



EFFECTIVENESS OF ONLINE EDUCATION TOWARDS HEALTHWORKERS KNOWLEDGE ENHANCEMENT ABOUT EARLY DETECTION OF CONGENITAL HEART DISEASE FOLLOWED BY ECHOCARDIOGRAPHY SCREENING IN PROBOLINGGO, EAST JAVA, INDONESIA

Community Medicine

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ABSTRACT

Introduction: Congenital Heart Disease (CHD) is considered as the most congenital abnormality found in newborn. The prevalence rate of CHD in 2017 was 17.9/1000 worldwide. One of the major reasons why this congenital abnormality remains a burden worldwide is the delayed of its diagnosis. Probolinggo, one of the cities in East Java, Indonesia, has no pediatric cardiologist, moreover, there is no data about CHD epidemiology of that city. The aim of this study is to improve the knowledge about early detection of CHD among healthworkers, and to provide the data about CHD's epidemiology in Probolinggo. **Materials and Methods:** This study used a pre-posttest to evaluate the knowledge of healthworkers about CHD. The intervention given was an online education by experts. The improvement of healthworkers knowledge was analyzed using paired-sample T-Test using SPSS version 20, with $p < 0.05$ was considered statistically significant. The visitation was conducted in Probolinggo, consisted of echocardiography screening by pediatric cardiologists. Participant's gender, age, chief complaints, and type of CHD were collected. **Results:** There were 154 participants of online education, most of them were general pediatricians with the total of 87 (56.5%), followed by general practitioners with 33 (21.4%). There was a statistically significant improvement ($p < 0.001$) in posttest score's mean (13.23/15) compared to the pretest (10.08/15). From the visitation we obtained 23 children were diagnosed with acyanotic CHD, 6 children with cyanotic CHD, and 4 children were normal. Ventricular septal defect (VSD) was found in 13 screened children (39.39%). 15 screened children were asymptomatic (45.45%), while 13 children had a recurrent acute respiratory infection (39.39%). **Conclusions:** Online education can be an effective method to improve the basic knowledge among health workers about early detection of CHD. In Probolinggo, VSD was the most common CHD lesion.

KEYWORDS

congenital heart disease, online education, probolinggo, echocardiography

INTRODUCTION

Every structural abnormality of the heart and/or large vessels that is present at birth is defined as congenital heart disease (CHD).¹ CHD is considerably the most congenital abnormality found in newborn. Despite numerous of CHD incidence, the etiology of this congenital abnormality is mostly undetermined. The prevalence rate of CHD in 2017 was 17.9/1000 worldwide, the survival rate at 28 days of life decreased by almost 70% in newborns with CHD, and it was responsible for 261,247 deaths.^{2,3} Asia is a region with the highest CHD prevalence globally, with the prevalence of 9.3/1000 live births.⁴ Unfortunately, there is no sufficient data which could thoroughly explain the epidemiology of CHD in Indonesia. The study which is conducted in Sardjito Hospital showed that the incidence rate of CHD in children was 10.4/1000, with ventricular septal defect (VSD) as the most common lesion.⁵

Delayed diagnosis of CHD is one of the major reason why this congenital abnormality remains a heavy disease burden worldwide, particularly in developing country, despite the advances in cardiovascular medicine and surgery over the past decades.⁶ Delayed diagnosis of CHD is determined as the CHD is diagnosed after the patient sent home from the birth hospital or others medical facility, or when a cardiac intervention is immediately needed after the very first diagnosis.⁷ One study which conducted in developing country indicated that 85,1% of children had delayed diagnosis of CHD.⁸ The other study in Indonesia demonstrated that six out of ten children experienced delayed diagnosis of CHD.⁷

Echocardiography, a noninvasive but accurate diagnostic tool, remains a golden standard of diagnosing CHD.⁹ Nevertheless, not all healthworkers are capable of utilizing it. Probolinggo, one of the cities in East Java, Indonesia, has no pediatric cardiologist. Moreover, there is not a single data of that city that could describe the number of CHD. The purpose of this study is to improve the knowledge about early detection of CHD among healthworkers, and to provide the data about CHD's epidemiology in Probolinggo, East Java, Indonesia.

MATERIALS AND METHODS

To evaluate the knowledge of healthworkers about CHD and its early detection, we used a pre-posttest design. The education method was carried out through online meeting/webinar, or online educations by public lectures, playing educational videos about CHD, and discussion session by Zoom Meeting, which conducted on 6th May 2023. The following subjects were used as topic of lectures: early detection of

CHD, Diagnosis and Treatment of CHD, Management of Patent Ductus Arteriosus in Newborn, Identifying Persistent Pulmonary Hypertension in Newborn, and Case Simulation. Bahasa Indonesia was selected as the main language for online education. Participants were all healthworkers, including general pediatricians, general practitioners, midwives, nurses, and medical student from various fields in Probolinggo, East Java, were gathered using consecutive sampling. The following were inclusion criteria for participants: age above 18, are able to communicate using Bahasa Indonesia, are working at Probolinggo, East Java, and willingness to participate in online education. Pre-test was taken by participants to evaluate their basic knowledge about early detection of CHD. Post test was conducted after the intervention was given to the participants. Pretest and posttest were the same 15 multiple choice questions in a random order, about basic knowledge and early detection of CHD, based on our previous study. Paired-sample T-test was used to analyzed pre-test and post-test results, using the SPSS version 20. $P < 0.05$ was considered statistically significant.

To provide the data of CHD in Probolinggo, East Java, a visitation of echocardiography practice and newborn pulse oximetry screening by Pediatric Cardiologist Consultants was conducted. The visitation was held at 3rd June 2023 in Probolinggo. Participants were all of children who lived in Probolinggo. The following were inclusion criteria for this visitation: age below 18, are suspected having CHD by general pediatricians or general practitioners, and have the parent's or their guardian's permission to participate in the echocardiography screening. Participant's gender, age, chief complaints, and type of CHD were collected.

RESULTS

There were 154 participants of this online education, and most of them were general pediatricians with the total of 87 (56.5%), followed by general practitioners, and nurses, respectively 33 (21.4%) and 22 (14.3%) (Table 1). There was an improvement in the posttest score. The mean of pretest score was 10.08/15, with 3 participants achieving a perfect score, while posttest had a mean score of 13.32/15, with 42 participants achieved a perfect score. T-test revealed that mean post-test score was significantly higher than the mean pre-test score ($P < 0.001$) (Table 2).

Table – 1 Participants Of Online Education

Participants	(N=154)
General Practitioners, n(%)	33 (21.4)

General Pediatricians, n(%)	87 (56.5)
Nurses, n(%)	22 (14.3)
Midwives, n(%)	10 (6.5)
Students, n(%)	2 (1.3)

Table – 2 Results Of Pretest And Posttest Of Online Education

Test	Mean score	P value
Pretest	10.08	<0.001
Posttest	13.23	

From the visitation we found that there was total of 33 children screened by echocardiography examination (male 51.52% and female 48.48%) by 3 pediatric cardiology consultants. Among all of the screened children, there were 23 children were diagnosed with acyanotic CHD, 6 children with cyanotic CHD, and 4 children were normal. VSD was the most common lesion among children (39.39%), followed by atrial septal defect (ASD) (24.24%) and persistent ductus arteriosus (PDA) (12.12%) in those diagnosed with acyanotic CHD. The most common cyanotic CHD was tetralogy of Fallot (ToF) and transposition of the great artery (TGA), with the total of 2 each (6.06%). 15 screened children were asymptomatic (45.45%), while 13 children got recurrent acute respiratory infection (39.39%) (Table 3).

Table – 3 Results Characteristics Of Participants In Echocardiography Screening Group (N=33)

Characteristics	Frequency(n)	Percentage(%)
Sex		
Male	17	51.52%
Female	16	48.48%
Age		
0-5 y	27	81.82%
6-10 y	2	6.06%
11-15 y	4	12.12%
Chief complaints*		
Cyanosis	4	12.12%
Growth failure	2	6.06%
Shortness of breath	1	3.03%
Recurrent acute respiratory infection	13	39.39%
Asymptomatic	15	45.45%
Type of CHD		
Acyanotic	23	69.70%
Cyanotic	6	18.18%
Normal	4	12.12%
CHD lesion**		
VSD	13	39.39%
ASD	8	24.24%
PDA	4	12.12%
ToF	2	6.06%
TGA	2	6.06%
DORV	3	9.09%
PS	4	12.12%
MR	2	6.06%
TR	5	15.15%
PR	3	9.09%

*1 patient could experience more than 1 sign and symptom

**1 patient could have more than 1 lesion of CHD

LBW= Low Birth Weight; VLBW= Very Low Birth Weight; VSD= Ventricular Septal Defect; ASD= Atrial Septal Defect; PDA=Patent Ductus Arteriosus; ToF=Tetralogy of Fallot; TGA=Transposition of Great Artery; DORV=Double Outlet Right Ventricle; PS=Pulmonal Stenosis; MR=Mitral Regurgitation; TR=Tricuspid Regurgitation; PR=Pulmonary Regurgitation

DISCUSSION

Education is still one of the essential methods to empower healthcare. In the time of pandemic, education technique was demanded to move online, which nowadays, online education has become an ordinary method and can be arranged easily.¹⁰ A recent meta-analysis study showed that synchronous distance education, which refer to online (live) education method, had a higher satisfaction ratings, with no significant different in effectiveness, for medical students, rather than the traditional one.¹¹ In addition, online education is also much more cost-effective and flexible both the location and time, which make this education method is quite acceptable and more convinient for healthworker who has a very diverse and tight schedule.^{10,12,13}

This study concluded that the online education, which was delivered through online meetings/webinar, had a significant role on improving healthcare's knowledge about early detection of CHD. Two previous studies, which conducted in Bojonegoro and Lumajang, Indonesia, also showed the similar improvement result.^{14,15} The same outstanding result has been reported by the study conducted in Jember.¹⁶ One comparative interventional study also stated that both the e-learning group and the lecturer (conventional) group had the same significant improvement on the knowledge about CHD.¹⁷ It can be assumed that online education is the effective method, and could possibly replace the conventional one, to improve basic knowledge about CHD.

The most common CHD lesion found in this study was VSD, followed by ASD, and PDA. A meta-analysis study of 260 across the world studies also elucidated that VSD is the most frequent congenital cardiac anomaly in children.¹⁸ Many studies in Indonesia showed the same result as well.^{5,14-16} However, there is no sufficient explanation that could explain about how VSD become the most frequent type of CHD lesion.

CONCLUSION

Limited knowledge among health workers of CHD could possibly be one of the major obstacles for early screening and identification, as well as timely management. Online education or webinar training can be an alternative method to improve the basic knowledge among health workers about early detection of CHD. In Probolinggo, VSD was the most common lesion for acyanotic CHD, while ToF and TGA was the most common cyanotic CHD.

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