Unrecognized Congenital Heart Disease among Thai Children

Jarun Sayasathid MD*,
Kriangkrai Tantiwongkosri MD*, Naraporn Somboonna PhD**

** Cardiac Center, Naresuan University Hospital, Phitsanulok, Thailand*
*** National Center for Genetic Engineering and Biotechnology, Thailand Science Park, Pathumthani, Thailand*

Objective: *To report on the prevalence of unrecognized congenital heart disease (CHD) among elementary school children (231 schools, 6 cities in Tak province).*
Material and Method: *Between January, 2006 and December, 2006, 38,055 children were examined by trained nurses and health officers to ausculate the precordium. Those with abnormal heart sounds were re-evaluated by pediatric cardiologists.*
Results: *Of the 278 subjects with abnormal heart sounds, 43 had proven heart disease, 40 showed CHD (1.05 per 1,000) and three had rheumatic valvular diseases.*
Conclusion: *Understanding the case rate helped approximate the number of children who are currently undetected but have heart problems or may develop heart problems in the future. Every diseased person will receive treatment.*

Keywords: *Heart defects, congenital, Heart diseases, Prevalence, Schools, Students*

J Med Assoc Thai 2009; 92 (3): 356-9
Full text. e-Journal: *http://www.mat.or.th/journal*

Congenital heart disease (CHD) is one of the most frequently reported diseases among newborns (age 0-1 month) in many countries. In the United States, the rate was reported to be at least eight in every 1000 newborns or about 40,000 newborns per year. Nonetheless, most cases were asymptomatic and left undiagnosed. Only two out of 1,000 generally showed symptoms of heart disease and were treated[1-4].

In Thailand, if the congenital heart disease rate is the same as in the US (8 per 1,000 newborns), then approximately 7,000 out of 900,000 babies are born each year with congenital heart disease. The studies of congenital heart disease rates in Ayuthaya and Sukhothai provinces revealed the rates per 1,000 newborns of 3 and 1.19, respectively. While half of the congenital heart diseased children showed distinct symptoms, such as exhaustion, slow grow rate, or cyanosis, the studies also found that the other half of the children showed no or mild symptoms[1,5,6].

Correspondence to: Sayasathid J, Cardiac Center, Naresuan University Hospital, Phitsanulok 65000, Thailand.

The objective of the present study was to report on the rate of unrecognized congenital heart disease among elementary school children in Tak province. The present study aimed to better understand the approximate number of babies who were born with congenital heart disease. This would lead to an appropriate health care budget and plan for the diseased children before the diseases become severe.

Material and Method

The present prospective study was a complete action research that includes screening, diagnosis, and confirmation of the elementary school age children with heart disease who had never reported heart disease. Between January 2006 and December 2006, 38,055 children from 231 Tak provincial elementary schools were included in the present study.

The authors started the present study by examining the heart rhythm and screening for heart murmur. This was performed by 112 professional nurses and health officers who were trained by a pediatric cardiologist. All of the nurses and health

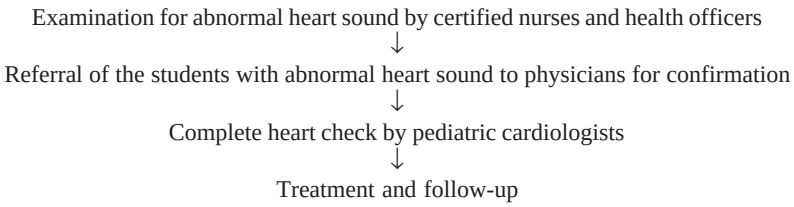

Fig. 1 Screening procedures for congenital heart defected children from those who were undiagnosed for heart disease prior to the present study

officers involved in this program scored at least 60% on the training test (equaling to 89.73 points from a total of 100 points). Those children who had abnormal heart rhythm and heart murmur were referred to pediatric cardiologists from the Cardiac Children Foundation of Thailand to receive complete heart diagnosis and treatment (Fig. 1).

The congenital heart disease cases under screening and diagnosis were collected and analyzed to determine the correspondence between the primary screening and the physicians' diagnostic performance. The congenital heart disease rate data were used to calculate the prevalence of congenital heart diseased children in Tak province. The prevalence rate was the number of congenital heart diseased children multiplied by 1,000 and divided by the total number of elementary school aged children who were participants in the present study.

Results

From the primary screening, 278 children with an abnormal heart condition were found. These children came from various areas in Tak province as shown in Table 1. Forty-three children who were unaware about their heart disease were confirmed by pediatric cardiologists. The heart abnormalities found in these children were divided into eight disease subtypes, which were atrial septal defect (ASD), ventricular septal defect (VSD), patent ductus arteriosus (PDA), tetralogy of fallot (TOF), pulmonary stenosis (PS), mitral regurgitation (MR), aortic stenosis (AS), and tricuspid regurgitation (TR) as shown in Table 2. VSD (41.86%), PDA (16.28%), PS (16.28%), and ASD (11.63%) were the most common. Three cases were excluded from the present study due to rheumatic mitral regurgitation because they were acquired heart disease. Surgery was required for 24 children (55.81%). ASD, VSD, PDA, and TOF were classified as the most prevalent reasons.

Therefore, the prevalence rate per 1000 for the recently diagnosed congenital heart diseases, elementary school-aged students who were detected during this research (40 cases) was equal to 1.05.

Discussion

Several countries reported the prevalence of newborns with congenital heart disease to be in a range between 3 and 12 per 1000, with 2 per 1000 cases showing symptoms. The diseases in 1.6 per 1000 newborn cases spontaneously recovered within one year without treatment and surgery[3,5]. Nonetheless, the actual prevalence may be higher, depending on

Table 1. Number and name of schools and cities that participated in the present study and the number of students who were identified as having an abnormal heart by certified nurses and health officers

City	Number of schools participated	Number of elementary children participated	Number of children detected at the first screening step
Tak	56	7,969	42
Maesot	52	11,818	50
Bantak	38	4,005	46
Maeramard	32	2,843	46
Sarmnjao	29	2,775	22
Tasongyang	24	8,645	72
Total	231	38,055	278

Table 2. Number of heart diseased, innocent students separated by disease categories. Numbers in parentheses are percentages of the 43 children with newly classified heart disease

Disease subtype	Number of children (43)
VSD	18 (41.86%)
PDA	7 (16.28%)
PS	7 (16.28%)
ASD	5 (11.63%)
MR	3 (6.98%)
TOF	1 (2.33%)
AS	1 (2.33%)
TR	1 (2.33%)

the experience of the nurses and health officers to diagnose the abnormal heart sound at the primary screening step. The previous studies in Ayuthaya and Sukhothai provinces found the prevalence for congenital heart disease in children to be 3 and 1.19, respectively[1]. Similar to the present findings, their studies reported that many children did not know about their heart disease prior to the studies but the prevalence in the present study was lower because the authors excluded children with recognized heart disease.

The present study is important to the health of the children in Tak province, and is significant to health care management. Especially because Tak, has a shortage of doctors, well-trained nurses, and competent health officers who are able to diagnose the disease. The subjects with heart impairment were referred to pediatric cardiologists and cardiac surgeons for appropriate treatment and surgery.

The present study can assist health care centers to approximate the number of congenital heart defective children in Thailand. The number of cases in Tak also serves as a good comparison to other regions where similar studies had been performed to determine the distribution of the congenital heart disease in various provinces and cities of Thailand. Special attention should be given to the areas where high numbers of cases exist to investigate potential factors.

Acknowledgements

1. Prof.Boonchob Pongpanich, MD, and The Cardiac Children Foundation of Thailand Under the Royal Patronage of H.R.H.Princess Galyani Vadhana Krom Luang Naradhiwas Rajanagarindra.

2. Mobile health care and career development service, Naresuan University.

3. Tak Provincial Health Office, Thailand.

4 Somdej Phrachaotaksinmaharaj Hospital, Tak, Thailand.

5. Maesot Hospital, Tak, Thailand.

References

1. Mongkonsiri D, Taytiwat P, Pankate P. The prevalence of congenital heart disease of elementary school aged students in Sukhothai province [in Thai]. Thai Med Council Bull 2005; 34: 91-104.
2. Hoffman JI. Incidence of congenital heart disease: I. Postnatal incidence. Pediatr Cardiol 1995; 16: 103-13.
3. Wren C, O'Sullivan JJ. Survival with congenital heart disease and need for follow-up in adult lift. Heart 2001; 85: 438-43.
4. Hoffman JI, Kaphan S. Incidence of congenital heart disease. J Am Coll Cardiol 2002; 39: 1890-900.
5. Mitchell SC, Korones SB, Berendes HW. Congenital heart disease in 56,109 births incidence and natural history. Circulation 1991; 43: 323-32.
6. Danford DA, Martin AB, Fletcher SE, Gumbiner CH. Echocardiographic yield in children when innocent murmur seems likely but doubts linger. Pediatr Cardiol 2002; 23: 410-4.

โรคหัวใจพิการแต่กำเนิดในเด็กไทย

จรัญ สายะสถิตย์, เกรียงไกร ตันติวงศ์โกสีย์, นราพร สมบูรณ์นะ

วัตถุประสงค์*: เพื่อทราบถึงอุบัติการณ์โรคหัวใจพิการแต่กำเนิดในเด็กนักเรียนชั้นประถมศึกษาที่ไม่ทราบมาก่อนว่าเป็นโรคหัวใจ ในจังหวัดตาก (231 โรงเรียน, 6 อำเภอ)*

วัสดุและวิธีการ*: โดยใช้พยาบาลและเจ้าหน้าที่สาธารณสุขในการตรวจคัดกรองเด็กนักเรียนชั้นประถมศึกษาในจังหวัดตาก 38,055 คน เด็กที่ตรวจพบเสียงหัวใจผิดปกติจะได้รับการตรวจวินิจฉัยยืนยันโดยแพทย์อายุรกรรมเด็กโรคหัวใจ*

ผลการศึกษา*: จากเด็กทั้งหมด 278 คนที่ตรวจคัดกรองพบเสียงหัวใจผิดปกติ ได้รับการตรวจวินิจฉัยยืนยันว่าเป็นโรคหัวใจจริง 43 คน โดย 40 คนเป็นโรคหัวใจพิการแต่กำเนิด (1.05 ต่อ 1000) อีก 3 คนเป็นโรคลิ้นหัวใจรูมาติก*

สรุป*: การทราบถึงอุบัติการณ์โรคหัวใจพิการแต่กำเนิดในเด็ก ทำให้สามารถทำนายและเฝ้าติดตามรักษาเด็กโรคหัวใจพิการแต่กำเนิดได้ต่อไปในอนาคต*