JPKM : Jurnal Pengabdian Kesehatan Masyarakat
http://ejurnal.ung.ac.id/index.php/jpkm/index
https://doi.org/10.37905/jpkm.v2i2.13923
E-ISSN 2774-3519

PELATIHAN WEBINAR DETEKSI DINI PENYAKIT JANTUNG KONGENITALDILANJUTKAN DENGAN EKHOKARDIOGRAFI DAN SKRINING PULSA OKSIMETRI DI LUMAJANG JAWA TIMUR INDONESIA

WEBINAR TRAINING OF EARLY DETECTION OF CONGENITAL HEART DISEASE FOLLOWED BY ECHOCARDIOGRAPHY AND PULSE OXIMETRYSCREENING IN LUMAJANG, EAST JAVA, INDONESIA

Mahrus Abdur Rahman[1], I Ketut Alit Utamayasa[2], Teddy Ontoseno[3], TaufiqHidayat[4], Henry Wicaksono[5]
[1,2,3,4,5,]Department of Child Health, Faculty of Medicine, Universitas AirlanggaDr. Soetomo General Hospital, Surabaya, East Java, Indonesia.
email: mahrus.a@fk.unair.ac.id

Abstract

Congenital heart disease (CHD) affects about 0.8% to 1.2% with the mortality rate being 81 cases per 100,000 live births. Generally, CHD is a structural abnormality of the heart and (or) large blood vessels that appear at birth. The purpose of this activity is to conduct webinar training on early detection of congenital heart disease followed by ecocardiography and oximetry pulse screening in lumajang east Java Indonesia the novelty in this service activity because it provides training on early detection of heart disease. The training method was carried out through webinars with health worker participants in Lumajang. The material provided includes early detection methods, diagnosis and therapy, as well as simulations of CHD cases. Pre and Post-test are used to evaluate the level of knowledge. A visit to the echocardiography and pulse oximetry examination by a pediatric cardiologist was carried out two weeks later in Lumajang. As a result of the activity, there were 140 participants who took part in the webinar training. The average score of the pre-test was 11.13/15 with only 5 participants getting a perfect score. At the end of the webinar, the average post-test score was 14.34/15 with 115 participants who finally got a perfect score. A total of 28 children were examined by echocardiography examination. 20 children were diagnosed with cyanotic CHD, 6 children were diagnosed with cyanotic CHD, and 2 were normal children. On pulse oximetry examination, all babies had an oxygen saturation of 95% or more and there was no difference of more than 3% between the pre and post duct sites. Conclusion Webinar training can increase health workers' knowledge about early detection of CHD.

Keywords : Congenital Heart Disease; Filtering; Echocardiography; Pulse oximetry.

Received : March 24th, 2022; 1st Revised April 01th, 2022; 2nd;
Accepted for Publication : May 23th, 2022

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 (1) (2).

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 termusually excludes congenital arrhythmias and cardiomyopathies even though these may be based on genetic or other abnormalities that are present at birth (3)(4). Despite of numerous etiologic investigations, only approximately 15% of cases of CHD can be attributable to a knowncause. 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 (2).

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 (5). 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 (1)(2). 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 (6). 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 ofpulse oximetry to detect CHD.

MATERIALS AND METHODS

These studies consisted of webinar training, echocardiography and newborn pulse oximetry 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 Lumajang. 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 October 24th, 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 6th 2021 in Lumajang.

RESULTS

Webinar training

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 Lumajang and 140 participants attended it with 45 general practitioners (32.15%), 30 general pediatricians (21.43%), 25 nurses (17.87%), 25 midwives (46.96%), and 15 students (10.78%) (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.

Before the public lectures were begin, a pre-test with 15 multiple

choice questions was performed. The mean score of pre-test was 11.13/15 with only 5 participants who got the perfect score. At the end of the webinar, the mean score of post-test was 14.34/15 with 115 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).

Echocardiography screening examination

At the visitation on November 6th 2021 in Lumajang, there were total 28 children screened by echocardiography examination (male 57% and female 43%) by 3 pediatric cardiology consultants. There were 20 children diagnosed with acyanotic CHD, 6 children with cyanotic CHD, and 2 children were normal. Ventricle septal defect (VSD) was the most common lesion among children (35%) followed by atrial septal defect (ASD) 31%, persistent ductus arteriosus (PDA) 19% in acyanotic CHD. While the most common of cyanotic CHD was Tetralogy of Fallot (TOF) 11%, followed by Transposition of the great artery (TGA) 8%. Most of them had symptoms of growth failure (57%). For nutritional status, most of them was moderate malnutrition (50%). For prenatal history, most participant was born spontaneously (78%) as term infant (75%) with normal birth weight (61%).

Newborn pulse oximetry screening

We also had an opportunity to do a pulse oximetry screening towards vigorous babies in neonatal ward of Haryoto Hospital Lumajang. The pulse oximetry screening was examined between a pre-ductal and post-ductal side, prior to the infant's discharge after day 1. From total 8 babies, only 1 baby was born as late preterm infant (36-37 weeks), while the others were born as term infant. All baby had an oxygen saturation at 95% or above and there was no difference more than 3% in oxygen saturations between a pre-ductal and post-ductal site.

DISCUSSION

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 (7). 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.(8)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 (6)(8). 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. Medical personnel have an obligation to continue developing themselves by following scientific and medical skill developments to support a good publichealth 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 hadparticipated (9).

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 (8)(10).

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 toincrease knowledge in the pandemic era that limits social interactions widelyand openly (9)(10).

From the echocardiography practice in Lumajang, Ventricle septal defect (VSD) was found as the most common lesion (35%) followed by atrial septal defect (ASD) 31%, persistent ductus arteriosus (PDA) 19%, and Tetralogy of Fallot (TOF) 11%. 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%) (11). In this present study, most of them had symptoms of growth failure (57%). For nutritional status, most of them was with moderate malnutrition (50%) (12). 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 (13). These data can be used as benchmarks in efforts to improve the nutritional status of children with CHD.

For the newborn pulse oximetry screening, all baby had an oxygen saturation at 95% or above and there was no difference more than 3% in oxygen saturations between a pre-ductal and post-ductal site. Many studies have shown that the measurement of oxygen saturation can identify neonates with mild cyanosis who do not have an audible murmur or other signs of cardiac abnormality and are not detected by routine clinical examination. Combining pulse oximetry with clinical examination can enhance the clinician's ability to detect life-threatening CHD in a timely manner. The American Heart Association (AHA) has recommended future

studies across a broad range of delivery systems to determine whether this practice should become the standard of care in the routine assessment of neonates. Recent studies reported high sensitivity and specificity of pulse oximetry screening in newborns to detect CHD (14).

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 Lumajang, 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.

Conflict of Interest: none declared

ACKNOWLEDGEMENT

Moreover, the team would like to thankthe District Head of Lumajang, Mr. Thoriqul Haq and community organization “Adventure Makelar Surga” (AMS) for their assistance in the success of community service activities that have been done.

Funding Acknowledgment

This work was supported by the Faculty of Medicine, Universitas Airlangga for the 2021 Fiscal Year under the Decree of the Chancellor of Universitas Airlangga Regarding the Implementation of the Universitas Airlangga Community Service Programfor 2021 No. 388/UN9/2021 of May 7th,2021.

ABBREVIATIONS

1. AHA : American Heart Association
2. ASD : Atrial Septal Defect
3. CHD : Congenital Heart Disease
4. DORV : Double Outlet of Right Ventric
5. LBW : Low Birth Weight
6. MR : Mitral Regurgitation
7. NICU : Neonatal Intensive Care Unit
8. PDA : Patent Ductus Arteriosus
9. PS : Pulmonary Stenosis
10. PR : Pulmonary Regurgitation
11. TGA : Transposition of the Great
12. Artery
13. ToF : Tetralogy of Fallot
14. TR : Tricuspid Regurgitation
15. VSD : Ventricular Septal Defect
16. VLBW : Very Low Birth Weigh

REFERENCES

1. Wu W HJS. Incidence and mortality trend of congenital heart disease at the global, regional, and national level, 1990-2017. Medicine(Baltimore).2020;99(23):e20593.doi:10.1097/MD.0000000000020593. 2020; 2020;
2. Lopes SAVDA, Guimarães ICB, Costa SFO, Acosta AX SKM. Mortality for Critical Congenital Heart Diseases and Associated Risk Factors in Newborns. A Cohort Study. Arq Bras Cardiol. 2018;111(5):666- 673. DOI: 10.5935/abc.20180175. 2018;
3. Bode-Thomas F. Challenges in the Management of Congenital Heart Disease in Developing Countries. In Tech. 11:263-271. DOI: 10.5772/27273. 2012;
4. Zimmerman MS et al. Global, regional, and national burden of congenital heart disease, 1990–2017: a systematic analysis for the Global Burden of Disease Study. The Lancet Child & Adolescent Health. ;4(3):185-200. 2017;
5. Situngkir D, Rusdy MD, Ayu IM, Nitami M. Occupational Safety and Health Socialization as an Eddort to Prevent Occupational Accidents and Work-Related Disease. J Pengabdi Kesehat Masy [Internet]. 2021;1(2):64–72. Available from: http://ejurnal.ung.ac.id/index.php/jpkm/index JPKM DOI : 10.37905/jpkm.v2i1.10242
6. Reller MD, Strickland MJ, Riehle-Colarusso T MWC. Prevalence of congenital hear defects in metropolitan Atlanta, 19982005.JPediatr.2008;153(6):807813.DOI:10.1016/j.jpeds.2008.05.059. 2008;
7. Hoffman JI KS. The incidence of congenital heart disease. J Am Coll Cardiol. 2002 Jun 19;39(12):1890-900. doi: 10.1016/s0735-1097(02)01886 7. PMID: 12084585. 2002;
8. Mohsin M HKA. Clinical Screening for Congenital Heart Disease in Newborns at a Tertiary Care Hospital of a Developing Country. Cureus. Published 2019 Jun 3. doi:10.7759/cureus.4808. 2019;
9. Ferrel M N RJJ. The Impact of COVID-19 on Medical Education.Cureus.2020;12(3):e7492. DOI:10.7759/cureus.7492. 2020;

10. Papapanou M, Routsi E, Tsamakis K, Fotis L, Marinos G, Lidoriki I, Karamanou M, Papaioannou TG, Tsiptsios D, Smyrnis N, Rizos E SD. Medical education challenges and innovations during COVID-19 pandemic. Postgrad Med J. 2021:1-7. DOI: 10.1136/postgradmedj-2021-140032. Epub ahead of print. PMID: 33782202. 2021;
11. Thomford, N.E., Biney, R.P. OE et al. Clinical Spectrum of congenital heart defects (CHD) detected at the child health Clinic in a Tertiary Health Facility in Ghana: a retrospective analysis. J Congenit Heart Dis. 2020;89(3):1-8. 2020;
12. Bangol A, Diantika A O, F GU. Analysis Of The Cost Effectiveness Of Therapy In Hypertension And Type 2 Diabetes Mellitus Patients In Outstanding Installation. JAMBURA J Heal Sci Res. 2022;4(1):426–42. 2022;
13. Jingyi Diao, Letao Chen, Jianhui Wei, Jing Shu, Yihuan Li, Jinqi Li, Senmao Zhang TWJ. Prevalence of Malnutrition in Children With Congenital Heart Disease: A Systematic Review and Metaanalysis. The Journal of Pediatrics.2021;3476(21)0106.,9 .DOI:10.1016/j.jpeds.2021.10 065. 2021;
14. Mahle WT NJ, Matherne GP, Smith FC, Hoke TR, Koppel R, Gidding SS BR 3rd G. American Heart Association Congenital Heart Defects Committee of the Council on Cardiovascular Disease in the Young, Council on Cardiovascular Nursing, and Interdisciplinary Council on Quality of Care and Outcomes Research; American Academy of Pediatrics . 2009;