



# Journal of Health and Medical Sciences

**Waris, Hifza, Malik, Sajid Shaheen, Fahim, Anjuman, Mukhtar, Zahra, Yousaf, Warda, and Farooq, S. Muhammad Yousaf. (2019), Frequency of Congenital Heart Diseases in Children and Its Clinical Presentations on Echocardiography. In: *Journal of Health and Medical Sciences*, Vol.2, No.4, 493-502**

ISSN 2622-7258

DOI: 10.31014/aior.1994.02.04.77

The online version of this article can be found at:  
**<https://www.asianinstituteofresearch.org/>**

Published by:  
The Asian Institute of Research

The *Journal of Health and Medical Sciences* is an Open Access publication. It may be read, copied, and distributed free of charge according to the conditions of the Creative Commons Attribution 4.0 International license.

The Asian Institute of Research *Journal of Health and Medical Sciences* is a peer-reviewed International Journal. The journal covers scholarly articles in the fields of Medicine and Public Health, including medicine, surgery, ophthalmology, gynecology and obstetrics, psychiatry, anesthesia, pediatrics, orthopedics, microbiology, pathology and laboratory medicine, medical education, research methodology, forensic medicine, medical ethics, community medicine, public health, community health, behavioral health, health policy, health service, health education, health economics, medical ethics, health protection, environmental health, and equity in health. As the journal is Open Access, it ensures high visibility and the increase of citations for all research articles published. The *Journal of Health and Medical Sciences* aims to facilitate scholarly work on recent theoretical and practical aspects of Health and Medical Sciences.



ASIAN INSTITUTE OF RESEARCH  
Connecting Scholars Worldwide



# Frequency of Congenital Heart Diseases in Children and Its Clinical Presentations on Echocardiography

Hifza Waris<sup>1</sup>, Sajid Shaheen Malik<sup>2</sup>, Anjuman Fahim<sup>3</sup>, Zahra Mukhtar<sup>4</sup>, Warda Yousaf<sup>5</sup>, S. Muhammad Yousaf  
Farooq<sup>6</sup>

<sup>1</sup> Student of MID, The University of Lahore. Contact Number: 0323-1423379. Email: hifzawaris44@gmail.com

<sup>2</sup> MBBS, DMRD, MSC Ultrasound, The University of Lahore. Contact Number: 0333-4485808. Email: sajid.shaheen@rsmi.uol.edu.pk

<sup>3</sup> Student of MID, The University of Lahore. Contact Number: 0335-4182836. Email: Anjuman.fahim@gmail.com

<sup>4</sup> Student of MID, The University of Lahore. Contact Number: 0309-3522678. Email: Zahra mukhtar98@gmail.com

<sup>5</sup> Student of MID, The University of Lahore. Contact Number: 03114356288. Email: Wardayousuf80@gmail.com

<sup>6</sup> M. Phill Ultrasound, The University of Lahore. Email: Yousafgelani@gmail.com

Correspondence: Hifza Waris. Email: hifzawaris44@gmail.com

## Abstract

**Background:** Congestive heart failure (CHF) is a chronic progressive condition that affects the pumping power of your heart muscles. While often referred to simply as "heart failure," CHF specifically refers to the stage in which fluid builds up around the heart and causes it to pump inefficiently. An evaluation of screening for CHDs is very important, echocardiography is a non-invasive technique and Modern two-dimensional echocardiographic strategies offer a comprehensive way for evaluating virtually all types of CHD observed in both adults and children. **Objective:** The aim of this study is to find out the most common clinical presentation of congenital heart defects in children from 3 months to 16 years of age referred to echocardiography and confirm the presence of disease on echocardiography in Children Hospital Lahore. **Methods:** This is a descriptive and prospective Hospital-based study conducted in the pediatric cardiology unit outpatient department of CHILDREN HOSPITAL. This study included all the patients, irrespective of age, having confirmed the diagnosis of CHD on the basis of echocardiographic report. **Results:** In my study, 288 patients of clinically Diagnosed CHD referred to echocardiography were studied. Congenital heart defects were diagnosed more commonly between 3 months to 5 Years than other age groups. The reason for the higher incidence in the age group of 3 months to 5 years maybe that CHD becomes symptomatic at that age group. The commonest congenital heart defects with a single lesion in our study were Ventricular septal defect followed by Atrial septal defect, Tetralogy of Fallot, Patent ductus arteriosus **Conclusions:** We observed that Symptomatic patients mostly present in 3 months -5 years of age. At 0.16-5 year of age child presented with sweating, respiratory distress, syncope and tachypnea. While from 5-16 years, commonest symptoms were murmur, chest pain, respiratory distress, tachypnea. The most symptomatic lesion Congenital heart defects were Ventricle septal defect and Teratology of fallot Ventricle septal defect, Atrial septal defect Pulmonary stenosis. Transthoracic echocardiography is an important tool for confirmation of clinical presentations of CHD at different age group.

**Keywords:** Congenital Heart Disease, Echocardiography, Clinical Diagnosis

## Introduction

As a relevant part of the circulatory device, the heart is in most cases accountable for pumping blood and dispensing oxygen and vitamins all through the body considered one of the most important organs, such that even small dysfunctions or abnormalities may additionally purpose drastic changes or effects in the human organism. The organ is divided into numerous chambers followed by way of veins and arteries that facilitate the equal characteristic. The valves that separate those chambers are called atrioventricular valves. The systole is a short duration that occurs whilst the tricuspid and mitral valves close; the diastole is a rather longer length while the aortic and pulmonary valves close. The systole-diastole courting is the reference in measuring blood pressure. Other approaches of bodily figuring out the normal functioning of the heart is through examining the heartbeat rate (beats per minute). The interventricular septum separates the right from the left ventricle. The valve among the right atrium and right ventricle are made up of 3 essential leaflets of unequal size. The outlet of the pulmonary artery is guarded by using a valve referred to as the pulmonary valve. This valve prevents the again flow of blood from the pulmonary trunk into the right ventricle when the ventricular muscle relaxes. Two pulmonary veins bring the arterial or oxygenated blood out of each lung. The 4 pulmonary veins empty their contents into the left atrium of the heart. The valve separating the left atrium from the left ventricle is known as the left atrio-ventricular valve, or mitral valve, and consists of cusps. It's far smaller than the tricuspid orifice. Inside the left ventricle, the 2 groups of papillary muscles arise from the junction of the apical and middle 1/3 of the ventricular wall (Mesotten et al.,1998).

Congenital heart disease (CHD) discuss with structural or purposeful heart sicknesses, that are present at delivery. These are visible in neonates, babies and children, even though in our country it is not uncommon to peer adults with uncorrected CHD (Saxena, 2005). The incidence of CHD in extraordinary studies varies from about four/1,000 to 50/1,000 stay births. The relative frequency of different most important kinds of CHD additionally differs greatly from look at to examine. In addition, every other 20/1,000 stay births have bicuspid aortic valves, remoted anomalous lobar pulmonary veins or a silent patent ductus arteriosus (Hoffman and Kalpan, 2002). Congenital heart disease is structural abnormality of heart or blood vessels near the heart, present either on the time of start or detected afterward (MEMON et al.,2012). They are the maximum, not unusual birth defects, happening in zero. Five-0. Eight% of stay births, three-4% of nevertheless births; and 10-25% of abortuses (George and Frank,2009). Non-Invasive Cardiac diagnostic technique (like TTE) plays foremost within the prognosis of CHD. An echocardiography has to be completed without delay (Jatav et al.,2018) Echocardiograms can follow the response to the lower inside the LVOT gradient and improvement in diastolic function following scientific remedy (Levy et al.,2014).An entire-dimensional echocardiography examination to the recommendations of the American Society of Echocardiography (KLEINMAN et al.,1981). Over the beyond 20-30 years, important advances were made in the diagnosis and treatment of CHD. Echocardiography is a non-invasive technique and Modern two-dimensional echocardiographic strategies offer a comprehensive way for evaluating virtually all types of CHD observed in both adults and children (Sani et al.,2007). Congenital heart defects (CHDs) are accountable for up to 40% of all deaths from congenital anomalies and account for 3–7.5% of all infant deaths. An evaluation of screening for CHDs presents numerous challenges as "congenital coronary heart defects" is a time period that includes many exceptional structural heart malformations with various incidence, medical functions, herbal history, interventions, and probable advantage from screening. Moreover a few CHDs, for example, a few muscular ventricular septal defects (VSDs), are of no useful or clinical result and may resolve spontaneously in early life. In figuring out the most useful screening techniques for CHDs, it is vital to bear in mind the perfect goals of screening. The cutting-edge screening pathway for CHDs is complex and sequential screening techniques aren't integrated throughout fetal and neonatal existence neither is the impact of antenatal screening on newborn screening nicely-described (Knowles et al., 2013). Studies of the prevalence of CHD generally estimate the total prevalence and the proportions of different CHDs (Hoffman and Kalpan, 2002). There are minor changes in the different heart defects with seemingly moderate growth in the burden of tetralogy of Fallot and atrial septal defects and a moderate decrease in the burden of patent ductus arteriosus (Abdulkadir, 2016). Consanguinity performs a first-rate role within the occurrence of predominant congenital malformations in kids. The occurrence of CHD is not uniform in our united states, as numerous studies have suggested it ranging from 1 to 50.89 in line with a thousand stay (Kumar B.D et al., 2015). Three-dimensional strategies are actually firmly mounted for imaging of congenital heart defects. Once the 3-dimensional dataset has been received, it can be interrogated in any desired photograph

plane. The viewing alternatives include visualization as a three-dimensional photo or as a two-dimensional image cut in any desired axis (multi-planar reformatted) (Kumar, A et al., 2017). Apparent will increase in the prevalence of CHDs are therefore probable to be due to expanded detection of these minor defects as echocardiography is more often used for cardiac investigation. Life-threatening CHDs consist of the hypoplastic left heart (HLH), interrupted aortic arch (IAA), transposition of the first-rate arteries (TGA), obstructed overall anomalous pulmonary venous connection (TAPVC), coarctation of the aorta (COA), crucial aortic stenosis (AS) and pulmonary atresia (PA). (Simpson,2008).The maximum customary lifestyles-threatening defects at live delivery are coarctation of the aorta (COA) and essential aortic stenosis (AS); the ventricular septal defect is the most common CHD but not likely to result in collapse or to die (Knowles et al., 2013).

## Methods

An Observational and Cross-sectional study was conducted at Children Hospital, Ferozpur road Lahore. Our sample size was 288 patients. 288 patients were included after the approval of synopsis from institutional review board (IRB). All the patients of Age group 3 months to 16 years were diagnosed with congenital heart defect, referred to echocardiography and confirm the presence of disease on echocardiography. Echocardiography machine GE(vivid) was used was used to perform this research to find out the most common clinical presentation of congenital heart defect in children from 3 months to 16 years of age referred to echocardiography and confirm the presence of disease on echocardiography in Children Hospital. Figure 6 shows a ventricular septal, Dilated MPA and TOF can be diagnosed in Figure 7.

## Results

This descriptive study was based on 3 months' time period and 288 patients of congenital heart disease were studied. A Performa was used for each patient, which were filled based on clinical presentation and Echo cardio graphic findings.

Among 288 patients 167(57.98%) were male and 121(42.01%) were female. Their overall ages ranged from 3M-16 years (Table 1). Congenital heart defects were diagnosed more commonly between 3 months to 5 Year (n=208, 72.22%) than from 5-10 years (n=54, 18.75%) and less observed in patients from 10-16 year (n=26, 9.08%)' age groups shown in (table 2). Table 3 shows that the major clinical finding was a detection of a respiratory distress (57.29%) followed by sweating (52.43%), Tachypnea (36.80%), cyanosis (12.15%), syncope (9.37%); murmur (2.77%) fits (1.38%) and spell (0.69%).

Table 4 shows that asymptomatic patients mostly present in 3M-5 years of age. At 3M-5years child presents with respiratory distress, followed by sweating, Tachypnea, chest pain, cyanosis, syncope, murmur, fits, and spell. These were common clinical presentations up to 5 years of age. The commonest clinical presentations in 5-10 years child were respiratory distress and sweating and less common one's clinical presentations are murmur, spell and fits. In 10-16 years, respiratory distress is the most common clinical presentation. Table 4 shows that the commonest congenital heart defects with single lesion confirmed by echocardiography in our study was Ventricular septal defect (n=30, 45.4%) followed by Patent ductus arteriosus (n=14, 21.2%)Tetralogy Of Fallot (n=11, 16.60%), Atrial septal defect (n=7, 10.6%), and complete atrioventricularseptal defect(n=4,6.10%).

Table 5 shows commonest Congenital heart defects in our study was Ventricular septal defects (n=69, 23.95%) followed by Atrial septal defects (n=33, 11.5%) and Tetralogy of fallot (n=29, 10.1%) each . The less common were Patent ductus arteriosus, left ventricle dysfunction, pulmonary stenosis, pulmonary hypertension, and coarctation of the aorta.

TABLE 1: Sex wise distribution of congenital heart diseases

<b>GENDER</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
MALE	167	57.98%
FEMALE	121	42.01%
TOTAL	288	100%

FIGURE 1: Sex wise distribution of congenital heart diseases

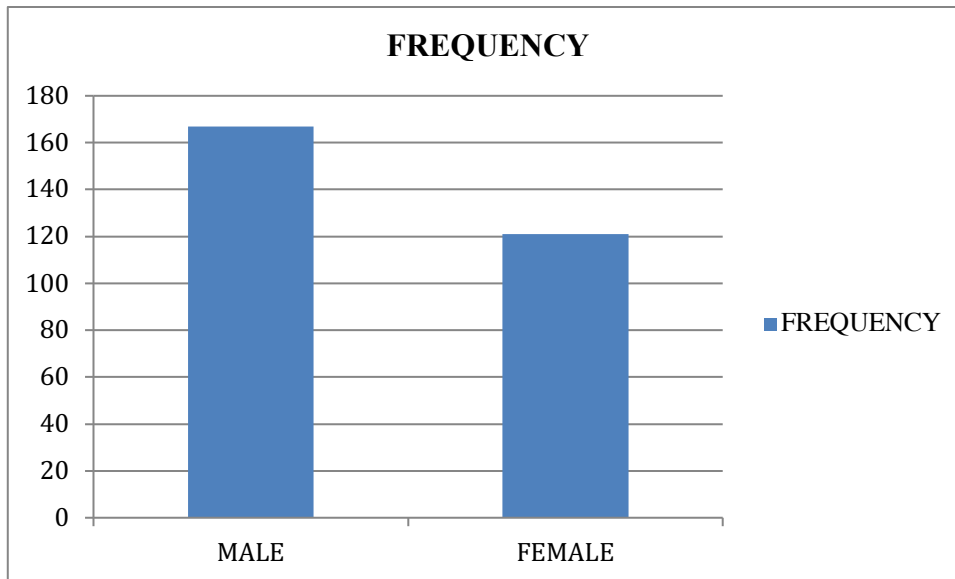


Table 2: Age-wise distribution of CHD among 288 patients

<b>Age</b>	<b>Frequency</b>	<b>Percentage</b>
3M-5y	208	72.22%
5-10y	54	18.75%
10-16y	26	9.03%
TOTAL	288	100%

Figure 2: Age-wise distribution of CHD among 288 patients

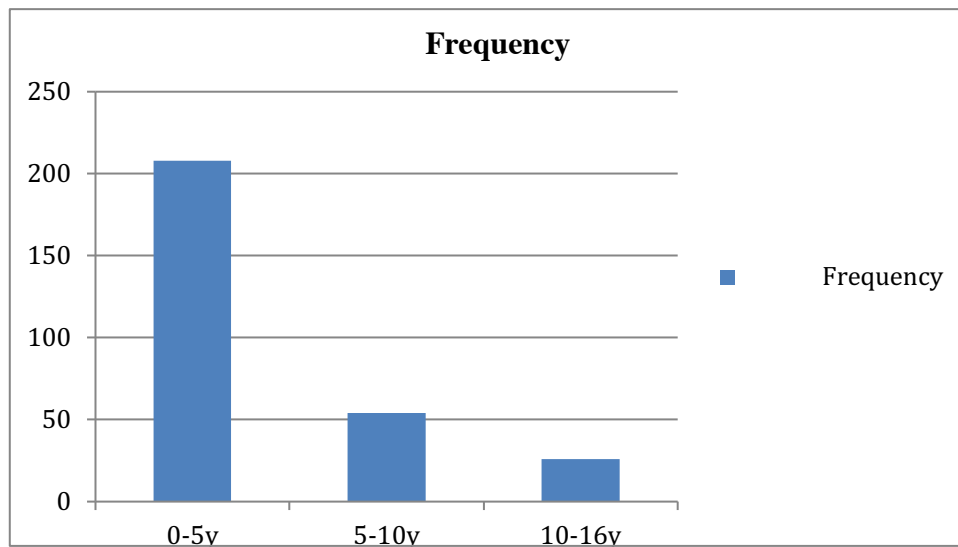


Table 3: Frequency of Clinical findings of the CHD in Symptomatic patients

Clinical findings	Frequency	Percent
Tachypnia	106	36.80%
Respiratory Distress	165	57.29%
Sweating	151	52.43%
Cyanosis	35	12.15%
Spell	2	0.69%
Fits	4	1.38%
Chest Pain	66	22.91%
Syncope	27	9.37%
Murmur	8	2.77%

Figure 3: Frequency of Clinical findings of the CHD in Symptomatic patients

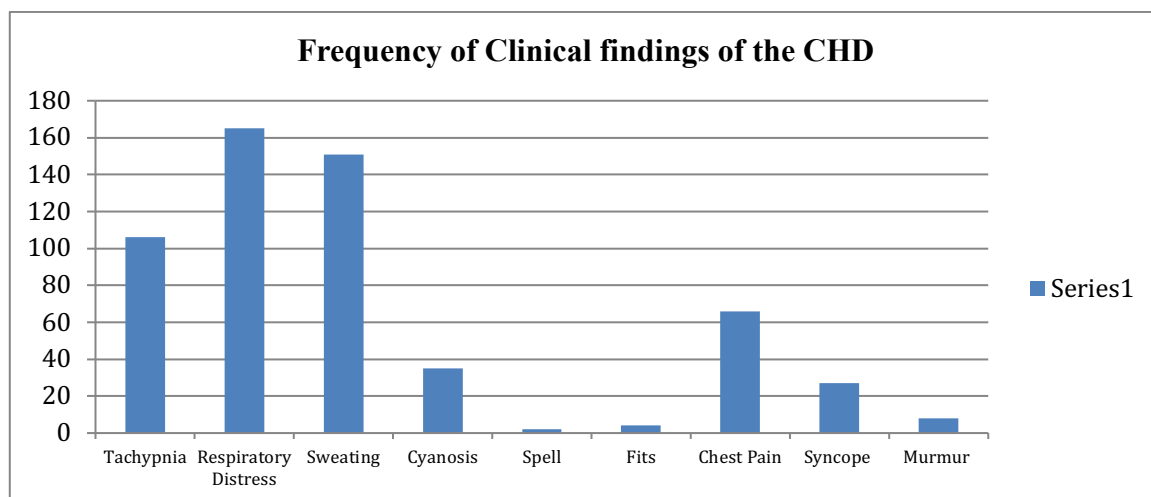


Table 4: Age-wise distribution of clinical presentations of Congenital Heart Diseases

Age	Asymptomatic	Tachypnia	Respiratory distress	Sweating	Cyanosis	spell	Fits	Chest pain	Syncope	Murmur	TOTAL
3M-5 year	61	82	123	109	28	1	2	47	22	5	480 (73.84%)
5-10 year	12	19	32	32	7	0	2	15	4	2	125 (19.23%)
10-16 year	13	5	10	10	0	1	0	4	1	1	45 (6.93%)
Total	86(13.23%)	106(16.30%)	165(25.38%)	151(23.24%)	35(5.38%)	2(0.3%)	4(0.6%)	66(10.16%)	27(4.17%)	8(1.24%)	650 (100%)

Figure 4: Age-wise distribution of clinical presentations of Congenital Heart Diseases

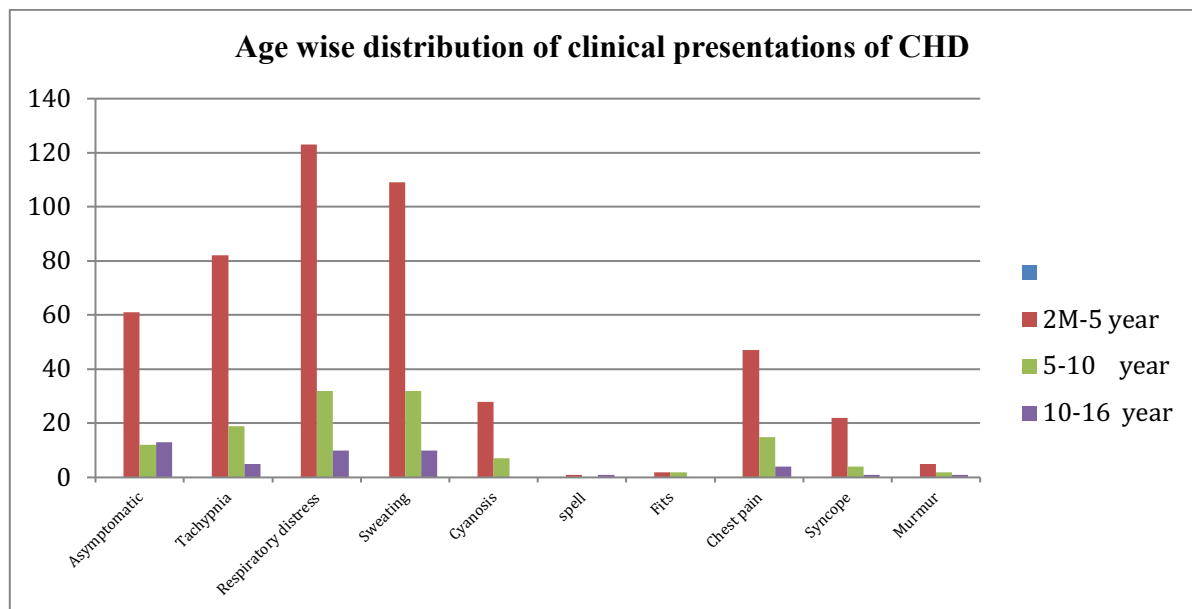


Table 5: Distribution of CHD (Confirmed By Echocardiography)

Diagnosis	Frequency	Percent
ASD	33	11.5%
CoA	4	1.4%
VSD	69	23.95%
PDA	24	8.33%
TOF	29	10.1
RHD	4	1.38%
PS	10	3.4%
P.H	8	2.8%
VALVULAR .AS	4	1.38
NORMAL	85	29.51
LV DISFUNCTION	18	6.25%
TOTAL	288	100%

Figure 5: Distribution of CHD

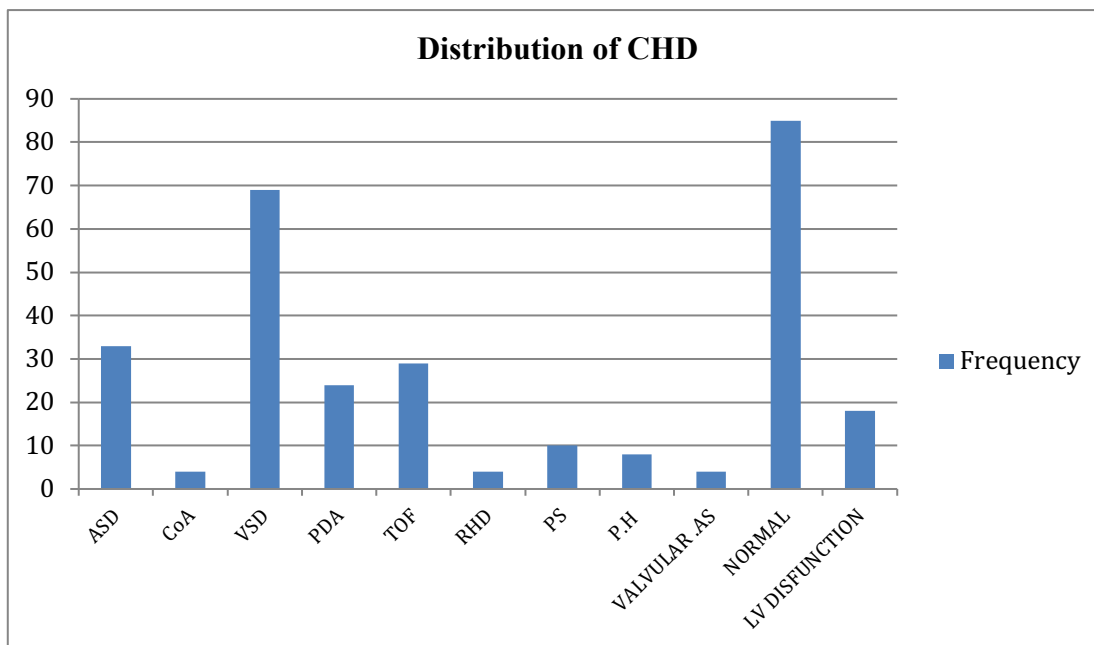




Figure 6

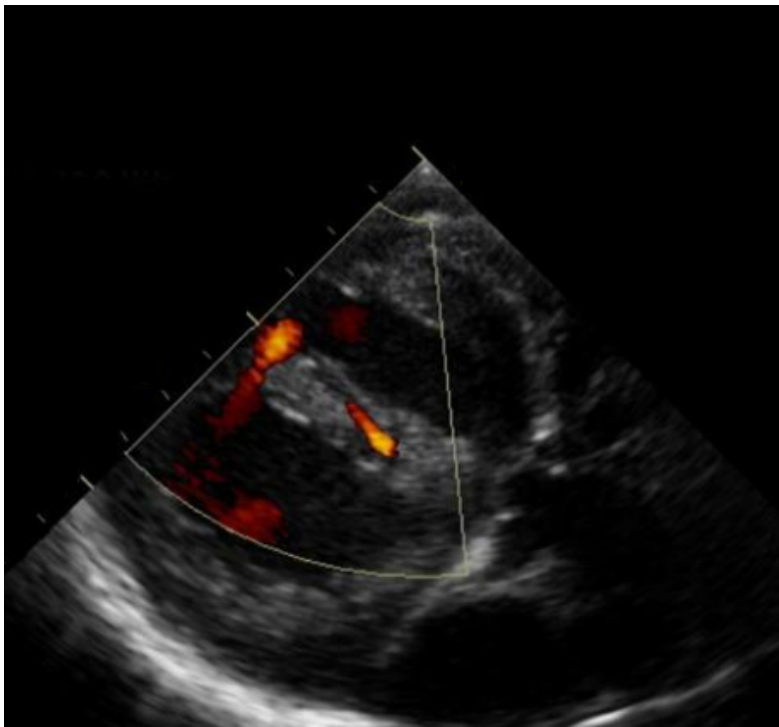
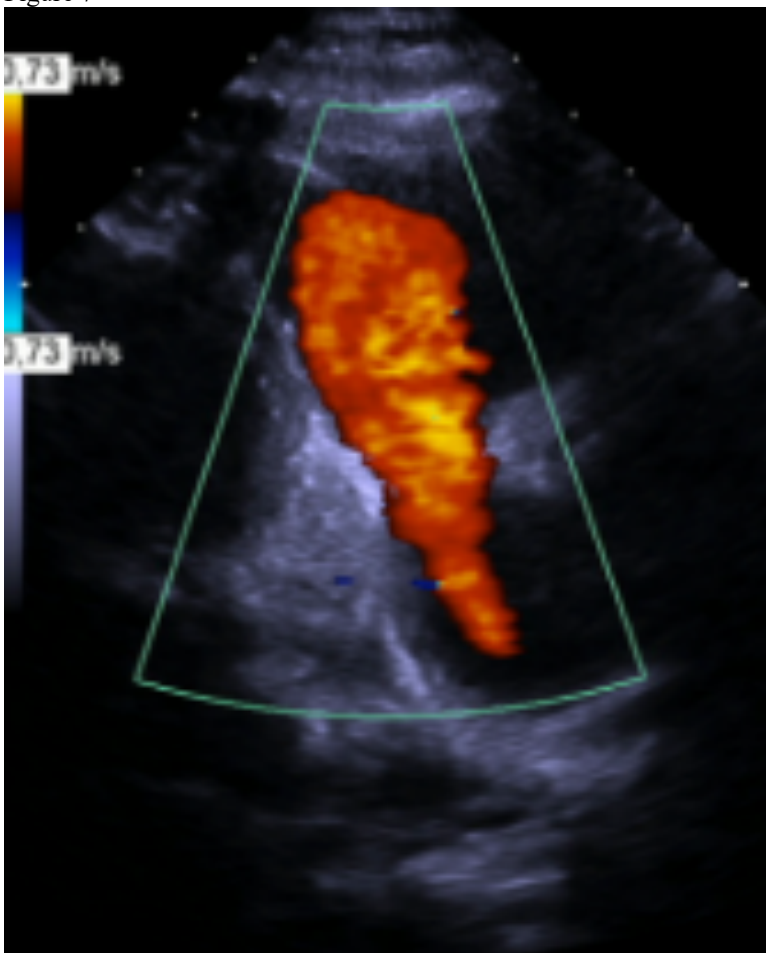


Figure 7



## Discussion

CHDs are the most common congenital fetal malformations accounting of all congenital malformations and are responsible for a high rate of child mortality and morbidity. In this study, patients presented with the most common clinical presentation of a congenital heart defect in children from 3 months to 16 years of age referred to echocardiography were included.

In my study, 288 patients of clinically suspected CHD referred to echocardiography were studied. CHD is more common in men than women as in my study, it was clearly demonstrated that male patients outnumbering the female. Congenital heart defects were diagnosed more commonly between 3 months to 5 Years (72.22%) than other age groups. The reason for the higher incidence in the age group of 3 months to 5 years maybe that CHD becomes symptomatic at that age group.

The commonest congenital heart defects with a single lesion in our study were Ventricular septal defect 23.95% followed by Atrial septal defect 11.5%, Tetralogy of Fallot 10.1%, Patent ductus arteriosus 8.33%. Mahapatra A *et al.* (2017) this study was very similar to study conducted by Mahapatra. They conducted a retrospective hospital-based study of 231 patients over a period of 20 months. Where all suspected children less than 14 years of CHD were subjected to Echocardiographic study. The age, sex, clinical presentation and echo findings were well documented. The male to female ratio was found 1.2:1. The most common CHD was diagnosed in 1 month to 1 Year (40.25%). Ventricular septal defect (36.3%) Tetralogy of Fallot (11.25%) was the commonest type of a CHD. The major clinical presentation was a detection of a respiratory distress (84.8%) followed by tachycardia (41.5%) and Tachypnea (36.3%).

Manjuleswari N, *et al.* (2016) work on 3853 patients in the pediatric ward in which 60 were diagnosed. Peak incidence was seen in the age group of 1-12 months, comprising of 46.67% of the total number of cases. Males' patients were 53.49% and females 46.51%. The commonest CHD was Ventricular septal defect (58.14%) and TOF (35.29%). The result of my study was the same as Manjuleswaristudy. Among 75 patient's major ratio observed in 0.16\_1 Year (29.3%). Male ratio 42(56%) predominate over female 33(44%). Ventricular septal defect (36.3%) and Tetralogy of Fallot (11.25%) were commonest congenital heart diseases.

Pathak .D, (2016) work on Incidence and Pattern of Congenital Heart Disease children of 82 confirmed patients between the ages group 1 month to 12 years. Pediatrics of CHD were suspected with a cardiac murmur, presence of cyanosis, feeding difficulties, cyanosis associated with feeding difficulties, clubbing, features of congestive cardiac failure, or failure to thrive. The final was confirmed by Echocardiography. These findings are consistent with my study results that major clinical finding observed was detection of respiratory distress (82%), tachypnea (78.7%), sweating & interrupted feeding (68%), chest pain (57%), cyanosis (26.7%).

Clinical presentation, according to the age of children, shows that asymptomatic patients mostly present in 2-5 years of age. At 0.16-2 year of age child presents with murmur followed by sweating & interrupted feeding, respiratory distress, syncope and Tachypnea. While in 2-5 years of age, they present with a murmur, syncope, respiratory distress, chest pain, and Tachypnea. These were common clinical presentations up to 5 years of age. The commonest clinical presentation above 5 years child was chest pain, respiratory distress, Tachypnea and syncope, and less common one's clinical presentations were our cyanosis, spell and fits. This study added these age-wise distribution of clinical presentation, which was not present in all these previous studies.

## Conclusion

Symptomatic patients mostly present in 3 months -5 years of age. At 0.16-5 year of age child presented with sweating, respiratory distress, syncope and tachypnea. While from 5-16 years, commonest symptoms were murmur, chest pain, respiratory distress, tachypnea. The most symptomatic lesion Congenital heart defects were Ventricle septal defect and Teratology of Fallot Ventricle septal defect, Atrial septal defect Pulmonary stenosis. Transthoracic echocardiography is an important tool for confirmation of clinical presentations of CHD at different age groups.

## References

- Mesotten, L., Maes, A., Hambj e, A.S., Everaert, H., Van den Maegdenbergh, V., Franken, P. and Mortelmans, L., 1998. Nuclear Cardiology, Part I: Anatomy and Function of the Normal Heart. *Journal of nuclear medicine technology*, 26(1), pp.4-8.
- Saxena, A., 2005. Congenital heart disease in India: a status report. *The Indian Journal of Pediatrics*, 72(7), pp.595-598.
- Hoffman, J.I. and Kaplan, S., 2002. The incidence of congenital heart disease. *Journal of the American college of cardiology*, 39(12), pp.1890-1900.
- MEMON, Y., MAJEED, R. and MEMON, F., 2012. Pattern of congenital heart disease at Liaquat University Hospital Hyderabad. *Pakistan Heart Journal*, 40(1-2).
- George, I.O. and Frank-Briggs, A.I., 2009. Pattern and clinical presentation of congenital heart diseases in Port-Harcourt. *Nigerian journal of medicine: journal of the National Association of Resident Doctors of Nigeria*, 18(2), pp.211-214.
- Jatav, R.K., Kumbhare, M.B., Srinivas, M., Rao, D.R., Kumar, P.G., Reddy, P.R. and Manjusha, M., 2014. Prevalence and pattern of congenital heart diseases in Karimnagar, Andhra Pradesh, India: diagnosed clinically and by trans-thoracic-two-dimensional echocardiography. *Int J Res Med Sci*, 2(1), pp.186-192.
- Levy, P.T., Tissot, C., Eriksen, B.H., Nestaas, E., Rogerson, S., McNamara, P.J., El-Khuffash, A. and de Boode, W.P., 2018. Application of neonatologist performed echocardiography in the assessment and management of neonatal heart failure unrelated to congenital heart disease. *Pediatric research*, 84(1), pp.78-88.
- KLEINMAN, C.S., HOBBS, J.C., JAFFE, C.C., LYNCH, D.C. and TALNER, N.S., 1981. Echocardiographic Studies of the Human Fetus: Prenatal Diagnosis of Congenital Heart Disease and Cardiac Dysrhythmias. *Obstetrical & Gynecological Survey*, 36(3), pp.133-134.
- Sani, M.U., Mukhtar-Yola, M. and Karaye, K.M., 2007. Spectrum of congenital heart disease in a tropical environment: an echocardiography study. *Journal of the national medical association*, 99(6), p.665.
- Knowles, R., Hunter, R. and Campus, R.F., 2013. Screening for Congenital Heart Defects. *UCL, UK NSC, London*.
- Hoffman, J.I. and Kaplan, S., 2002. The incidence of congenital heart disease. *Journal of the American college of cardiology*, 39(12), pp.1890-1900.
- Abdulkadir, M. and Abdulkadir, Z., 2016. A systematic review of trends and patterns of congenital heart disease in children in Nigeria from 1964-2015. *African health sciences*, 16(2), pp.367-377.
- Kumar, B.D., Reddy, K.R. and Elizabeth, B., 2015. Study of incidence of congenital heart diseases in children of age group 1 month to 12 yrs. *J Evol Med Dental Sci*, 4, pp.1151-9.
- Kumar, A., Begum, R., Bezboruah, G. and Swastika, N., 2017. Profile of Congenital Heart Disease in Children: A Hospital Based Study. *International Journal of Contemporary Research and Review*, 8(07).
- Simpson, J.M., 2008. Real-time three-dimensional echocardiography of congenital heart disease using a high frequency paediatric matrix transducer. *European Journal of Echocardiography*, 9(2), pp.222-224.
- Knowles, R., Hunter, R. and Campus, R.F., 2013. Screening for Congenital Heart Defects. *UCL, UK NSC, London*.