

CHAPTER 1

INTRODUCTION



1.1 Background

In the 1960s and 1970s, with the best rapid progress in biochemistry and other technological advances, neonatal mass screenings were introduced for the early diagnosis and treatment of congenital metabolic and endocrine diseases that resulted in severe physical and mental disorders. Neonatal screening program for Congenital Hypothyroidism has been generally introduced in 1974 and in the present time is a routine screening in many industrialized countries. Neonatal screening programs for Congenital Hypothyroidism have been generally undertaken on the basis of purely medical consideration without any serious of cost and benefit estimation. However, a lack of economic analysis can be slowed down in the future development and may introduce a certain degree of apathy toward effecting changes or modifications. Resources dedicated to health care need more input in the mist of various limitations. In developing countries this limitation is so absolute, especially in the term of health care uses of nutrition and shelter. Developed countries have gain more resources, but still also looking for better offer of new technologies. Health care workers find themselves, which more questions about technologies concerning on the privileged and the maximum health goal. Therefore, this study will be concluded on an approach to the cost benefit analysis of the Chulalongkorn neonatal screening program. The aim of this study will reveal the positive expected benefit-cost ratio.

Congenital Hypothyroidism resulted from insufficient production of thyroid hormones and it will cause mental retardation and could be prevented by proper treatment promptly. The severe mental retardation admitted at institution reveals 1% to 2% causes by Congenital Hypothyroidism. The suddenly neonatal diagnosis of this disease and subsequent treatment by thyroid hormone replacement appear the near on normal intelligence of children. Controversial, the undetected and untreated at the 3 months old patients show in favor of retardation. The average incidences of Congenital Hypothyroidism are varying from 1 per 2700 to 1 per 8500 live births in various countries. In Thailand, the average incidence is approximately 1 per 4000 (Rajatanavin 1993 quoting Sukthomya 1986) in the southern while the study at Ramathibodi Hospital in 1990 to 1992 shows approximately -

1 per 2486 – 3843(Rajatanavin, 1993). Screening can be performed on cord blood serum or on capillary serum usually taken by heel prick when two to five days of age.

The most frequent cause of Congenital Hypothyroidism originate from an abnormal embryological development of the thyroid gland. Developmental anomalies, which are three times more common in girls than boys, cause either of the complete absence of the thyroid gland (athyreosis) or the fault in the migration of thyroid tissue (ectopic thyroid gland). The treatment of the pregnant against Hyperthyroidism may cause goiter and hypothyroidism in the infant, especially regresses spontaneously during the first weeks of life. Then, Thyroid status of the mother stays its important on the severity in the newborn occurred proportional to that in the mother. Environmental factors such as iodine deficiency and the presence of goitrogens in the nutrition cause reduction in maternal thyroid activity as well as in the fetus and newborn.

Symptoms of thyroid insufficiency are often hidden and do not investigate suspected diagnosis by one third to one half at the first year of life. More frequent symptoms include growth retardation and delay of bone age with more or less marked developmental retardation. The severity of Hypothyroidism depends on the period of time that will affect spontaneously the cerebral maturation. The clinical symptoms are characterized not only by mental retardation but also by the problems of coordination, such as, cerebella ataxia, strabismus and nystagmus. Speech delay, primary enuresis, behavior problems, such as emotional instability and hyperkinesis, concentration difficulties, problems in orientating time and space, difficulties in thought, slow in thought and movement are all typical symptoms.

The aim of treatment intend to establish a euthyroid state as quickly as possible. If the treatment starts before the age of three month, the prognosis for mental development is considerably improved. Recently, it has been demonstrated that an encouraging improvement in intellectual quotient in congenital hypothyroid children those treated correctly and maintained throughout the adult life.

The blood level of TSH and T4 hormone can indicate Congenital Hypothyroidism after birth. Hormone determinations are performed either in the cord blood or in the

dried blood spotted on filter paper. Generally, the determination method varies country to country due to the different environment and government policy.

1.2 Rationale

The approximately newborn in Thailand per one year is a million live births. From the roughly incidence of Congenital Hypothyroidism is 1 in 2700, the total number of Congenital Hypothyroidism cases are about 370 patients annually. Failure to diagnose and treat this disorder within 2-3 month of age will result in severe irreversible mental retardation and stunted growth. Consequently, it will be a huge burden to their family and society, since all of them can not be self-dependence. Right now, medical technologies have been improved thus some of diseases can be detected and treated in order to prevent the handicapped. Thyroid screening in newborn is one of the advantages of modern technology. This test per case is relatively inexpensive with high sensitivity and high specificity

Thai government has realized the severity of this problem especially in iodine insufficiency area, such as, Nan province, the incidence rate of this disease increases to around 1 per 600 live births. As the result, in 1991, there are few studies on neonatal screening projects, including economic evaluation and pilot study that conducted by Ministry of Public Health and Medical Science Department in order to improve the plan to be a national screening plan. Right now, the aim of the plan in the 8th national economic and social development plan reveals to reduce at least 50% of mental retarded cases, which cause from Congenital Hypothyroidism, and screening activity to at least 50% of total newborns in 40 provinces.

Although, in November, 1999, MOPH announced that the cost of hypothyroid testing in newborn is 25 Baht per test (Bangkok post, 1999). This figure might probably be true if the cost is only material cost for laboratory testing. Moreover, there is a study at Ramathibodi hospital in 1993 on the cost and benefit of Congenital Hypothyroidism screening. However, the result is not conclusive. Consequently, this study will describe the Chulalongkorn hospital as a case study. This study provides an economic efficiency analysis for on evidence-based decisions for decision-makers and planers in health sectors.

1.3 Research Question

- What is the prevalence and incidence rate of Congenital Hypothyroidism?
- Is the Congenital Hypothyroidism screening program economically worthwhile?
- What are the costs and benefits of Congenital Hypothyroidism neonatal screening program?
- What does it cost of one treatment case for Congenital Hypothyroidism?

1.4 Research Objective

1.4.1 General objective

- To evaluate the costs and the benefits of the TSH screening program for Congenital Hypothyroidism in newborn.

1.4.2 Specific objectives

- To identify the number of the cases detected by the program screening.
- To evaluate the total costs of the screening from provider, patient and family as well as society point of view.
- To assess benefits from the early detection and treatment for the Congenital Hypothyroidism children.
- To obtain the cost per screened case, cost per correctly detected case.

1.5 Scope of the Study

This study is an empirical study with application of an economic evaluation for the in time diagnosis and treatment of Congenital Hypothyroidism. The study evaluates the early detection and treatment in newborn program by analyzing both for direct and indirect costs and benefit of different perspectives from provider, patient as well as society. In this study the benefits are determined as cost savings from the early diagnosis and treatment.

This study will be carried out at Neonatal Department of Chulalongkorn Hospital by collecting the data from 1991 to 1999. Expecting of the incidence of the Congenital Hypothyroidism case, sensitivity and specificity of the TSH and T₄ testing will be

collected the data from 1991 to 1999. The cost and benefit calculation will base on the data in the fiscal year of 1999. This study classifies as a part of the pilot project experiment study at Chulalongkorn hospital.