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Webinar Training of Congenital Heart Disease Followed by Echocardiography Screening in Jember

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Abstract
Background: *Congenital heart disease (CHD) affects approximately 0.8% to 1.2% with incidence rate of mortality was 81 cases per 100,000 live births. Generally, CHD is a structural abnormality of the heart and (or) great vessels that is present at birth. Limited knowledge among health workers for the etiologist, risk factors, and the high heterogeneity in CHD constitutes the major obstacles for prevention and early screening. The educational activities aim to increase the medical personnel's knowledge to conduct early detection and management of CHD in Jember.*
Methods: *These activities consisted of training followed by echocardiography screening. The training was implemented through webinar with health workers participants in Jember. The topics contained how to detect, diagnosis and therapy, and cases simulation of CHD. Pre and Post-test were used to evaluate knowledge level. The visitation of echocardiographic screening by Pediatric cardiologist was held a week later in Jember.*
Results: *There were 208 participants during the webinar training. The mean score of pre-test was 10.09/15 with only 7 participants who got the perfect score. At the end of the webinar, the mean score of post-test was 14.34/15 with 127 participants who finally got the perfect score. Total 28 children were screened by echocardiography examination. There were 14 children diagnosed with acyanotic CHD, 10 children with cyanotic CHD, and 4 children were normal.*
Conclusion: *Webinar training can improve the knowledge among health workers about early detection of CHD and there were 86% children diagnosed with CHD among screening participants in Jember.*

Keywords: *Congenital Heart Disease; Screening; Echocardiography; Children; Jember*

Abstrak
Latar belakang: *Penyakit jantung bawaan (PJB) mengenai 0,8% sampai 1,2% dengan angka kejadian kematian adalah 81 kasus per 100.000 kelahiran hidup. Penyakit ini merupakan gangguan struktural jantung dan (atau) pembuluh darah besar yang muncul saat lahir. Keterbatasan pengetahuan petugas kesehatan mengenai etiologi, faktor risiko, dan tingginya heterogenitas PJK merupakan hambatan utama untuk pencegahan dan skrining dini. Kegiatan edukasi ini bertujuan untuk meningkatkan pengetahuan tenaga medis untuk melakukan deteksi dini dan penatalaksanaan PJK di Jember.*
Metode: *Kegiatan ini berupa pelatihan yang dilanjutkan dengan pemeriksaan ekokardiografi. Pelatihan dilaksanakan melalui webinar dengan peserta tenaga kesehatan di Jember. Materi yang diberikan meliputi cara deteksi, diagnosis dan terapi, serta simulasi kasus PJB. Pre dan Post-test digunakan untuk mengevaluasi tingkat pengetahuan. Kunjungan pemeriksaan ekokardiografi oleh dokter spesialis jantung anak dilakukan seminggu kemudian di Jember.*
Hasil: *Terdapat 208 peserta selama pelatihan webinar. Nilai rata-rata pre-test adalah 10.09/15 dengan hanya 7 peserta yang mendapat nilai sempurna. Di akhir webinar, nilai rata-rata post-test adalah 14,34/15 dengan 127 peserta yang akhirnya mendapat nilai sempurna. Sebanyak 28 anak diperiksa dengan pemeriksaan ekokardiografi. Terdapat 14 anak terdiagnosis PJK sianotik, 10 anak terdiagnosis PJK sianotik, dan 4 anak normal.*
Simpulan: *Pelatihan webinar dapat meningkatkan pengetahuan petugas kesehatan tentang deteksi dini PJB dan terdapat sekitar 86% anak terdiagnosis PJB di Jember.*

Kata Kunci: *Penyakit Jantung Bawaan; Skrining; Ekokardiografi; Anak-anak; Jember*

1. INTRODUCTION

Congenital heart disease (CHD) is the most common congenital disorder in newborns. The incidence of CHD was relatively high in developing countries located in Africa and Asia, while low in most developed countries. The incidence of CHD remained stable over the last 3 decades, suggesting

little improvement in prevention strategies and highlighting the importance of etiological studies (Wu, 2020).

Basically, Congenital heart disease (CHD) refers to the presence of a structural abnormality of the heart and / or great vessels that is present at birth and is of actual or potential functional significance.3 The term usually excludes congenital arrhythmias and cardiomyopathies even though these may be based on genetic or other abnormalities that are present at birth (Bode-Thomas, 2012; Zimmerman, 1990-2017). Despite of numerous etiologic investigations, only approximately 15% of cases of CHD can be attributable to a known cause. Although advances in cardiovascular medicine and surgery over the past decades have decreased mortality drastically and enabled most patients to reach adulthood, CHD remains the leading cause of mortality from birth defects and imposes a heavy disease burden worldwide (Lopes SAVDA, 2018).

The incidence rate of mortality from congenital heart disease was 81 cases per 100,000 live births. The lethality attributed to critical congenital heart diseases was 64.7%, with proportional mortality of 12.0%. The survival rate at 28 days of life decreased by almost 70% in newborns with congenital heart disease. Moreover, the incidence and mortality of CHD are substantially heterogeneous across the world. Limited knowledge among health workers for the etiologist of CHD and the high heterogeneity in CHD epidemics constitutes the major obstacles for prevention and early screening (Wu, 2020; Lopes SAVDA, 2018).

The educational activities were focused on the early detection and management of congenital heart disease especially in the primary health facility in Lumajang. The activities were held in the form of education for health workers and echocardiography practice. We also carried out the visitation activities with the objective of 1) screening all newborns admitted in the nursery and neonatal intensive care unit (NICU) to rule out CHD before discharge from hospital and 2) to find out the utility of pulse oximetry to detect CHD.

2. METHODS

These studies consisted of webinar training and echocardiography screening. For webinar training, the subject of this study was all health workers, including general practitioners, general pediatricians, midwives, nurses, and medical student from various fields in Jember. Our research sample selection was doing by total sampling. The education method was carried out through free webinar by public lectures, playing educational video about CHD, and Q&A by Zoom Meeting on Saturday, October 30th, 2021 started at 9 AM (Figure 1). To attract participants, there was free pulse vouchers for the first 100 registrant. The topics focused on how to early detect CHD, management diagnosis and therapy of CHD, and some cases simulation. The variable for assessing the health workers knowledge was evaluated by pre and post-tests in a knowledge level questionnaire with 15 multiple choice questions. The results of the pre-test and post-test were analysed statistically with the t-test.

The visitation of echocardiography practice and newborn pulse oximetry screening by Pediatric Cardiologist Consultant was held on November 7th 2021 in Jember.

3. RESULTS AND DISCUSSION

The online education method was carried out in the form of a free webinar with the theme of early detection of congenital heart disease in a child for health workers in Jember and 208 participants attended it with 55 general practitioners (26%), 66 general pediatricians (32%), 45 nurses (22%), 23 midwives (11%), and 19 students (9%) (Tabel 1). The activities were done using the online method in the form of educational videos, public lectures, and Q&A by pediatric cardiologist consultants (Figure 2). The materials provided in the online seminar activities were how to detect CHD, management diagnosis and therapy of CHD, and cases simulation of CHD.

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Table 1. Participants attended webinar training

Profession	Participants	%
General practitioners	55	26
General Pediatricians	66	32
Nurses	45	22
Midwives	23	11
Students	19	9
Total	208	100

Before the public lectures were begin, a pre-test with 15 multiple choice questions was performed. The mean score of pre-test was 10.09/15 with only 7 participants who got the perfect score. At the end of the webinar, the mean score of post-test was 14.34/15 with 127 participants who finally got the perfect score. The comparison of both results with the t-test showed a significantly different result ($p < 0.05$) (Table 2).

Table 2. Results of pre and post-test

Test	Mean Score	p
Pre-test	10.09	0.002
Post-test	14.34	

Echocardiography screening examination

At the visitation on November 7th 2021 in Jember, there were total 28 children screened by echocardiography examination (male 68% and female 32%) by 3 pediatric cardiology consultants. There were 14 children diagnosed with acyanotic CHD, 10 children with cyanotic CHD, and 4 children were normal. Ventricle septal defect (VSD) was the most common lesion among children (34%) followed by atrial septal defect (ASD) 7%, persistent ductus arteriosus (PDA) 2% in acyanotic CHD. While the most common of cyanotic CHD was Tetralogy of Fallot (TOF) 11%, followed by Double Outlet of Right Ventricle (TGA) 7%. Most of them had symptoms of growth failure (27%). For nutritional status, most of them was moderate malnutrition (64%). For prenatal history, most participant was born spontaneously (78%) as term infant (75%) with normal birth weight (75%).

Table 3. Characteristics of subjects

Characteristics	Frequency (n)	Percentage (%)
Sex		
- Male	19	68
- Female	9	32
Age		
- 0-3 y	19	68
- 4-7 y	5	19
- 8-11 y	2	7
- 12-15 y	1	3
- 16-18 y	1	3
Chief Complaints*		
- Cyanotic	10	25

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- Growth failure	11	27
- Shortness of breath	10	25
- Recurrent acute respiratory infection	9	23
Gestational Age		
- Term	21	75
- Preterm	7	25
Nutritional status		
- Good	10	36
- Moderate	18	64
Mode of delivery		
- Spontaneous	19	68
- C-section	9	32
Birth weight		
- Normal	21	75
- LBW	7	25
Type of CHD		
- Acyanotic	14	50
- Cyanotic	10	36
- Normal	4	14
Lesion of CHD**		
- VSD	15	34
- ASD	3	7
- PDA	1	2
- ToF	5	11
- DORV	3	7
- PS	8	18
- MR	2	4
- TR	3	7

*1 patient could experience more than 1 sign and symptom
**1 patient could have more than 1 lesion of CHD

Diagnostic and treatment capabilities for CHD have dramatically improved over the past 80 years. In the Metropolitan Atlanta Congenital Defects Program, infant survival with critical CHD improved from 67.4% for the 1979–93 birth cohort to 82.5% for the 1994–2005 cohort (Reller MD, 2008). These findings show substantial improvement in survival in developed regions of the world, however the same success rates are not yet seen in developing regions. CHD accounts for 6%-10% of all infant deaths and accounts for 20%-40% of all infant deaths that occur due to malformation. One of the major contributors to increased infant mortality and morbidity is the clinical deterioration and collapse prior to diagnosis and treatment (Mohsin M, 2019). Congenital heart defects involve a problem during the development of the heart which can manifest at any age. This problem can be mild with no significant hemodynamic compromise to critical, requiring early intervention and surgeries. About 25% of CHDs are life-threatening and may manifest before the first routine clinical examination (Reller MD, 2008; Mohsin M, 2019). Failure to identify these critical lesions immediately after birth leads to a delay in referral and increased mortality and morbidity. Therefore, it is very necessary for all health workers to be able to identify those with CHD early in order to get the best management since the cases is usually found mostly in primary health facility where the qualified human resources and diagnosis instrument are very minimal.

Due to the COVID-19 pandemic, the training and education method must be held online. The online educational process has become a transitional phase that takes place very quickly. In several countries, it has been going well and fast by using certain platforms such as ZOOM, Google Meet, and so on to support the educational process.[8] Medical personnel have an obligation to continue developing themselves by following scientific and medical skill developments to support a good public health

service. The conditions of the outbreak of COVID-19 have made online seminars became an alternative popular method of increasing the medical personnel knowledge in health services, but they also have limitations in improving skills. The results statistically showed an increase in the medical personnel knowledge who had participated (Ferrel M N, 2020).

Online seminars can easily accommodate many participants and reach remote areas in Indonesia. In this pandemic, it is time to develop educational tools necessarily, to strengthen internet networks in remote areas of Indonesia, and to develop a delivery model in the form of interesting and interactive video tutorials of medical skills, and it is expected that there will be a model of continuing education that is managed with communication and consultation models with experts in their respective fields using available information technology to implement the knowledge gained in health services in the field (Papapanou M, 2021; Ferrel M N, 2020).

This online seminar activities received very well appreciation from the participants because they seldom get these materials before although they claimed that the cases are very often. Knowledge about early detection and management of CHD is very necessary for health services. Therefore, the online method can be an alternative educational method to increase knowledge in the pandemic era that limits social interactions widely and openly (Papapanou M, 2021; Ferrel M N, 2020).

From the echocardiography practice in Jember, Ventricle septal defect (VSD) was found as the most common lesion (34%) followed by atrial septal defect (ASD) 7%, persistent ductus arteriosus (PDA) 2% for acyanotic CHD, and Tetralogy of Fallot (TOF) 11% for cyanotic CHD. This result was similar with Thomford et al in 2020 that stated the most common acyanotic CHD was VSD affecting 31.4% while TOF being the commonest cyanotic CHD (25.5%) (Thomford, 2020). In this present study, most of them had symptoms of growth failure (57%). For nutritional status, most of them was with moderate malnutrition (50%). Our findings were similar with Diao's et all that stated children with CHD have a high prevalence of pre-operative malnutrition and some show catch-up growth post-operatively (Jingyi Diao, 2021). These data can be used as benchmarks in efforts to improve the nutritional status of children with CHD.

4. CONCLUSION

The incidence of CHD was relatively high in developing countries, including Indonesia. Limited knowledge among health workers for the etiologist, risk factor, detection, and early management of CHD constitutes the major obstacles for prevention and early screening. Webinar training can be an alternative method to improve the basic knowledge among health workers about early detection of CHD. In Jember, Ventricle septal defect (VSD) was found as the most common lesion for cyanotic CHD, while Tetralogy of Fallot (TOF) is the most common cyanotic CHD.

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ABBREVIATIONS

1. AHA : American Heart Association
2. ASD : Atrial Septal Defect
3. CHD : Congenital Heart Disease
4. DORV : Double Outlet of Right Ventricle
5. LBW : Low Birth Weight
6. MR : Mitral Regurgitation
7. NICU : Neoantal Intensive Care Unit
8. PDA : Patent Ductus Arteriosus
9. PS : Pulmonary Stenosis

10. PR : Pulmonary Regurgitation
11. TGA : Transposition of the Great Artery
12. ToF : Teralogy of Fallot
13. TR: Tricuspid Regurgitation
14. VSD : Ventricular Septal Defect
15. VLBW : Very Low Birth Weight

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