ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

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Magnitude of Congenital Heart Defects and Associated Factors among Children Diagnosed With Congenital Anomalies in Addis Ababa Governmental Hospitals, Ethiopia

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Addis Ababa, Ethiopia

Magnitude of Congenital Heart Defects and Associated Factors among Children Diagnosed With Congenital Anomalies in Addis Ababa Governmental Hospitals, Ethiopia

Thesis Submitted to School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for Degree of Masters of science in Anatomy

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Declaration

This is to certify that the thesis prepared by Feredegn Talargia, entitled: The Magnitude of congenital heart defects and associated factors among children diagnosed with congenital anomalies in Addis Ababa governmental hospitals and submitted in partial fulfillment of the requirements for degree of Masters of science in Anatomy complies with the regulation of the University and meets the accepted standards with respect to originality and quality. This thesis has not been presented for degree any other University, and that all sources of materials used for the thesis have been fully acknowledged.

Status	Failed	Passed	Score
Thesis		X	Very Good

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Abbreviations and Acronyms

AOR: Adjusted odd ratio

ART: Anti retro viral drug

AS: Aortic stenosis

ASD: Atrial septal defect

AVSD: Atrioventricular Septal Defect

CHD: Congenital Heart Defects

CI: Confidence Interval

CoA: Coarctation of Aorta

DORV: Double outlet right ventricle

IAC: Interatrial communication

IVC: Interventricular communication

HTN: hypertension

MS: mitral stenosis

PDA: patent ducts arteriosus

VSD: ventricular septal defect

WHO: world health organization

Abstract

Back ground: Congenital heart defect (CHD) is a structural heat defect present at birth and it accounts for nearly one-third of all major congenital anomalies. The most important factors for the development of CHDs are smoking and alcohol consumption habits of mother, mothers' past medical history and emotional status, family history of disease, consanguineous marriages, sex, age, delivery method and many other factors.

Objective: The objective of this research was to assess the prevalence congenital heart defects and identify the associated factors among children diagnosed with congenital anomalies in Addis Ababa governmental Hospitals, Ethiopia, 2017.

Methods and Materials: Hospital based cross-sectional study was carried from the time period of July 2017- October 2017. The data on congenital anomalies in children were collected using a structured questionnaire and diagnosis of CHD of children was taken from the children's medical records. The sample size was 271and 4 hospitals were selected from 12 governmental hospitals in Addis Ababa based on patient load. Binary logistic regression followed by multivariate logistic regression analyses was done to determine factors associated with CHDs. The 95% confidence interval was determined and associated factors with p-value of less than 0.05 were considered significant.

Result: The prevalence of congenital heart defects among children diagnosed with congenital anomalies was estimated to be 35.8%. The most common congenital heart defect was VSD (Ventricular Septal Defect) 30(30.9%), followed by ASD (Atrial Septal Defects) 23.7%. Previous history of abortion AOR (Adjusted odd ratio) =1.96; CI (Confidence interval) = (0.277-0.935); p=0.03) and past history of drug intake during pregnancy (AOR= 2.149; CI= (0.252-0.861); p= 0.015) were significantly associated with CHD.

Conclusion and Recommendation: Out of the total study participants (271), 134 (49.4%) were males and 137(50.6%) were females. The present study identified high prevalence of congenital heart defects among children diagnosed with congenital anomalies. Mothers who had previous history of abortion and drug intake during pregnancy were associated with the occurrence of congenital heart defects.

Key words: congenital heart defects, congenital anomalies, prevalence, associated factors

1. Introduction

1.1Background of the study

CHD is a major cause of serious morbidity and mortality. It is defined as clinically significant structural heart disease present at birth [1]. CHD is one of the most common congenital defects and accounts for nearly one-third of all major congenital anomalies; Population based studies on the prevalence of CHD worldwide was found to range between 8 to 12% live births and constant throughout the world [2].Another study done in urban America describes the prevalence of CHD occurring in approximately 3–9 of every 1,000 live births [3].

CHD have a wide spectrum of severity in infants. About 30-40% of patients with CHD are symptomatic in the 1st year of life, while the diagnosis can be established in 60% of patients by the 1st month of age [3]. There are 8 common CHD these are VSD ,ASD, patent ductus arteriosus (PDA), coarctation of aorta (CoA), tetra logy of fallot(TOF),transposition of great vessel (TGA), pulmonary stenosis,(PS) and aortic stenosis (AS), all together make up to 90% of all cases. The remaining 10% consists of more complex anomalies [4].

CHD occurs more predominatly in males than females and some lesions such VSD, TOF, Atriaventricular septal defects (AVSD) are more common in males whereas ASD, PDA, COA, TGA are more common in females [5].The causes of most CHDs are unknown. Most cases of CHD are thought to be multifactorial and result from a combination of genetic predisposition and environmental stimulus[6].The common genetic causes are chromosomal aberration such as Down syndrome (trisomy 21),Turner syndrome (monosomy X), Patau syndrome (trisomy 13) and Edwards syndrome (trisomy 18) [7, 8]. Besides genetic causes, a number of environmental influences are known to increase the risk of congenital heart malformations. These include environmental teratogens like dioxins and pesticides, maternal alcohol consumption, smoking and drug exposure rubella infection during pregnancy as well as insufficient maternal foliate intake .Increasingly common metabolic diseases like diabetes and obesity also constitute important CHD risk factors[7].

Maternal age is a risk factor for CHD even in the absence of any chromosomal abnormality in the newborn. Whether the basis of the risk resides with the mother or oocyte is unknown. The age-associated risk varies with the mother's strain background, making it a quantitative genetic

trait. Most remarkably, voluntary exercise, whether begun by mothers at a young age or later in life, can mitigate the risk when they are `older [8].

Maternal exposure to environmental factors such as ambient air pollution, heavy metals, and micronutrients are positively related to CHD prevalence because elements in the soil, water, and air affect human beings directly or indirectly. The physical environment such as solar radiation and magnetic fields also has influence on prevalence CHD. Further-more, socio-economic and lifestyle habits affect CHD prevalence [9].

1.2 Statement of the problem

Worldwide, CHD are the main heart diseases found in children and constitute one of the major causes of infant mortality, particularly in developing countries [10, 11].They also represent the most common of all congenital malformations accounting for more than 20% of prenatal deaths (12).Their estimated prevalence is eight cases per 1000 live births across the globe, representing ~1.35 million newborns each year with CHD, but these figures vary worldwide [10]. For instance, the incidence of CHD in different studies varies from about 4/1000 to 50/1000 live births and, despite advances in detection and treatment, CHD account for 3% of all infant deaths and 46% of deaths from congenital malformations in developed countries such as United states of America [12,13]. In addition, these abnormalities can be life threatening in early childhood, and children born with severe forms are at ~12 times higher risk of mortality in the first year of life [14]. Thus, hundreds of thousands of children die each year from congenital heart defects, while millions more remain in desperate need of treatment in the developing world [15, 16]. Africa is thought to have one of the highest prevalence of heart diseases in children and young adults, including CHD, but the main findings include evidence that the CHD burden is underestimated mainly due to the poor outcome of African children with CHDs [14]. From a global point of view, the epidemiology of these abnormalities is still unknown in Africa with few data on the topic. Reducing the prevalence of these diseases is urgent and requires a real inventory of the premises of the problem that would clarify the issue for more effective prevention strategies and improved management.

So far, very little information is available regarding the magnitude of CHD and associated factors among children in Ethiopia. This study was designed to investigate the prevalence CHD and determine associated factors among children diagnosed with congenital anomalies in Addis Ababa governmental hospitals. Results from this study would give an insight into the magnitude of the problem and provide baseline data for future detailed studies. In addition, information from this study is would be use full in developing strategies for improved management and rehabilitation of patients with CHD.

1.3 Significance of the study

CHD is a major cause of the child mortality and morbidity in Africa including Ethiopia due to lack of adequate diagnostic facilities, less awareness about the disease by the parents and negligence of the concerning body (2).

This study may be helpful in filling the gap of information on the magnitude, pattern and associated factors of CHD among children with congenital anomalies in Addis Ababa governmental hospitals.

It might be important to know the magnitude and patterns of CHDs at Addis Ababa governmental hospitals to develop strategies for improved patient management and rehabilitation. This may help patients to get early treatment and appropriate management. This may includes medical and surgical interventions as well as providing adequate counseling to parents and their children.

Information on associated factors may shed light on their roles as risk factors for occurrence of CHD hence it provides baseline data for future detail studies and public health measures.

2. Literature review

2.1Anatomy of the heart

The normal heart, an organ little larger than the adult fist, comprises four chambers and four valves. It develops between days 17 and 50 of gestation.

After the Primitive heart tube arises, this single tube folds, loops, rotates and differentiates into a four chambered heart with valves that control blood flow from the atria to the ventricles and from the ventricles into the great arteries. The blood flows in only one direction, due to the valves, by the pumping action of the coronary arteries which draw their blood from the aorta. Half of the blood (the blood on the left side) is oxygenated having just come from the lungs. The other half (on the right side) is deoxygenated having just circulated the body and then returned to' the heart before going to the lungs [17].

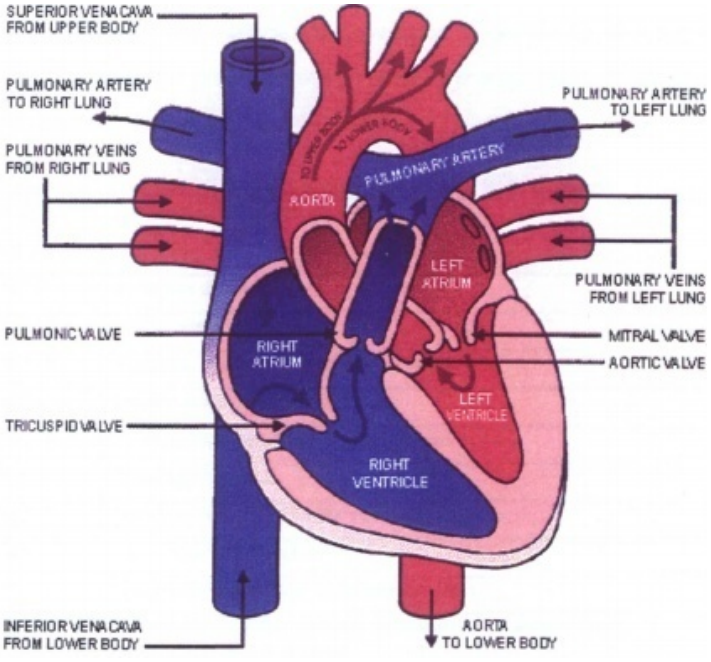


Figure 1 anatomy of the heart from the Children's Heart Institute (http://www.childrenheartinstitute.orgleducateiheartwrklbloodflw.htm)

Heart development in humans is complex and starts very early, from the third to eight weeks of gestation [18]. Development begins with a primitive tube that beats at 25th day of gestation and ends in the four-chamber heart [18].

2.2 Definition of congenital heart disease

According to the World health organization (WHO) the term congenital anomaly includes any morphological, functional, biochemical or molecular defects that may develop in the embryo and fetus from conception until birth, present at birth, whether detected at that time or not [19,20].

CHD is structural heat defect present at birth and it accounts nearly one-third of all major congenital anomalies [2]. CHD comprise a heterogeneous group of cardiac malformations affecting different structures of the heart and can be divided into three main categories, namely septation defects, cyanotic heart disease and left-sided obstruction defects. Septation defects can affect the ASD, the VSD or structures in the central part of the heart (atrioventricular septum defect, AVSD). Cyanotic heart defects lead to a bluish appearance of the skin due to mixing of deoxygenated and oxygenated blood; this condition is also known as the "blue baby syndrome". Underlying malformations include (TOF), transposition of the great arteries (TGA), double outlet right ventricle (DORV), Ebstein's anomaly, and persistent truncus arteriosus (PTA).

Left-sided obstructive lesions comprise diseases like hypo plastic left heart syndrome, mitral or AS and CoA [6].

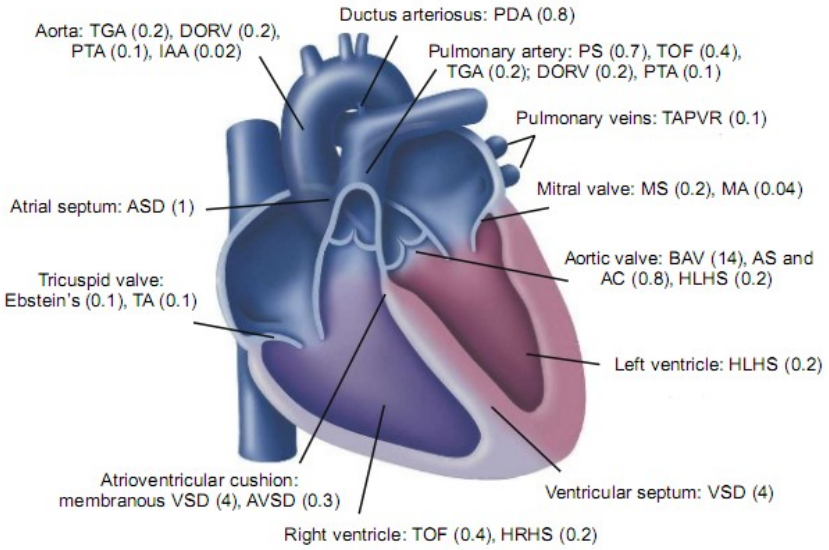


Figure 2 structure of the heart affected by congenital heart defects the estimated incidence of each disease per 1,000 live births is given in parentheses.

2.3 Magnitude of congenital heart defects and associated factors

The incidence of CHD is approximately 8 per 1000 live birth, with a higher rate in stillbirth, spontaneous abortion and prematurity [21, 22]. The prevalence of CHD among congenital anomalies is very high which accounts 46 % and it is still the highest incidence from all cardiac problems in children [13]. The reported incidence of CHD varies substantially between different regions of the world, with the highest rate in Asia (0.93%) and lower rates in Europe (0.82%) and North America 0.69% [23]. The observed differences might be attributed to genetic, environmental as well as socioeconomic factors (e.g. Parental consanguinity) and/or differences in healthcare and referral systems [24]. For instance, we observe a high prevalence of this association in Africa. This is mainly due to the unfavorable socio-economic conditions in Africa, the lack of diagnostic genetic laboratories and also prenatal diagnosis to prevent congenital anomaly [2].

Various researchers show that the most CHD are VSD (36%), ASD (5%), PDA (9%), Atrioventricular Septal Defect(AVSD) (4%), PA (9%), AS (5%), CoA (5%), TGA 4%), TOF (4%) [21,22]. The other 20% of CHD consists of many rare or complex lesions (24). CHDs as a whole occurs with equal frequency in male and females but some lesions such as PS, CoA, transposition of great vessels and TOF are more common in males whereas ASDs are more common in females [22].

The prevalence of CHD significantly differed with children's screening age, birth weight, gestational age, maternal pre pregnancy body mass index (BMI), pregnant infection, and contact with toxic substance, using medicines, pregnancy-induced hypertension, gestational diabetes and anemia during pregnancy [21,19]. Infants with screening age < 1 month, birth weight < 2500 g, gestational age < 37 gestational weeks and maternal pre-pregnancy BMI > 28 (kg/m^2) has the highest prevalence of CHDs. The prevalence of CHD is higher among the infants with maternal age's ≥ 40 years and < 20 years. In addition, the CHD is also higher among the infants with parents' history of CHDs, parents' lower education and lower family income [26]. There is also an important increase in CHDs due to maternal conditions. These maternal conditions comprise pre-gestational diabetes and phenylketonuria, and other related pathologies. Maternal diabetes mellitus is associated with increased teratogenesis, which can occur in pre-gestational diabetes type 1 and type 2. Cardiac defects are the most common malformations observed in fetuses of

pre-gestational mothers with diabetes [19]. Medications as valproic acid and isotretionin have show teratogenic effects [19, 21]. The most teratogenic anti-epileptic drug seems to be valproic acid which causes about 2% of CHDs and an additional increase of 4% to 8% in major congenital anomalies. Most literature agreed on incidence of CHD, which is similar in all countries and between races. In addition, in school-aged children the prevalence of the common CHD is similar and also constant around the world. VSDs are the most common lesions, followed by ASDs and PDAs. These lesions affect the sexes equally and make up about 60% of all heart defects encountered in school aged children around the world; they appear to have remained constant over the last 30 years [27].

The prevalence of CHD in patients with Down syndrome ranges from 40 to 50 % [28, 29]. Among the patients who have a CHD, half of them presents with AVSD, which is rarely an isolated heart defect (2.8%) [30,31]. In a 10-year follow-up study about AVSD, the researcher found high mortality rate when AVSD was related to Down syndrome [32].In addition to AVSD, interatrial communication (IAC), interventricular communication (IVC) and PDA are also frequent in Down syndrome [33,34]. Recently, it has been declared that the effect of the environmental factors is much more than that of the genetic factors, but still there is very limited and incomplete data about main reasons for incidence of this disease. Among the most important factors the following have been studied in most of surveys: the individual social variables such as occupation, educational background, health status, and smoking and alcohol consumption habits of mother, mothers' past medical history and emotional status, family history of disease, consanguineous marriages, sex, age, delivery method and many other factors [26].

3. Objectives

3.1 General objective

To assess the magnitude of congenital heart defects and associated factors among children diagnosed with congenital anomaly in Addis Ababa governmental hospitals, Ethiopia, 2017.

3.2 Specific objectives

- ✓ To determine the magnitude of congenital heart defects among children diagnosed with congenital anomaly in Addis Ababa governmental hospitals, Ethiopia, 2017.
- ✓ To identify the associated factor of congenital heart defect among children diagnosed with congenital anomaly in Addis Ababa governmental hospitals, Ethiopia, 2017.

4. Materials and Methods

4.1 Study setting and period

The study was conducted in Addis Ababa governmental hospitals. There are 11 public hospitals in Addis Ababa. These are Alert Hospital, Dejach Balcha **(**Russian Hospital), Federal Defense Hospital, Gandhi Memorial Hospital, Menilik Referal Hospital, Ras Desta Hospital, Police Hospital, Saint Paul's Hospital Melinium Medical College, Yekatit 12 Hospital Medical College, Tikur Anbesa Specialized Hospital and Zewditu Memorial Hospital. From these Hospitals six are owned by Addis Ababa City Administration Health Bureau; three are by Federal Minster of Health; two are by Defense Force and Police; one by Federal Minster of Education. The study was conducted in Saint Pauli's Hospital Melinium Medical College, Tikur Anbesa Specialized Hospital, Yekatit 12 Hospital Medical College and Zewditu Memorial Hospital. The study was conducted from July 2017- October 2017.

4.2 Study Design

The study was conducted by hospital based cross sectional study design among children diagnosed with congenital anomalies in Addis Ababa governmental hospitals, Ethiopia.

4.3 Source population

All children diagnosed with congenital anomalies in Addis Ababa governmental hospitals.

4.4 Study population

All children diagnosed with congenital anomaly in a selected governmental hospital during the study period.

4.5 Inclusion and Exclusion criteria

4.5.1 Inclusion criteria

Children diagnosed with congenital anomalies whose age was less than 18 years during the study period.

4.5.2 Exclusion criteria

Children who were severely sick during the study period were excluded. If there was unclear diagnosis or not confirmed by the pediatricians it was excluded. Cases older than 17 years and cases referred from one selected hospital to the other hospitals were excluded.

4.5 Sample size determination

The sample size was calculated using statically proportion formula.

$n = Z^2 p (1-p)/w^2$

n= sample size

Z= critical value given confidence interval

P= proportion

W=margin of error, (Z= 1.96, p= 0.5, w= 0.05)

Since there was study conducted in sub Saharan Africa [19] similar with this topic the prevalence of CHD was 20 %, So, P =0.2, 95% confidence interval and 5% margin of error. By using the above formula and substitute the given value the sample size was $n = Z^2 p (1-p)/w^2 = (1.96)^2(.2)(.8) / (.05)^2$ =245.8≈246, 10% non respondent rate was added .Therefore; the final sample size was 271.

4.6 Sampling method

The study hospitals were selected based on patient load; because of the fact that these hospitals were referral and teaching hospitals. The congenital anomaly cases in those hospitals were counted and the proportion was calculated for each hospital in four months before the data collection. Congenital anomaly cases were screened from all children by their respective diagnosis profile from their medical cards, and then children who fulfill the inclusion criteria were included consequently until the desired sample was achieved.

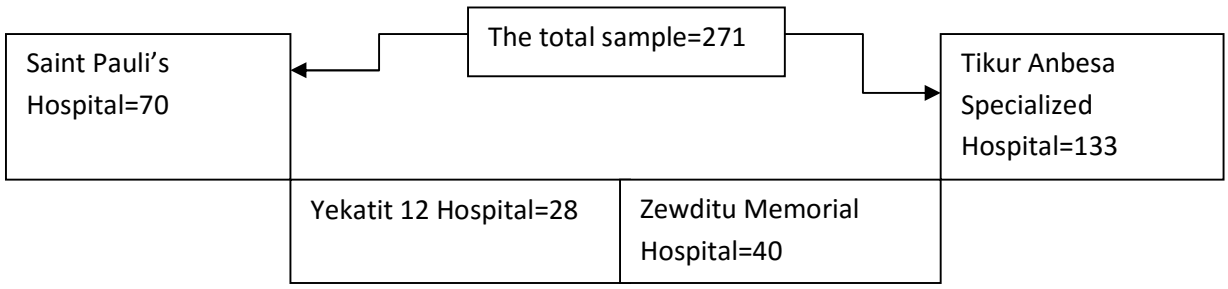


Figure 3: schematic presentation of sampling procedure in selection of children diagnosed with congenital anomalies.

4.7Study variables

4.7.1Dependent variable

- ✓ Prevalence of CHD

4.7.2Independent variables

- ✓ Maternal age,
- ✓ Sex
- ✓ History of abortion
- ✓ Family history of congenital heart defects
- ✓ History of maternal chronic illness
- ✓ History of maternal alcohol intake
- ✓ Previous history of maternal drug intake

4.8 Method of data collection

In order to collect data on congenital anomalies in children less than 18 years old, structured questionnaire was administered for the parents or care givers of the children. The questionnaire was first developed in English and translated in to Amharic (the Ethiopian official language), and then translated back in to English by a third person to check the reliability of the questionnaire.

Data collectors were recruited in each selected governmental hospitals and they were trained for two days, regarding the objectives of the study, about inclusion and exclusion criteria and on sampling procedures. Data on socio-demographic and clinical information were gathered from the respective patients' cards. In addition parents or care givers of the children who gave verbal and written consent were interviewed and provided data variables such as maternal age and parity, history of Diabetes Mellitus, drug intake, exposure to X-ray, history of CHD in the family, residential area, maternal age, history of chronic disease and number of antenatal clinic visits. The diagnosis of CHD of children was taken from the children medical record after it was confirmed by the physician with echocardiography.

The data were collected at pediatrics clinics, pediatrics emergency and pediatrics outpatient department. During data collection Pediatricians and Neonatologists were consulted when there was an unclear diagnosis. Moreover, a diagnosis was excluded if it was not confirmed by

pediatricians/experienced specialists. The proportion of children with CHDs were calculated by dividing the number of birth CHD cases (numerator) by the total number of children diagnosed with congenital anomalies visiting the Hospitals (denominator) in the same period.

4.9 Data quality control and management

To maintain data quality, from each Hospital data collectors who are working in outpatient department, pediatrics emergency and pediatrics ward were recruited and trained by the principal investigator. The questionnaire was pre-tested to check for the accuracy of responses and appropriateness of data collection tool, estimate time required and the necessary amendment was considered. The collected data were reviewed and checked for omissions, legibility of handwriting, completeness and consistency by principal investigator on daily bases during data collection time.

4.11 Data analysis and interpretation

Data was entered, and analyzed by Epi data version 3.1and SPSS (statical package of social science) version 23 softwares respectively. Categorical variables were reported as proportions and compared using Chi Square tests. Continuous data was described by mean and standard deviation. Biviariate followed by multivariable logistic regression analyses was done to determine factors associated with CHD. The 95% confidence interval was determined and an associated factor with p-value of less than 0.05 was considered as significant.

4.12 Operational Definitions

Congenital anomalies: defined anatomical anomaly of prenatal original Congenital Malformations, Deformations, and Chromosomal Abnormalities of the International Classification of Diseases, (ICD-10). For the purpose of this study, congenital anomalies were disease of children diagnosed by pediatricians.

Congenital heart defect: major or minor congenital anomalies defined as anatomical structural and functional defect present at birth which was confirmed by pediatricians with echocardiography.

Children: For the purpose of this study, there age was less than 18 years old.

4.13 Ethical clearance

Ethical clearance was obtained from Departmental of Research Ethics Review Committee (DRERC) of department of Anatomy, School of medicine, Addis Ababa University and Institute of Review Board (IRB) of Saint Pauli's Hospital Melinieum Medical College.

4.14 Dissemination of the result

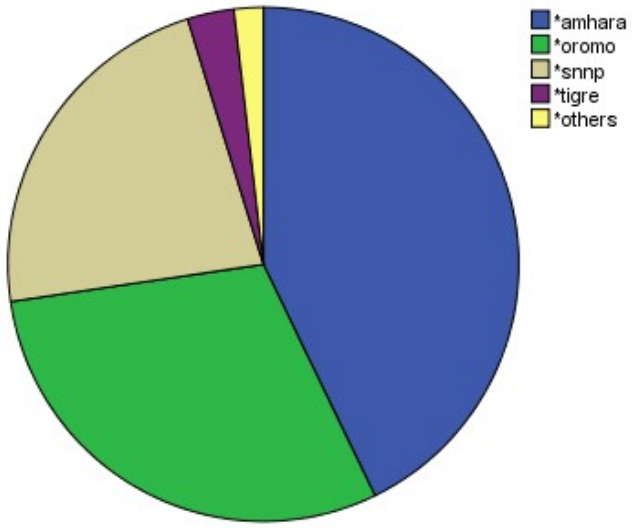
After completion of research, the results of the study will be presented during thesis defense and the final result will be submitted to Addis Ababa University School of medicine department of Anatomy. In addition to this the final result document will be presented to Addis Ababa regional health bureau, Saint Pauli's Hospital Melinieum Medical College institute of review board and other responsible bodies. Beside to this, the findings of the study will be disseminated through publications and presentation in scientific conferences and workshops.

5. Results

5.1 socio demographic characteristics

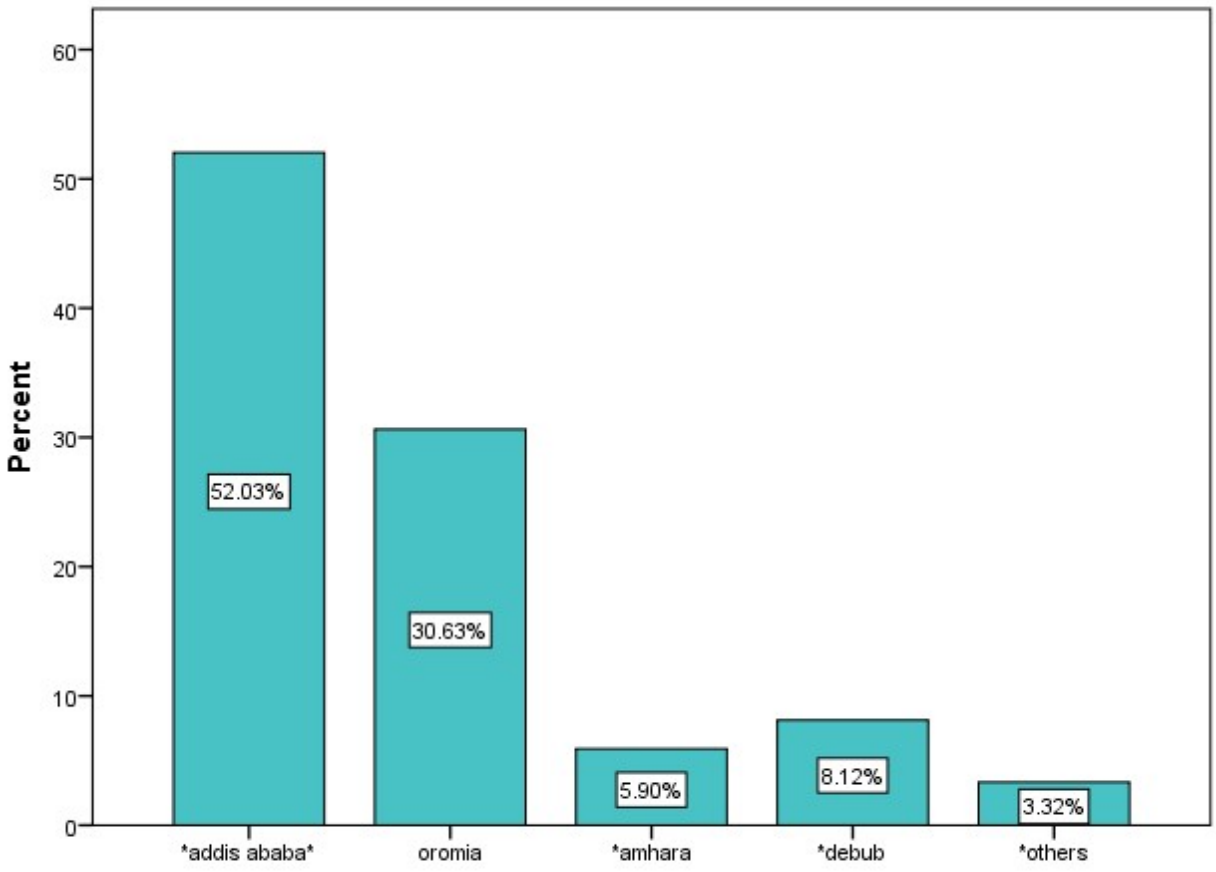
The study population consisted of children in the age group of less than 18 years old from heterogeneous groups in terms of residential area ,ethnicity and religion. Two hundred seventy one (271) mothers /primary care takers of children's pair were included in the study with a response rate of 100%. The largest ethnic group was Amhara 116(42.8%) followed by Oromo 81(29.9) (Fig 4). Most of the participants were orthodox Christian religion follower 165(60.9%) followed by Muslim 79(29.2%) and Protestant 27(10%). Majority of the study participants were from Addis Ababa 141(52.0%) followed by Oromia 83(30.60%) (Figure 5).

The majority of children in the survey 109 (40.3%) were in the age group of 2- 6 years and children in the age group of 13-17 years comprises the smallest percentages, 28(10.3%), with the mean age of the children and the standard deviation were 5.09 and $\pm$4.64 respectively. From the total study participants 134 (49.4%) were males and 137(50.6%) were females.



*others are Afar, Benshangul Gumz and Ethiopian Somali region ethnic back ground.

Figure 4: Ethnicity of children diagnosed with congenital anomalies in Addis Ababa Governmental Hospitals, Ethiopia, 2017.



*Others from Afar, Bensangul gumez, Diredewa and Somalia region.

Figure 5: Region oriented residential Area of children diagnosed with congenital anomaly in Addis Ababa governmental hospitals, Ethiopia, 2017.

5.2 Maternal characteristics

The vast majority of children's mother age was between 20-25years old 221(81.5%), while mothers whose age less than 20 and greater than 35years old was 13(4.8%) and 37(13.7%)

respectively. Among the children's mothers 216(79.7%) had no previous history of abortion, 263(97.0%) had no previous history of still birth, 246(90.8%) had no history of chronic disease, 218(80.4%) had no previous history of drug intake during pregnancy, 12(4.4%) did not take folic acid at the time of pregnancy, 236(81.7%) had no history of alcohol intake during pregnancy, 269(99.3%) had no history of cigarette smoking during pregnancy, 260(95.9%) had no history of passive smoking during pregnancy,261(96.3%) had no history radiation exposure during pregnancy, however 25(9.2%) had history of chronic disease from these mothers 6 (24%) had diabetes mellitus 9(36%) had HIV AIDS,8 (32%)had hypertension(HTN),2 (8%) had chronic kidney disease. Out 271 children's mothers 53(19.6%) had used drugs during pregnancy. Majority of these mothers used antibiotics which accounts 20 (37.7%), the rest used anti retroviral drug (ART) 7(13.2%), Anti HTN 8(15.1%), Insulin 6(11.3%), Anti pain 5(9.4%), and 7(13.2%) mothers did not recognize the name of the drug that used at the time pregnancy. From the mothers who had taken medication during pregnancy, majority was used medication during second trimester 15(25.3%), others used first trimester 10(18.9%), third trimester 13(24.5%) and some of the mothers also used medication throughout pregnancy 15(28.3%). Most of the mothers used folic acid 251(95.6%), out of these mothers only 3(1.2%) took folic acid before pregnancy, while the rest 256(98.8%) were taking folic acid during pregnancy. Majority of the mothers 224 (86.5%) used folic acid three month and above but, 35 (13.5%) of the mothers used folic acid below three month .35 (12.9%) of the mothers had drunk alcohol during pregnancy, from these mothers 4(11.4%) drunk per day, 18(51.4%) per week and 13(37.1%) per month. Majority of drunker mothers 10(28.6%) drunk alcohol during first trimester, the rest was drunk during second trimester 9(25.7%), third trimester 7(20.0%), and throughout pregnancy 9(25.7%).

5.2 Children general characteristics

Table 1: Demographic and general characteristics of children diagnosed with congenital anomalies, in Addis Ababa governmental hospitals, Ethiopia, 2017.

Variable	Number	Percent
Age category		
0-1 year	79	29.4
2-6year	109	40.2
7-12year	55	20.3
13-17year	28	10.3
Sex	134	49.4
Male	137	50.6
Female		
Types of pregnancy	252	93.0
Single	19	7.0
Twin		
Gestational age		
Pre term	28	10.3
Term	243	89.7
Birth order		
1st order	104	38.4
2nd order	72	26.6
3rd order	45	16.6
>3rd order	50	18.5
Family history of CHD		
Yes	13	4.8
No	258	95.2

5.3 Prevalence of Congenital Heart defects

In the present study, among 271 children diagnosed with congenital anomalies 97(35.8%) of them had CHD. The types of CHD identified were VSD, ASD, PDA, CoA, TOF, TGA, PS and AVSD. The prevalence of ASD, AVSD, CoA and VSD were 23.7%, 9.3%, 4.1% and 30.9%, respectively while the prevalence of PDA,PS,TGA, and TOF were 15.5%, 3.1%, 2.1% and 11.3%, respectively (Figure 6).The most common type of CHD was VSD 30(30.9%), followed by ASD 23(23.7%). The prevalence of ASD and VSD in male children was 17.6% and 33.3%, respectively, while the prevalence in female children was 30.4% and 28.3%, respectively. (Figure 6)

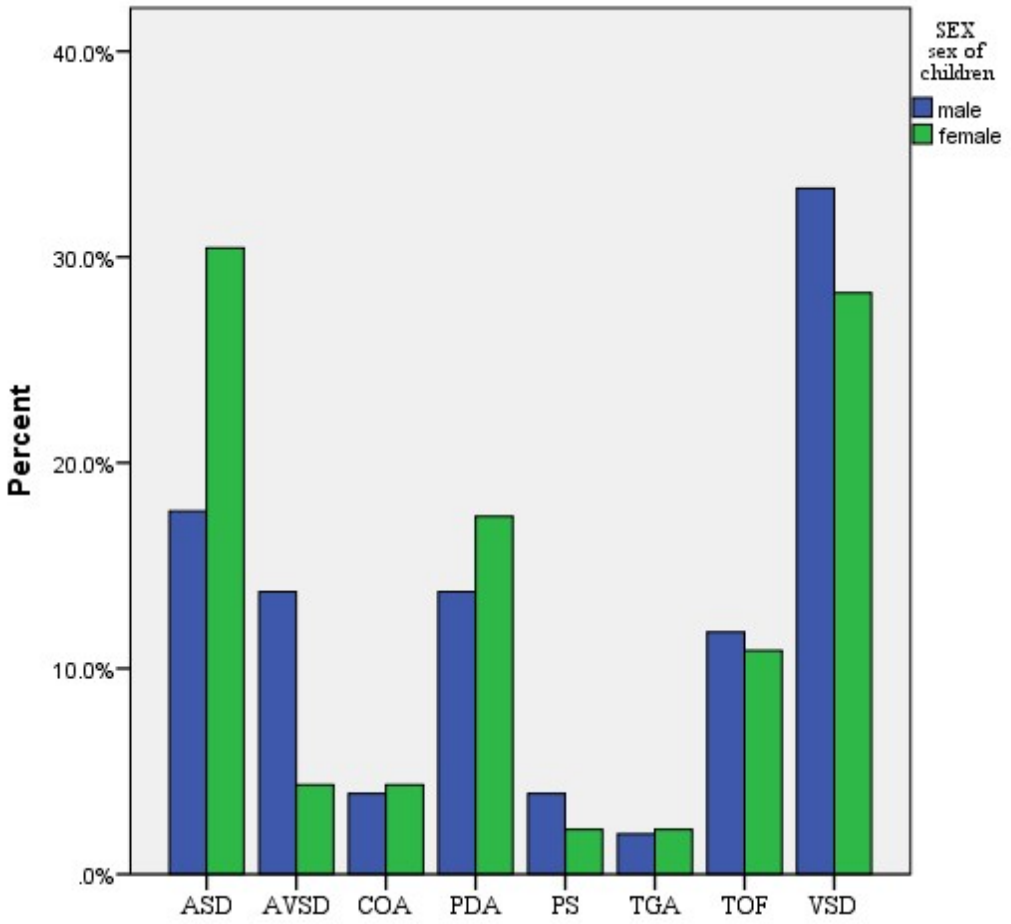


Figure6: Distribution of CHD by sex among children diagnosed with congenital anomalies in Addis Ababa, governmental hospitals, Ethiopia, 2017.

5.4 Factors associated with congenital heart defects

5.4.1Maternal factors

The maternal factors investigated in the present study were maternal age, previous history of abortion, history of chronic disease, previous history of drug intake, previous history of alcohol intake and previous history of cigarette smoking. Previous history of abortion and drug intake during pregnancy demonstrated significant association with the presence of CHD among children diagnosed with congenital anomalies. However the other variables such as maternal age, History of chronic disease of the mothers, alcohol intake during pregnancy and history of cigarette smoking during pregnancy did not show any significant association with CHD.

Table: 2 Bivariate analysis between maternal characteristic and presence of CHD

Variable	CHD No N (%)	Yes N (%)	COR(95%CI)	P value
Maternal age				
<20	**7(53.8)**	**6(46.2)**	**1.26(0.35-4.49)**	**0.563**
20-35	**145(65.6)**	**76(34.4)**	**0.8(0.77-3.77)**	
>35	**22(59.5)**	**15(40.5)**		
Previous history of abortion				
No	**146(67.6)**	**70(32.4**	**2.1(0.91-4.780)**	***0.023**
Yes	**28(50.9)**	**27(40.1)**		
Previous history of drug intake				
No	**148(67.9)**	**70(32.3)**	**2.2(1.194-4.037)**	***0.011**
Yes	**26(50.9)**	**27(49.1)**		
Folic acid intake				
No	**8(66.7)**	**4(33.3)**	**0.9(0.26-3.04)**	**0.856**
Yes	**166(64.1)**	**93(35.9)**		

*value have a significant association with CHD (P value<0.05, COR=crude odd ratio N=number

Table: 3 Bivariate analyses between maternal characteristics and presence of CHD

Variable	CHD			P value
	No N (%)	Yes N (%)	COR(95%CI)	
History of chronic disease of the mothers				
NO	162(65.9)	84(34.10)	2.1(0.913-4.780)	0.081
Yes	12(48.0)	13(52.0)		
History of Alcohol intake during pregnancy				
No	156(66.1)	80(33.9)	1.8(0.9-3.8)	0.09
Yes	18(51.4)	17(48.6)		
History of cigarette smoking during pregnancy				
No	172(63.9)	97(36.1)	–	0.999
Yes	2(100.0)	0(0.0)		

*N= number, COR= crude odd ratio

5.4.2 Children factors

None children characteristics including sex ,types of pregnancy, gestational age, birth order and family history of CHD showed not statistically significant association with CHD among children diagnosed with congenital anomalies by binary logistic regression. (Table 4)

Table: 4 Bivariate analysis between children's characteristic and presence of CHD.

Variable	CHD		COR (95%CI)	P value
	N No (%)	N Yes (%)		
Sex				
Male	83(43.7 %)	51(52.6%)	1.2(0.7-1.9)	0.442
Female	91(52.3%)	46(47.4%)		
Pregnancy types				
Single	161(63.9 %)	91(36.1%)	0.817(0.3-2.222)	0.692
Twin	13(68.4 %)	6(31.6%)		
Gestational age				
Pre term	15(53.6%)	13(46.4%)	0.6(0.28-1.34)	0.218
Term	159(65.4%)	84(34.6%)		
Birth order				
1st	74(71.2%)	30(28.8%)	0.6(0.28-1.132)	0.274
2nd	45(62.5%)	27(37.5%)	0.8(0.4-1.7)	
3rd	26(57.8 %)	19(42.2%)	1.01(0.45-2.28)	
>3rd	29(58.0)	21(42.0%)		
Family history of CHD				
No	167(64.7%)	91(35.3%)	0.6(0.21-1.95)	0.428
Yes	7(53.8%)	6(46.2%)		

*N= number, COR= crude odd ratio

5.4.3 Over all factors associated with congenital heart defects

Variables that showed significant association in binary logistic regression model were previous history of abortion and drug intake during pregnancy .These variables were taken to the multiple logistic analysis models to control for confounding variables, and still previous history of abortion and drug intake during pregnancy remained significantly associated with CHD (P<0.05). The present study also revealed that children whose mothers had previous history of abortion were two times more likely to have CHD Adjusted odd ratio (AOR=1.964 95%CI (0.277-0.935), P=0.03). Children whose mothers had previous drug intake were also two times more likely to develop CHD (AOR=2.149, 95%CI (0.252-0.861), P=0.015). (Table 5)

Table 5: Multi variable analysis of factors that determine the presence of CHD among children diagnosed with congenital anomalies, in Addis Ababa governmental hospitals, Ethiopia, 2017.

Variable	AOR (95%CI)	P value
Previous History of abortion		
No		*** 0.03**
Yes	**1.964(0.277-0.935)**	
Previous drug intake during pregnancy		
No		*** 0.015**
Yes	**2.149(0.252-0.861)**	

*variable have significant association with CHD (P value<0.05), AOR= Adjusted odd ratio

6. Discussion

The present study has shown a relatively high prevalence of CHD among children diagnosed with congenital anomalies and also identified risk factors associated with CHD. The present study has recorded a prevalence 35.8% which is slightly higher than the average worldwide prevalence of CHDs (33.3%) among all major congenital anomalies [2]. The current prevalence of CHDs is similar with the findings research done in Ecuador with children attending echocardiography, which reported a prevalence of 35.95% [35].However, this prevalence recorded in the present study is not in line with that reported (46%) by way of a cross sectional survey carried out in Nigeria [13]. This significantly higher prevalence of CHDs in the study in Nigeria may be due to difference in study settings. There is relatively higher level of industrialization and pollution compared to that in Addis Ababa, Ethiopia. .

The frequency of different types CHDs observed in this study is consistent with other studies conducted in Africa as well as in other countries. The most common type of CHD was VSD followed by ASD which was similar with that reported by a study in the Sudan which was 33.4 %([22] and in Ecuador 29.9% ([35]). The prevalence of VSD in the current study, studies in the Sudan and in Ecuador were 30.9%, 34.4% and 29.9%, respectively. However, this prevalence of VSD recorded in the present study was not consistent with that reported by a Nigerian investigation which was considerably higher (49%) (34). other studies conducted in also have identified ASD as the commonest CHD followed by VSD [1, 26, 36].

The prevalence of CHD in this study was slightly higher in male children (52.6%) than in females (47.4%), with a ratio of1.1:1. Similar sex distribution of CHD was reported also by other studies [5, 22, 27]. However, other investigations have reported that CHDs were more common in female children [38] and where as other studies have found no difference in sex distribution of CHD [37]. The frequency of the types CHDs were varied based on the sex of the child [5, 27, 39]. In the current study, VSD, AVSD, TOF and PS were more common in male children while ASD and PDA were common in female children. This observation is similar with that reported by Sharman et. al. [27].Other similar studies also have shown that VSD and TOF were more common in male children where as ASD and PDA more common in female children [40]. However, other studies have reported that ASD and VSD were more prevalent in males and females, respectively [39].

Maternal age is a risk factor for CHD even in the absence of any chromosomal abnormality in the newborn. Whether the basis of the risk resides with the mother's oocyte is unknown [8]. The prevalence of CHD in this study is high in mother's whose ages were below twenty (42.6%) and above 35 (40.5%), however, the prevalence of CHD was relatively lower in mothers whose ages were between 20 and 35years (34.4%). This finding is consistent with that reported in a study done in China [26]. Similar studies conducted in America have indicated that CHD was more prevalent when maternal age increased, even in the absence of any chromosomal abnormalities [8, 9]. With maternal age above 35 years there is a high frequency of chromosomal abnormalities in the embryo e.g. Down syndrome and other trisomies. The possibility of new gene mutation also increases with age [6, 7, 8].

In the current study, history of Abortion was found to be significantly associated with the presence of CHD. Results of other investigations also have shown that the prevalence of CHD was higher in stillbirth, spontaneous abortion and prematurity [21, 23]. These findings were also consistent with findings from a systematic review and meta analysis done in China where the risk of CHD increased by 18% in spontaneous abortion and by 58% in induced abortion with an odd ratio of 1.28 in mothers with previous history of abortion[41]. A case control study conducted by Li et. *a*l (42), on the other hand, reported that there was not any significant positive association between number of maternal abortion (spontaneous, induced abortion) with prevalence of CHD. Family history of CHD did not show any significant positive relationship with the frequency of occurrence of CHD in this study. However, a study conducted in Egypt showed a significant association between history of CHD in the family and prevalence of congenital anomalies[20]). The association was even much stronger in siblings from consanguineous marriages. Consanguineous marriages were not practiced among the study participants of the present study, but these are common in Egypt and in Middle East countries [20, 39, 44].

The history of drug intake during pregnancy has been found to have a significant positive relationship with prevalence of CHD, with an odd ratio (OR) of 2.15. This study go in line with scientific published article done in America explained the risk of CHDs has been increased after the mother treated with several drugs [43]. Study conducted by Kuciene *et.al* also consistent with the current study showed that the prevalence of CHD was higher in Children whose mothers use

medication during pregnancy [21]. Potentially any form of drug intake during pregnancy could be teratogenic. On the other hand, some of the mothers in study area have been taking contraceptive pills without knowing when they become pregnant. Study conducted in Pakistan not consistent with the present study that drug intake during pregnancy had no any significant association with the presence of CHDs [44]. In this study, maternal history of chronic disease and multi party were not associated with the presence of CHDs. Study carried out in Pakistan is consistent with the current study showed that there were no association between maternal chronic disease and occurrence of CHDs [44]. It is known from the literature that maternal history of chronic disease and multi party has been associated with CHDs. Several maternal chronic diseases especially Diabetes mellitus, HTN, CHD and Epilepsy were associated with higher prevalence of any form of CHDs [19, 21, 45].

In the current study maternal alcohol consumption during pregnancy has no association with the occurrence of CHDs. This finding goes in line with a systematic review and Meta analysis done in Italy, 2016 where alcohol consumption during pregnancy were not associated with a risk of CHDs[46]. However, study carried out in China where identified the probability of having CHD in mothers who drank alcohol during pregnancy were high as compared to mothers had no consume alcohol [7]. Alcohol consumption during pregnancy is not common in this study setting. In the current study cigarette smoking during pregnancy has not a significant association with the presence of CHDs. This finding is inconsistent with study conducted in China where the habit of smoking was increased the presence of CHDs [7].

7. Conclusion

The present study had identified a comparatively high prevalence of CHDs (35.8%) among children diagnosed with congenital anomalies. The gender distribution of CHDs in this study showed that males predominated than females. The current study identified that VSD, AVSD, TOF and PS were more common in males than females, while ASD and PDA were common in female. It also identified VSD the commonest CHDs followed by ASD.

There was significant association between maternal drug intake and history of abortion with CHDs.

8. Recommendation

The burden of CHDs among congenital anomalies in Addis Ababa Governmental hospitals was found to be high. The hospitals should mobilize more resources for optimal and timely management of these patients. These resources should include human resources, such as counselors, pediatric surgeons, cardiologists, pediatric anesthetists, nurses and others. An adequate supply of medical equipment and medications are also important. The hospitals should also plan the introduction of genetic testing services for accurate diagnosis in the future.

Addis Ababa Health Office in collaboration with Minster of Health should create awareness about the risk of taking medication during pregnancy.

Further large scale research should be carried out to determine the prevalence of CHDs and associated factors at national level.

9. References

1. Julien I.H .The global burden of congenital heart disease. Cardiovascular Journal of Africa. 2013; 24(4): 44-48.
2. Raissa T, Annette U , Yvan B , Janvier H, Seraphine M, Lamberte U, Janvier N. Pattern of congenital heart diseases in Rwandan children with genetic defects, Pan African medical journal. 2014.
3. Claire EL, Suk DA, Megan T, Herman L, Alayna K , Adam A, Mary M, David B, and Patrick Y. The Maternal Age-Associated Risk of Congenital Heart Disease. 2015; 520(7546): 230–233. Doi: 10.1038/nature14361.
4. Sadiq M, Al H. Pattern of Congenital Heart Disease A Hospital-Based Study. Al Kindy Col Med J. 2006; 3 (1): 44-48.
5. Bernstein D. Nelson textbook of Pediatrics. Lippincott Williams. Philadelphia Saunders.2004, 5th edition.
6. Zur E, Grades D. Identification of Disease-Related Genes in Congenital Heart Defects using Next-Generation Sequencing. 2014.
7. Li GM, Jun Z, Zhou P.R, YuanY.W, Zuo QP, Jin FW ,Xu M. Spatial patterns of the congenital heart disease prevalence among 0- to 14-year-old children in Sichuan Basin, P. R China. BMC Public Health 2014; 14:595,http://www.biomedcentral.com/1471-2458/14/595.
8. Assia M, Tiffany R, Csaba S, Jaime L. Frias, and Adolfo C. Maternal Age and Prevalence of Isolated congenital heart defects in an Urban Area of the United States. American journal of human genetics.2011; 1-9.
9. Shaad A, Akash G, Tabassaum S. Profile and Risk factors for congenital heart defects. Annals of Pediatric Cardiology.2016; 9(3):216-221.
10. Chelo D, Nguefack F, Menanga AP. Spectrum of heart diseases in children an echocardiography studies of 1,666 subjects in a pediatric hospital, Cameroon. 2016; 6:10–19.
11. Kouame BD, Nguetta IA, Kouame GSY. Epidemiology of congenital abnormalities in West Africa: results of a descriptive study in teaching hospitals in Abidjan: Cote d'Ivoire. African J Pediatrics and Surgery. 2015; 12:51–55.
12. Sadowski SL. Congenital cardiac disease in the newborn infant in Critical Care Nursing Clinic North America. 2009; 21:37–48.

13. Chinawa JM, Eze JC, Obi I. Synopsis of congenital cardiac disease among children attending University of Nigeria Teaching Hospital Ituku Ozalla, Enugu. BMC Res Notes 2013; 6:475
14. Otaigbe BE, Tabansi PN. Congenital heart disease in the Niger Delta region of Nigeria: a four-year prospective echocardiographic analysis. Cardiovascular Journal of Africa 2014; 25:265–268
15. Massoure PL, Roche NC, Lamblin G. Cardiovascular disease in children in Djibouti: a single-centre study. Pan Africa Med Journal 2013; 14:141.
16. Nelson IM, Silvia MC. Epidemiological Study of Congenital Heart Defects in Children and Adolescents. Arq Bras Cardiol. 2003; 80(3): 274-278.
17. Keith LM, Arthur FD, Anne M. clinically oriented anatomy. Lippincott Williams and Wilkins, Philadelphia. 1992; 514:522-24.
18. Moorman A, Webb S, Brown NA. Development of the heart:(1) formation of the cardiac chambers and arterial trunks. Heart. 2003; 89: 806-814.
19. Tantchou JC, Butera G, Giamberti A, Ambassa JC, Sadeu JC. Occurrence and pattern of congenital heart diseases in a rural area of sub-Saharan Africa. Cardiovascular journal of Africa.2011; 2:63-66.
20. Rabah M. Congenital malformations prevalent among Egyptian children and associated risk factors. The Egyptian Journal of Medical Human Genetics.2011; 22:69-78.
21. Kuciene R, Dulskiene V. Selected environmental risk factors. Med (Kaunas).2008; 5(2): 827-832.
22. Salah AI, Mohammed H. Pattern and diagnosis of heart disease in patients attending Ahmed Gasim cardiac center.2012; 7(2):249-254.
23. Hoffman J.I, Kaplan S. The incidence of congenital heart disease. J Am Coll Cardiol. June 2002; 39(12):1890-1900. Pub Med | Google Scholar.
24. Denise L, Elisabeth E.M, Maarten A. Prevalence of Congenital Heart Disease Worldwide. Journal of American college of cardiology.2011; 58(21): 2241-2248.
25. Fahed AC, Gelb B.D, Seidman JG. & Seidman CE. Genetics of congenital heart disease. The glass half empty. Circ. Res. 2013; 112: 707–720.
26. Xiaocheng L. ,Gongshu L. ,Ping W ,Yunzhou H ,Enqing L ,Dongb L.R, Lei PN L ,Xilin Y. ,Zhijie Y . Prevalence of congenital heart disease and its related risk indicators among Chinese infants aged less than 6 months in Tianjin. International journal of Epidemiology. 2015; 5(3):89-95.

27. Shamima S.L, Azizul H.M, Iqbal B.M, Ayub A.M. Pattern and Clinical Profile of Congenital Heart Disease in Teaching Hospital. The Journal of Teachers Association. TAJ 2008; 21 (2).
28. Murray C.J, Lopez A.D. Global mortality, disability, and the contribution of risk factors: Global Burden of Disease Study .Lancet. 1997; 349 (9063): 1436 –1442.
29. Vilas Boas L.T, Albernaz E.P, Costa R.G. Prevalence of congenital heart defects in patients with Down syndrome in the municipality of Pelotas, Brazil. Journal of Pediatrics. 2009; 85(5):403-407.
30. Assia M., Tiffany R.C, Csaba S, Jaime L. Frias and Adolfo C. Maternal Age and Prevalence of Isolated Congenital Heart Defects in an Urban Area of the United States. American journal of human genetics.2011; 1-9.
31. Stoll C., Alembik Y., Dott B., Roth M.P. Study of Down syndrome in 238,942 consecutive births. Ann Genet.2008; 41:44-51.
32. Luciana T., Vilas B., Elaine P. Prevalence of congenital heart defects in patients with Down syndrome in the municipality of Pelotas, Brazil. J Pediatrics (Rio J). 2009; 85(5): 403-407.
33. Hayes C., Johnson Z., Thornton L., Fogarty J., Lyons R. Ten-year survival of Down syndrome births. Int J Epidem. 2007; 26:822-629.
34. Gupta B. And Anti A.U. Incidence of Congenital Heart Disease in Nigerian Children. 2012; 1-4.
35. Gonzalez A.F, Lopez P.R. Congenital malformations in Ecuadorian children: urgent need to create a National Registry of Birth Defects. The Application of Clinical Genetics. 2010; 3:29-39.
36. Fen L., Yenning Y. , Xiang X., Xiao M., Zhen F., Bang D.C. Prevalence of congenital heart defects in Xinxiang multi ethnic group of China. PLOS journal.2015; 4-11.
37. Alabdulgader A. Congenital heart disease in Saudi Arabia: current epidemiology and future projections. East Mediter Health J .2006; 12 (2).
38. Antia A.U. Congenital heart disease in Nigeria: Clinical and necropsy study of 260 cases. Arch Dis Child 1974; 49(1):36-9.
39. Bagher N., Maliheh S., Arezo M., Mustafa Q., Candidate, Mohammad J.G. Prevalence and Pattern of Congenital Heart Disease among Neonates in Gorgan, Northern Iran.2011; 21(3):307-312.
40. Salah A.I. Pattern and Diagnosis of congenital heart disease in Patients attending Ahmed Gasim Cardiac Center.2012; 7(4):249-254.

41. Feng Y. Maternal reproductive history and risk of congenital heart defects in offspring: systemic review and Meta analysis. 2015; 36(2): 253-263.
42. Li NN .Maternal Abortion history and risk of congenital heart defects. Repro Med.2015; 60(5-6):236-242
43. Karl R. Drug in pregnancy. Journal of Experimental and Clinical cardiology .2010; 15(4):100-103.
44. Faheen U.H. Risk factors predisposing to congenital heart defects .Ann Pediatric Cardiac J. 2011; 4(2):117-121.
45. Hsin H.C. Association of maternal chronic disease with risk of congenital heart disease in off spring. CMAJ. 2016; 188(17-18):438-446.
46. Zhongyuan W. Association between alcohol consumption and risk of congenital heart defects in off spring. Italian journal of pediatrics.2016; 42:2.

10. Annex

Research questionnaire English version

Prevalence and associated factors among children diagnosed with congenital anomalies in governmental hospital of Addis Ababa, Ethiopia

Part-1 Socio demographic characteristics

1. Age ----------

2. Sex Male ☐

Female ☐

3. Ethnicity 1. Amhara 2. Oromo 3.SNNP 4. Tigray 5. Others (Specify)

4. Religion 1. Orthodox 2. Protestant 3. Catholic

4. Muslims 5. Unknown 6. Others

5. Region (Residence)

Part-2 Risk factors associated with Congenital Heart Defects

1. Age of the mother……

2. The index pregnancy was (a) single tone (b) twin pregnancy (multiple Pregnancies)

3. Gestation age at delivery (a) preterm (b) Full term

4. The birth order of the Child…….

5. Previous history abortion in past pregnancy/pregnancies? (a). Yes (b). No

6. Previous history of still birth in past pregnancy/Pregnancies? (a). Yes (b). No

7. Previous history of congenital heart defects in family? (a). Yes (b). No

9. If yes, how is that person related to this child?

a. First degree relative

b. Second degree relative

c. Third degree relative

10. History of Chronic Disease of the mother? (a). Yes (b). No

11. If yes, which type the disease……..

12. History of medication during pregnancy (a). Yes (b). No

13. If yes which type/types…….

14 .If yes, for how long did she use it……

15. If yes, at what gestation age?.....

16 History of folic acid intake during the pregnancy? (a). yes (b). No

17. If yes, when did she start using them?

a. before pregnancy (specify)……

b. after conceiving (specify gestation age)……

18. For how long did the mother use folic acid?.....

18. History of alcohol intake during pregnancy? (a). Yes (b). No

19. If yes, alcohol intake per day…… and how often ……

20. If yes, during which month of pregnancy? (Gestation age)……

21. History of smoking cigarette during pregnancy? (a). Yes (b). No

22. If Yes, the amount of smoke per day……

23. If Yes, at which gestation age (estimation)……

24. Was the mother staying with the cigarette smoker during pregnancy, hence Passively smoking ? (a) Yes (b) No?

25. Was the mother exposed to X ray irradiation during pregnancy? (a). Yes (b). No

26. If yes, how many X ray exposures did she have? (a) 2 or less (b) more than 2

27 .If yes, at what estimated gestation age……..

The diagnosis taken from patient medical charts

1. Are there any congenital heart defects? (a) Yes (b) No

2. If yes, what type of heart defects_____?

Consent form (English Version)

I have obtained adequate information about the process and objective of the study and I have understood the same as written that includes information about the purpose, advantage, and disadvantage of this study titled pattern of congenital heart defects and associated factors among children in Addis Ababa governmental hospitals, Ethiopia. I also understood that the research imposes no risk and no composition would be provided to me and my family. I have been told that if I fill discomfort to respond to any of the question, I fill free to withdraw at any time as I wish to do so. I have understood the information given and the participation is completely voluntary based. I have been told that my answers to the questions will not be given to anyone and not expect to my name. Now I am giving my written consent to participate in the study voluntarily. Therefore, I have now consented to participate in the study by signing this form.

Signature of participant_____ Date _____

Signature of investigator _____ Date _____

የስምምነት መዋዋያ ቅጽ (Amharic version)

ኮድ _____ ቁጥር _____

ጥናቱንበሚያካይዱትሰዎችስለጥናቱበቂመረጃተሰጥቶኛል፡፡

የዚህጥናትዓላማምሆስፒታልዉስጥአብሮየሚወለድየህፃናትየልብበሽመጠንእናየሚአጋልጡሁኔ

ታወችንለማወቅመሆኑንተረድቻለሁ፡፡

ከኔየሚወሰደውየዕዉቀትመረጃበኔላይምንምየጤናጉዳትየማያስከትልመሆኑንአውቂአለሁ፡፡

ማንኛውምእኔንየተመለከተመረጃሚስጥራዊነቱየተጠበቀነው፡፡

እደዚሁምበጥናቱለመሳተፍፈቃደኛካልሆንኩበጥናቱለመሳተፍእንደማልገደድነገርግንበዚህጥና

ትመሳተፌለሳይንሳዊዕውቀትጠቃሚመረጃማበርከትናወደፊትበዚህዙሪያለሚሰሩሰራዎችመሰረ

ትየሚሆኑግብአትመስጠትእደምችልተረድቻለሁ፡፡

በመሆኑምበዚህጥናትላይለመሳተፍየተስማማሁመሆኔንበፊርማዬአረጋግጣለሁ፡፡

የተሳታፊውፊርማ_____ቀን------/-------/-------

የጥናቱአስፈጻሚፊርማ_____ቀን-----/------/--------

የመረጃ መጠየቂያ ቅጽ(Amharic version)

ኮድ_____ ቁጥር _____

ሀ. ማህበራዊሁኔታ

1. **እድሜ _____**
2. **ፆታ - ወንድ□ ሴት□**
3. **ብሄር_____**
4. **ሀይማኖት _____**
5. **ክልል(መኖርያ ቦታ)**

ለ. አብሮ ለሚወለድ የልብ በሽታ የሚአጋልጡ ሁኔታወችን በተመለከተ

1. **የእናት እድሜ _____**
2 **የበሽታው ስም _____**
3 **የእርግዝና ሁኔታ ሀ.አንድ ለ.መንታ ሐ. ሶስት እና ከዚያበላይ**
4 **በስንተኛ ወሩ ነው ህጻኑ የተወለደው ሀ.ያለጊዘው ለ. በትክክልኛ ጊዘው**
5 **ስንተኛ እረግዝና ልጆት ነው**
6 **ከዚህ በፊት ዉርጃ ነበሮት**
7 **ከዚህ በፊት የወሊድ ግዜው ሳይደርስ ወልደው ያውቃሉ ሀ. አዎ ለ. የለም**
8 **.በቤተሰቦ ዉስጥ የዚህ አይነት በሽታ ነበር ሀ. አዎ ለ. የለም**
9 **ካለ የዝምድናዉ ቅርበት ምን ያህል ነው**
10 **የልጅ እናት የቆየ በሽታ ነበረባቸው ሀ. አዎ ለ. የለም**
11 **ካለ የበሽታው አይነት ምንድነው**
12 **በርግዝና ወቅት መድሃኒት ወስደው ያውቃሉ ሀ. አዎ ለ. የለም**
13 **መልስዎ አዎ ከሆነ መድሃኒቱ ምን ነበር**
14 **መልስዎ አዎከሆነ ለምን ያህል ጊዜ ወሰዱት**
15 **መልስዎ አዎከሆነ በየትኛው የእርግዝና ወቅት**
16 **በእርግዝና ወቅት የ ፎሊክ አሲድ እንክብል ወስደዋል ሀ. አዎ ለ. የለም**
17 **ከወሰዱ መቼ ሀ. ከርግዝና በፊት ለ. በርግዝና ጊዜ(በስንተኛ ወር)**
18 **መልስዎ አዎከሆነ ለምን ያህል ጊዜ ወሰዱት**
19 **በርግዝና ወቅት አልኮል ጠጥተዉ ያወቃሉ ሀ አዎ ለ. የለም**

20 መልስዎ አዎ ከሆነ ለምን ያህል----------

21 መልስዎ አዎ ከሆነ በስንተኛው የእርግዝና ወቅት----------

22 በርግዝና ወቅት ሲጋራ አጭሰው ያወቃሉ ሀ አዎ ለ. የለም

23 መልስዎ አዎ ከሆነ ለምንያክል ጊዜ ሲጋራ ያጨሳሉ _____

24 መልስዎ አዎ ከሆነ በስንተኛው የእርግዝና ወቅት_____

25 ቤት ውስት ሌላ የሚያጨስ ሰው አለ ሀ አዎ ለ. የለም

26 በርግዝና ወቅት ራጅ ተነሰተው ያወቃሉ ሀ አዎ ለ. የለም

27 መልስዎ አዎ ከነ ለምን ያክል ጊዘ

28 መልስዎ አዎ ከሆነ በስንተኛው የእርግዝና ወቅት_____

የህክምና ካርድ በማየት የሚሞላ

1. የልብ ክፍተት በሽታ አለ ሀ. አዎ ለ.የለም
2. ካለ ይጠቀስ