optimal number size of screening laboratory in future, quality control system for neonatal screening, follow up system etc. The members of the committee should include specialists in the area pediatric endocrinology, analytic chemistry, clinical chemistry, nutrition and public health. This committee should assist in program development by evaluating the results of pilot screening and making recommendations for expansion.

Another essential step is to educate the health personnel to realize about the health problem from this disease that can be detected and treated and realize that the more than 50% of the successful of the screening program depend on them. It is also essential that vigorous education program be designed to educate parents as to the important of and the procedures involved in neonatal screening. The government should take an active role in developing such a program. Maximum use of the media is encouraged including newspapers, radio and television. Production and distribution of printed materials announcing the program should be available through public health offices, physicians and midwives.

The information system is another important of the nationwide screening program. Nowadays, the health information system of Thailand to follow patients has already been more efficiency. So, the government should provide the reestablish understanding in the system for all levels of health personnel by the provincial health offices to put more effort and awareness. Since, the successfully of the national screening depends on the rapid result and the efficiency of the following system. Therefore, the successfully in this part needs the convenient of the system in provincial public office, including the supporting from the Ministry. If the telecommunication system covers all of the country, the report and following system will be more efficiency.

For the government, it is essential to concert a political effort to begin screening program. The government should support the immediate implementation in close

cooperation with the multidisciplinary advisor committee, the Ministry of Public Health, the Ministry of University Affairs and other appropriate organization. Moreover, funding should be a government priority.

5.7 Strengths And Limitations of the Study

Although, the calculation in this study is not completely data, this study has tried to include in three perspectives that are provider, patient as well as societal in order to easy for decision-makers. And in this study consists of various uncertainty points so, many sensitivity analysis is done in uncertainty variables, which relevant for policy decision for improving the national plan for Congenital Hypothyroidism screening program. In order to evaluate the economical worthwhile of the screening program, in this study has adjusted all of cost items into the costs at general public hospital since Chulalongkorn Hospital is a teaching hospital and the size differs from the general public hospital. Lastly, the analysis in this study was separated in three scenarios of different incidence rate of Congenital Hypothyroidism because of the various of incidence rate.

The following facts are the weakness of this study.

- Because most of assumptions for cost and cost saving calculation, especially the maternal forgone money came from the literature review, which are the western country patterns. Probably they are not the same pattern with the Asian countries. So, sometimes the cost and cost saving calculation may not the exactly figure.
- In the benefit or cost saving calculation may be under estimated because there many organizations and institutions for mental retarded people. However, the cost saving calculation in this study is only the sample calculation from the societal perspective. And because of the difficulty of getting data, in some cost saving calculation had to exclude from this study, such as, budget from mental retarded institution.
- In the provider cost calculation in this study based on the actual cost at Chulalongkorn Hospital, where is a teaching hospital. This figure may not provide a basis for the general public hospital. Therefore, the provider cost calculation is probably higher than the general public hospital.

- In this study assumed that the sensitivity and specification of the TSH and T₄ test is 100%. In fact, for the national screening program, the sensitivity and specification of both tests may not be 100%, so the cost calculation has to take account the cost of false negative case that will reduce the benefit-cost ratio.

5.8 Recommendations for Further Study

The following studies are recommended to fill the gap of information and to strengthen research study.

- Study for the cost of taking care and welfare for mental retarded individually in Thailand.
- Study of the sensitivity and specification of the TSH kit that manufactured in Thailand and compare the quality with the test kit that imported from abroad.
- Study of the severity of the Congenital Hypothyroidism situation in Thailand.
- Study of the problem of the Congenital Hypothyroidism screening program after implementation.