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ASSESSMENT OF SCHOOL PERFORMANCE AND ASSOCIATED FACTORS OF CHILDREN WITH CONGENTIAL HEART DISEASE ATTENDING TIKUR ANBESSA SPECIALIZED HOSPITAL PEDIATRICS CARDIAC CLINIC ADDIS ABABA, ETHIOPIA 2024.

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(PEDIATRICS AND CHILD HEALTH YEAR III RESIDENT)

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Thesis submission form

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Declaration form

This is to certify that the thesis prepared by Dr Asamirew Tedila , entitled Assessment Of School Performance And Associated Factors Of Children With Congenital Heart Disease Attending Tikur Anbessa Specialized Hospital Pediatrics Cardiac Clinic Addis Ababa, Ethiopia, March 2024 and submitted in partial fulfilment of the requirements of speciality complies with the regulations of the university and meets the accepted standards with respect to originality and quality. This thesis has not been presented for a degree in any other university, and that all sources of materials used for the thesis have been duly acknowledged.

ASSURANCE OF PRINCIPAL INVESTIGATORS

I, the undersigned, declare that this postgraduate degree thesis is my original work, has not been presented for a degree in any other university and that all sources of materials used for the thesis have been duly acknowledged.

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APPROVAL OF THE ADVISORS

This thesis has been submitted with my approval as university advisor.

APPROVAL OF ADVISOR

Name of advisor: _____Signature _____ Date. _____

APPROVAL OF EXAMINER

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Signature _____ Date. _____

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Contents

List of acronyms

AAP	American Academy of Pediatric
AAU	Addis Ababa University
ASD	Atrial Septal Defect
CHD	Congenital Heart Disease
Coarc	Coarctation of the Aorta
VSD	Ventricular Septal Defect
PDA	Patent Ductus Arteriosus
PS	Pulmonary Stenosis
QOL	Quality of Life
TGA	Transposition of the Great Arteries
TOF	Tetralogy Of Fallot
WHO	World Health Organization
COR	Coefficient of odds ratio
OR	Odd ratio

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Abstract:

Background: The condition is known as a congenital heart defect (CHD) occurs when heart or the blood arteries surrounding it don't grow normally before birth. Biological and environmental risk factors contribute to the neurodevelopmental morbidity risk in children with congenital heart disease. The risk can be higher in setting like ours where timely surgical correction palliation and Periodic developmental surveillance, screening, evaluation and interventions guidelines lacks. In our setup the magnitude of the impact that heart disease has on school performance has never been estimated

Objective: To determine school performance of children with congenital heart disease who are on follow up at TASH paediatrics cardiac clinic. **Method:** The study was a hospital based cross-sectional study conducted between September 2023 to January 2024 .For those willing participants structured questionnaire was administered to collect data. There were three sections to the questionnaire. The first section included basic demographic data. Inquiries to evaluate the child's medical status were included in the second section. Seven questions made up the third section, which evaluated the child's academic performance. After being examined and cleaned, the data was encoded into SPSS version 27.0 for analysis. Finally, the study result will be disseminated to each concerned body.

Result: 140 children with CHD was participated .There were 65(46.4%)) males and 75 (63.6%) were females .the commonest non -cyanotic CHD was VSD and cyanotic lesion was TOF. Surgical correction were done for 33(23.6%). The rate drop out school withdrawal of children with congenital heart disease was 15.7 % (22 of 140) and 12.1% (17 /140) of students respectively. 48 (34.3%) of the subjects had a record of greater than 10 days of school absentee, The mean of the average score and SD of the participant in the past academic year was 74.65 ± 13.25 with 95% CI [72.34-76.96]. multiple ordinal logistic analyses showed that malnutrition and low maternal educational level were negatively associated school performance while few absent days and symptomatic treatment are positively related .But type of sex, CHD ,surgical correction, socio-economic level of the family show no relation with school performance

Conclusion: The rate of drop out of school among children with CHD at TASH can be higher than the healthy children. The average of score of children with CHD is above satisfactory. Higher absent days as a result heart disease related symptoms malnutrition and low maternal education negatively affect the school performance of children with CHD.

Key word congenital heart disease, school performance maternal education, malnutrition

1. INRODUCTION

1.1. Back Ground

When the heart or the blood arteries surrounding it don't grow normally before birth, the condition is known as a congenital heart defect (CHD) (1). CHD symptoms and indicators vary depending on the kind and extent of the specific abnormality. Certain abnormalities may show few or no symptoms at all. Some other lesions could present with: cyanosis, rapid or laboured breathing, and fatigue while feeding (2).

There are currently more than 18 different kinds of congenital cardiac abnormalities identified (1). The prevalent forms of cardiac heart disease include ventricular septal defect (VSD), atrial septal defect (ASD), patent ductus arteriosus (PDA), pulmonary stenosis (PS), tetralogy of fallot (TOF), and coarctation of aorta (Coarc) and transposition of great arteries (TGA) respectively (3).

The birth prevalence of CHD was increasing globally until it was plateaued to 9.1 per 1000 live birth since last couples of decades. Asia had the highest birth prevalence of CHD (9.3 per 1000 live births), whereas Africa had the lowest birth prevalence (1.9 per 1000 live births). (3). So many factors can be accounted for lowest number of reports including early mortality, paucity of reported data.

In our country little is known about the burden of congenital heart disease. However it is the most common congenital anomaly type of reported cases of congenital anomalies Ventricular septal defect (30.9%) was the most frequent congenital heart defect (CHD), followed by atrial septal defect (23.7%) (4). If a patient was born in a medical facility, the majority of them received a diagnosis of congestive heart failure (CHD) at birth; for those born at home, the diagnosis came considerably later. Many children were received incorrect diagnosis prior to visiting a large hospital for treatment. Patients had to wait more than a year for surgery following diagnosis.

In terms of IQ, school competency, school QOL, and executive functioning, complex CHD survivors fared worse than average. Behavioural regulation was not as badly impacted as metacognition, and metacognitive abnormalities were more common in older children. Even after accounting for IQ, disease severity, and demographics, metacognition was a distinct and significant predictor of lower academic achievement (5).

Biological and environmental risk factors contribute to the neurodevelopmental morbidity risk in children with congenital heart disease. The circulatory anomalies unique to the heart defect, underlying syndromes or genetic/developmental problems, and the necessary medical and surgical interventions are examples of biological risk factors. Environmental risk and protective factors at home, school, and job modify biological risk factors. When there is a lack of periodic developmental surveillance, screening, evaluation, and intervention guidelines and prompt surgical corrective palliation, the risk may be increased (6).

Many patients' quality of life (QOL), employability, lifetime wages, ultimate educational achievements, and insurance are frequently restricted by the neurodevelopmental and psychosocial morbidity associated with congenital heart disease (CHD) and its treatment. Comparing individuals with CHD to peers without the condition, lower levels of educational achievement are more common among CHD patients (7).

The definition of school performance is academic achievement that is typical for a given age, set of cognitive abilities, and level of education. A wide range of factors that contribute to subpar academic performance can be categorized as illnesses and related limitations as well as pedagogical challenges. Specific learning disabilities (in reading, writing, and math), attention deficit/hyperactivity disorder (ADHD), developmental coordination disorder (DCD), and other neuropsychiatric illnesses, neurologic diseases, and medical problems are among the diseases and associated disabilities.

1.2. Statement of the Problem

Outcomes in children with heart disease have often been described by mortality and morbidity or health status, including anatomic or physiologic consequences, and exercise tolerance; however, the aforementioned parameters alone cannot tell the child improvement in quality of life outside the health care setup. As modern medicine advances in technology and options of interventions become widely available, measurement of patient quality of care goes beyond survival.

Memory and attention impairments were the most frequently reported school or cognitive issues by parents and patients, according to a multicentre study carried out in the United States to examine Quality of Life in Children with Heart Disease as Perceived by Children and Parents (8).Patients with congestive heart failure (CHD) were more likely to experience psychological problems and repeat schooling (11.2%). (9).

1.3. Significance of the Study

The current study is noteworthy since it examines how a child's academic performance is affected by congenital heart disease (CHD). Knowing the impact of congenital heart disease (CHD) on academic performance is crucial because our system lacks early surgical correction, special education, and school nursing assistance. By investigating variables that could impact a child with congenital heart disease's academic performance, this study will add to the body of current research. The findings of this study can serve as a foundation for providing children with heart disease with treatment and assistance outside of the hospital. Policymakers may find it easier to comprehend the unique needs of a student with heart disease who attends school. In order to allocate the limited resources for screening, evaluation, and intervention for high-risk groups who may perform poorly in school, these groups will be identified.

1.4. Literature Review

A cohort study conducted from 2006 to 2014 in New South Wales (NSW), Australia to evaluate academic outcomes among children hospitalised with a chronic health condition showed Children with chronic health conditions have 30-80% increased risk of missing school due to recurrent hospitalizations for the treatment of their health conditions. Moreover it's reported that children hospitalized once or one to two days had 30-50% increased risk of academic under performance. Children hospitalized with cardiovascular or neurological conditions had the second highest odd of performance of performing below standard across domains at each grade (9).

In Danish a population-based follow-up study showed long-term congenital heart defect survivors had lower level educational attainment when compared with controls. The total subjects of the study were 2986 patients. Their odds of finishing the required basic education were roughly 10% lower than those of the control group (adjusted hazard ratio: 0.79, 95% confidence interval: 0.75–0.82). Furthermore, among congenital heart defect patients in the sub-cohort, the probability of completing a basic education program was found to be lower than that of the comparison cohort (hazard ratio 0.87; 95% confidence interval: 0.83–0.92), after accounting for individuals born with extra cardiac defects, chromosomal abnormalities, or preterm birth. Besides, the probability of lower educational achievement is consistent in both sever and non-sever forms of CHD when compared with non CHD individuals (10).

When compared to normal values, a Swiss cohort of children with congenital heart disease (CHD) showed markedly lower overall IQ, working memory, processing speed, and metacognition at the age of ten. Both academic achievement and leisure activity engagement are impacted by these deficiencies. Compared to 97% of the Swiss population overall, 82.4% of children with CHD attended regular school ($P < 0.001$) (11).

In a study at Medical School University of Indonesia, factors influencing school performance in children with rheumatic heart disease were identified through the use of educational achievement, absenteeism, and dropout rates as measuring metrics. In this study, the number of children in the household, age, sex, length of the disease, premorbid educational success, and parental educational level were not related to the school performance of patients with RHD, but the severity of the disease ($p= 0.0010$) and parental educational level ($p= 0.0507$) were(12).

2. OBJECIVES

2.1. General Objective

To assess school performance of children with congenital heart disease who are on follow up at TASH pediatrics cardiac clinic

2.2. Specific Objectives

To assess the grade of average score of children with CHD

To calculate the rate of drop and withdrawal out of school as result of their illness

To calculate the average missed school days because of illness and hospitalization

To identify factors associated with the level of school performance of children with CHD

3. Methodology

3.1. Study setting

The Tikur Anbessa Specialized Hospital served as the study's location. Tikur-Anbessa Specialized Hospital is located in Lideta sub city of Addis Ababa, the country's capital. The hospital, which was founded in 1972, is the biggest referral hospital in the nation and sees about 400,000 patients annually, however the precise figure is unknown. The hospital is the biggest teaching hospitals in the nation, it offers more than 70 postgraduate and eight undergraduate programs. The Ethio-Swedish Pediatric Clinic (ESPC), led by Professor Edgar Mannheim, was established at the former Princes Tsehai Memorial Hospital, marking the beginning of the provision of pediatrics treatment as a specialist health service.

The AAU Faculty of Medicine established the Department of Pediatrics in 1966. The AAU's pediatrics residency program was established in Ethiopia in 1979 with the goal of developing Ethiopian experts to fulfil the country's increasing need for teaching personnel and patient care.

A pediatrics cardiac clinic serves as a follow-up facility for patients with heart disorders who are treated as outpatients. With congenital cardiac disease, children make up the majority of patients. The clinic is open for service on each of the five weekdays. It is managed by a pediatrics cardiologist, pediatrics and child health residents, pediatrics cardiology fellows, and certified nurses. Children and teenagers between the ages of 0 and 18 attend it. Approximately thirty patients visit the clinic each day on average.

3.2. Study Design

An Institution-based Cross-sectional study design was employed.

3.3. Study Period

The study will be conducted from sep11/2023-January 30/ 2024.

3.4. Population

3.4.1. Source Population

All children with congenital heart disease attending TASH paediatrics cardiac clinic for cardiac care and follow up of congenital heart disease

3.4.2. Study Population

All children with congenital heart disease attending TASH paediatrics cardiac clinic for cardiac care and follow up of congenital heart disease during the study period

3.5. Inclusion and Exclusion Criteria

3.5.1. Inclusion Criteria

Children with congenital heart disease attended primary school and above in the last academic year

3.5.2. Exclusion Criteria

Syndromic known Developmental delay/ intellectual development delay, hearing and visual impairment, neuropsychiatric disorder and other chronic illness

3.6. Sample Size Determination

The required sample size of eligible participants for the study will be determined by using a single population proportion formula.

Formula**: n=Za/22 *p (1-p)/d2** Where:

n = the desired sample size

P= 50 %(prevalence children with congenital heart disease having poor school performance

d =5% (maximum margin of error the researcher is willing to allow)

Z =1.96 (standard normal deviation value corresponding to 95% confidence level)

n= (1.96)2*0.50(1-0.50) / (0.05)2 =384

The total number of children attending in TASH paediatrics cardiac clinic is unknown but estimated to be about 2000-2500 based on the monthly clinical audit. So, the following correction formula for the sample size determination is used:

S = n/ (1 + n/N)

n = sample size for population of size

N= number of children with congenital heart disease attending TASH cardiac clinic during the study pe

S=384/ 1+384/500) =220

S=220 adding 10 % (22) for non-response rate, Therefore, the required sample size of this study is 220+22= 242

3.7. Sampling Technique

In this study consecutive/ enumerating technique will be used to select the study participant since data was collected at time of clinical visit for follow up it was not possible to know the actual size of sample frame at the beginning of the study.

3.8. Variables of the Study

3.8.1. Dependent Variable

Drop out of school

Repeated grade

Withdrawal

Average score

Rank in class by percentile

3.8.2. Independent Variables

Age

Sex

Parent's education status

Family income

Place of residency (urban and rural)

Hospitalization

Type of the congenital heart disease

Need of symptomatic management

Number missed school days because of illness

3.9. Operational Definition

School average Grade description

95-100 “excellent”

90-94 “very good”

80-89 “good”

70-79 “satisfactory”

Below 70 “un satisfactory

Percentile –the cumulative percentage of students a subjects ranks above

3.10. Data Collection Instrument

3.10.1. Data collection tool

A structured questionnaire administered by data collector was used to collect data from participants and electronic medical record known as I-Care. It was adapted from different literature with some modification by researcher. It was presented in Amharic and filled data by Amharic version due to the fact that, the medium of instruction is Amharic

3.10.2 .Data Collection Methods

Two certified degree nurses from Tikur Anbessa Specialty Hospital served as the data collectors. They had received training on the purpose of the study, its methodology, and the primary investigator's made supervision during the data gathering process. Every day, the chief investigator oversaw everything. After obtaining informed consent, data was collected using a structured questionnaire from a surrogate and/or a child. There were three sections to the questionnaire. The first section included basic demographic data. Inquiries to evaluate the child's medical status were included in the second section. Seven questions made up the third section, which evaluated the child's academic performance. The surrogate will complete the questions on the spot, and all of them are in Amharic. Expert clearance from previously completed, diverse literatures established the questionnaire's face and content validity.

3.10.3. Data Quality Control

A pre-test was conducted on five percent of the actual sample size who met the requirements before the actual data collecting, which took place outside the study location. Following a review of the content applicability, clarity, and item arrangement required for each questionnaire, the study was carried out.

3.11. Data Processing and Analysis

After being examined and cleaned, the data was encoded into SPSS version 27.0 for analysis. Inconsistent and incomplete data was substituted with those from another questioner. Descriptive statistics yielded results that were expressed as a percentage and frequency. In order to determine which variables are significantly correlated with the result variable, associations between independent variables and dependent variables were analysed using ordinal regression analysis for ordinal dependent variables. P values less than 0.05 and the 95% confidence interval (CI) will be used to determine whether the relationship between the various independent factors and the dependent variable is statistically significant.

3.12. Ethical Consideration

The Department of Pediatrics and Child Health at Addis Ababa University provided an official letter and ethical permission. Each surrogate gave verbal consent. There won't be any harm to the participants because the data collected will be anonymous and will not include participant names or any other personal information.

3.13. Dissemination Plan

The study's findings will be submitted and presented to the department of pediatrics and child health at Addis Abeba University's College of Health Sciences. The thesis summary will be submitted to an international or national peer-reviewed journal for publication, and the study abstract will be presented at organizations such as the Ethiopian Paediatrics Society (EPS).

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4. RESULT

There were 140 participants in this research, yielding a response rate of 57.8%. There were 65 (46.4%) men and 75 (63.6%) women among them. Over 90% of the participants fell between the ages of 8 and 15, with a mean age ± SD of 11.57±2.41 years. Among them, 117 people (83.6%) lived in urban areas, while the remaining 23 people (16.4%) resided in rural areas. Table 1 displays the sociodemographic characteristics of the study population.

4.1Characteristics of the subjects

Table 1 Socio Demographic characteristics of participants

Variables		Frequency	Percent
Age	8 to 11 years	74	52.8
	11 to 15 years	54	38.6
	16 to1 19 years	12	8.6
Sex	Male	65	46.4
	Female	75	63.6
Residency	Urban	117	83.6
	Rural	23	16.4
MONTHLY FAMILY INCOME	<1200 Birr	26	18.6
	1200-9000 Birr	81	57.1
	>9000-Birr	33	24.3
Mothers Education status	illiterate	45	34.4
	primary school	28	21.4
	high school	44	33.6
	collage	14	10.7
Fathers Education status	illiterate	20.0	21.1
	primary school	20.7	21.8
	high school	33.6	35.3
	collage	20.7	21.8

4.2. Distribution of Congenital heart Disease (CHD) and treatment Profile

The commonest CHD type was ventricular septal defect (VSD) which accounts 35 (25%) of the participants, followed by patent ductus arteriosus (PDA) and Tetralogy of Fallot (TOF), both accounting 19 (13.6%) of the subjects. non cyanotic defects was seen in 68.6%(96/140) of the cases while cyanotic lesion are 31.4% with proportion of 2.2:1 respectively . Surgical correction were done for 33(23.6%) of the children before the last academic year. pulmonary hypertension of any severity was seen in 25 (17.9%) of the participants. When it is corrected to the type of lesion which can be complicated by development of pulmonary hypertension it reaches to 25% (24/101). 60% of the participant are on symptomatic managements with drugs and phlebotomy. The adherence rate for pharmacotherapy was 100%. Based on BMI for age, 53 (37.9%) and 40(28.6%) of them fall under the category of sever acute malnutrition (SAM) and moderate acute malnutrition (MAM) respectively.

Table 2 Distribution of Congenital heart disease

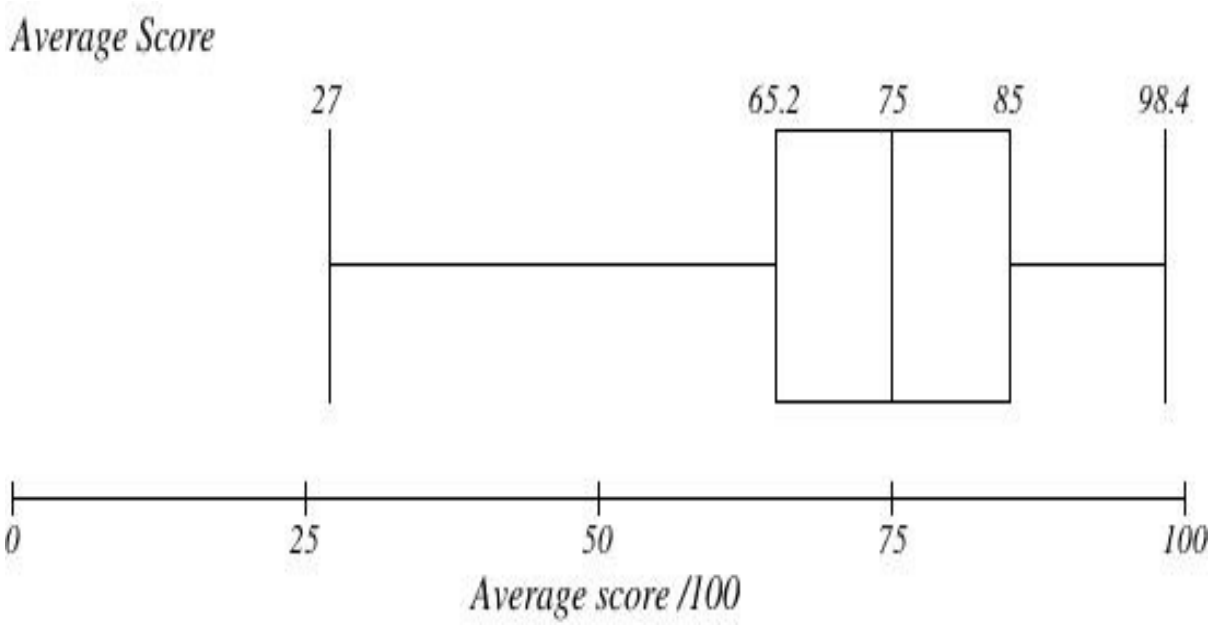
TYPE OF CHD	FREQUENCY	PERCENT
VSD	35	25.0
PDA	19	13.6
TOF	19	13.6
PS	11	7.9
COA AND AORTIC INTERRUPTION	11	7.9
ASD	10	7.1
DORV	10	7.1
TGA	7	5.0
TRICUSPID ATRESIA	7	5.0
AS	5	3.6
OTHERS	6	4.2
TOTAL	140	100.0

4.3. School performance

The rate of drop outs from school among the participants because of heart disease related symptoms was 15.7 % (22 of 140). 17 (12.1%) of students had had withdrawal from school one or more times as a result of symptoms of their heart condition since they started to attend elementary school. during the last academic year 48 (34.3%) of the subjects had a record of greater than 10 days of school absentee which was attributed to cardiac related symptoms by their caregivers. 20 (14.3%) were hospitalized at least once and missed school.

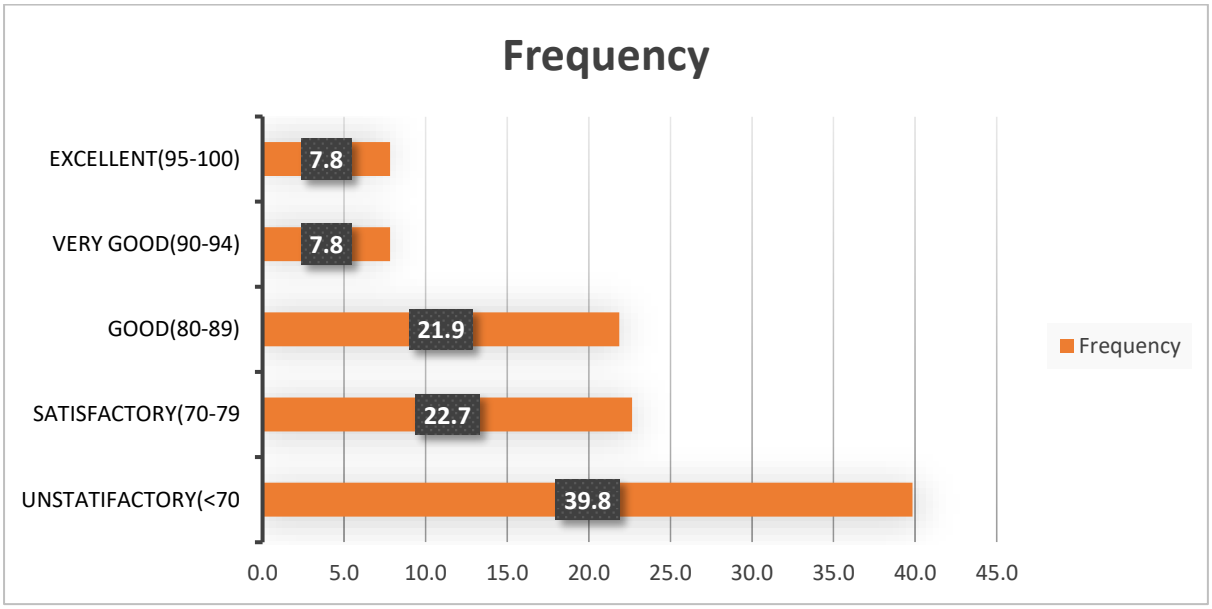
The mean of the average score out of 100 and SD of the participant in the past academic year was 74.65 ± 13.25 with 95% CI [72.34-76.96].The median average score was 75/100 with the min and maximum score of 27 /100 and 98.4 /100 respectively. 50 % percent of the participants score between 65.2 and 85/100

Figure 1 Box plot of the average score of the subjects in the last academic year



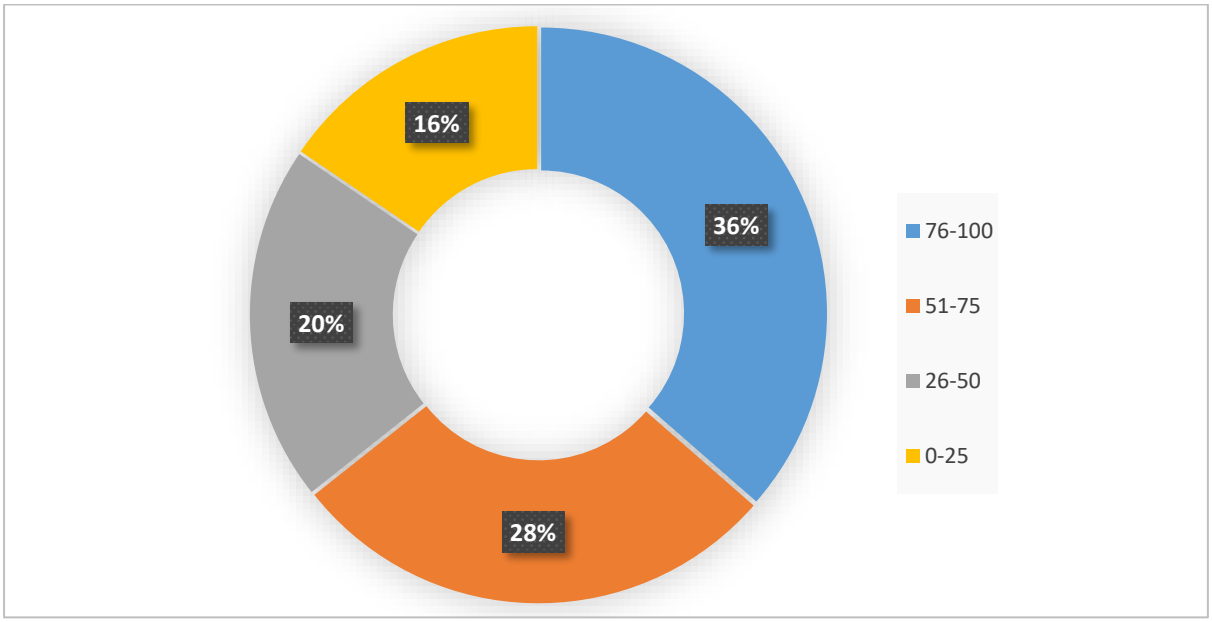
The average score was graded according the operational definition give for graded of average score. The highest number of subjects were seen in unsatisfactory category which accounts 39.8 % of the participants.

Figure 2 Bar chart of grade of average score



When we looked in to the Rank of students in centile defined as cumulative percentage of students in a given class of students a case rank above 48 % of our subjects rank below 50 centile of their classes.

Figure 3 Pie chart of percentile of rank in class



4.3Multiple ordinal regression

Multiple ordinal regression Analysis was used to look for the association of each independent variables and grade of score in a class as dependent variable because there is a natural order (ordinal variable) of the grade of score Cumulative odds ratio (COR) and odds ratio was calculated with statically significance test, p value.

Having symptomatic treatment and lower number of school absentee are positively correlated with high grade of score with COR of **1.902** 95% CI [**0.895 - 2.908**], OR **6.7** and P –value 0.000 and COR of **1.098** .95% CI [**0.162 - 2.034**], OR 3 and P –value 0.022 respectively.

the presence of sever acute malnutrition (SAM) increase the likely hood of falling in the lower grade of score with cumulative odds ratio (COR) of **-1.464** ,95% CI[**-2.488 - -0.440**] , P –value 0.005 OR of 0.23. Similarly lower maternal education status decrease the probability scoring the higher grade category COR **-2.756** CI [**-4.576 - -0.935**], p-value 0.003 and OR of 0.064.

There was no statically difference among the type of CHD and between the non-cyanotic and cyanotic groups in affecting grade of score. The above is also true for having surgical correction or not. The number school absent days and hospitalization also did not affect the outcome variables.

Table 3 multiple ordinal regression model showered association of grade of score with independent variables

independent variables	Estimate	OR	Std. Error	Wald	df	Sig.	95% Confidence Interval
Nutritional status SAM	-1.464	0.231	0.522	7.858	1	0.005	-2.488 - -0.440
MAM	-1.268	0.281	0.580	4.786	1	0.029	-2.404 - -0.132
Normal	0[a]				0		
Mother Education illiterate	-2.756	0.064	0.929	8.797	1	0.003	-4.576 - -0.935
Primary school	-3.188	0.041	0.953	11.191	1	0.001	-5.056 - -1.320
High school	-2.173	0.114	0.800	7.372	1	0.007	-3.742 - -0.604
Collage	0[a]				0		
Symptomatic Rx yes	1.902	6.696	0.514	13.703	1	0.000	0.895 - 2.908
No	0[a]				0		
Sick days absente <5 days	1.098	2.998	0.478	5.283	1	0.022	0.162 - 2.034
5-10 days	0.075	1.078	1.071	0.005	1	0.944	-2.025 - 2.175
> 10 day	0[a]				0		

Red is reference category

5Discussion

5.1 Distribution of Congenital heart Disease (CHD) and treatment Profile

Most of the participant are from urban area. The difference can be as result of poor health service coverage and lack of referral from rural area of the country

The commonest a cyanotic congenital heart diseases seen in this study was VSD and PDA while TOF was the commonest cyanotic heart disease. This is agree with the worldwide systemic review done in 2011 by Denise van der Linde, MSC and etal mentioning 8 common CHD types.

5.2 Factor affecting School performance

Even though no single study or report was found showing the rate of drop out from school of children with congenital heart disease the drop rate of school among participant was (15 %) Ethiopian School age children dropout rate was 17 % reported as in 2011 by Woldehanna.T, and etal (13). Even though direct comparison the two rates is impossible the rate drop out among children with congenital heart disease looks higher than healthy school age children given they are the sub set of the larger population.

Children receiving treatment for their symptoms have a higher odds of being in the higher grade of score. This should not lead to conclusion that asymptomatic children are less likely to be in high grade of score because those who are no receiving medical treatment may also include children whose symptom control require only surgical correction of the lesion.

The other independent variable showed increased probability achieving higher grade is few days of school absent days. Students who had school absence of < 5 days are 3 time more likely to be in high grade of score than those who have > 10 days. Intuitively one can understand as the number of school absentee decrease, students can have good engagement with learning environment and consequently they can understand the subject matter better.

Having uneducated mother also increase the probability of lower score. Similar effect of parental education was seen in study conducted to identify factors affecting school performance in children with rheumatic heart disease in Medical School University of Indonesia. Children of educated parents are more likely to study because they live in an environment which is usually more intellectually stimulating. Secondly, parents who are more educated, may value education more than less educated parents.

The presence of malnutrition also showed to increase odds against high grade of score. Good nutrition status is essential for normal neurocognitive function. The relation of malnutrition and poor school performance among Ethiopian children was also demonstrated by a study by Zerga AA and etal reported that being underweight reduces the academic performance of children by 68 % (14). Children with CHD are at risk poor nutritional status as direct consequence of their illness. Hence the poor school performance seen among these subgroup of the participants can be taken as indirect measure of school performance of children with congenital heart disease.

20% of the study subjects had to miss 1 or more school days because of hospitalization but it does not show statistical significant effect on school under performance unlike a cohort study conducted by Nan Hu and etal from 2006 to 2014 in New South Wales (NSW), Australia. The deference can because of the design the duration and sample size of the study

6. Limitations and strength of the study

Due to the cross sectional nature of the study the loss on follow up and death during the study period may significantly alter measure of the outcome variable.

Because of lack of consistent data the presence of anemia is not included into the independent variables.

Since study was done in a small number of study populations the true dimension of the correlation exist between the variables can be different from what is found in this study

Conclusions

This study reveal the level of school performance of children with congenital heart disease

The rate of drop out of school among children with CHD at TASH can be higher than the healthy children.

The highest number of subjects were seen in unsatisfactory category of grade of score

Our study showed poor school performance of children who had higher absent days as a result heart disease related symptoms.

Malnutrition and low maternal education also seen negatively affecting the school performance of children with CHD.

Recommendations

We forward the following recommendations for the relevant organs in light of our study's findings.

Clinician who are giving care for children with congenital heart disease should regularly ask for school performance of the child so as to consider optimization of the care to reduce school absentee of the child as result of poor symptoms control.

Clinician and care giver have to regularly assess the nutritional status of the child they are caring so early intervention to will be instituted to prevent it and its negative impact on the child education.

Teachers and school guidance's should aware the additional burden of children with congenital heart disease so there should have extra efforts to make up for days missed at school because of sick days

Policy makers as their effort to improve quality of education the need of children with congenital heart should be identified and considered in policy making.

ANNEX

Annex I:

Questionnaire for Participant Information Sheet Identification Number: _____
_____ is my name. As a research data collector, I am employed by car by Dr Asamirew Tedila, who is carrying out this study to partially fulfil the requirements for his pediatric and child health specialty at AAU. We are researching how students with congenital cardiac illness perform academically. If you agree to join after reading and comprehending the information below, you will:

This study aims to ascertain the academic achievement of children with heart disease who are receiving follow-up care at TASH Paediatrics Cardiac Clinic.
Procedure: You must comprehend this and answer "yes" on the agreement form if you are willing to be included this study.

Risk/ Discomfort: There is no compensation, risk, or discomfort associated with taking part in this research project; the only thing you might have to worry about is that it could be uncomfortable, especially if it takes up to 20 minutes of your time. In order to benefit from the research findings, we sincerely hope that you will take part in the study. I'm positive there isn't any risk involved with taking part in this study**.**

Benefits: Although there might not be a direct benefit to you, your participation will probably aid us in determining how congenital heart disease affects children who attend TASH's pediatric cardiac clinic in terms of their academic achievement.

Confidentiality: The data gathered for this research project will be kept private and confidential. The information about you that is being gathered will be maintained in a file with a code number instead of your name. It will also be kept locked with a key and disclosed to no one other than the lead investigator. Right to decline or to leave: You are completely free to decline to take part in this study. If you do not wish to answer any of the questions, you can decide not to answer any of them. In case you have any more inquiries about this research, feel free to get in touch with the lead investigator.

Address of the principal investigator

NAME: Dr Asamirew Tedila

PHONE: +251937398739

Annex II: **Consent Form**

I am aware of all the prerequisites listed above. I am aware that taking part in this study is completely voluntary. I've been assured that my responses to the questions won't be shared with anybody else, and that my identity won't ever be revealed in any study reports. I am therefore prepared and eager to take part in this investigation. You made the choice:

1. I consent to take part [_____signature, continue
2. I decline to participate (end here); many thanks!

Begin the interview with the study participant if they consent to take part.

NB: The respondent's inclusion in the study is not required to be enforced.

Annex III. **Questioner**

Title of the Research

School performance and associated factors of children with heart disease attending Tikur Anbessa specialized hospital pediatrics cardiac clinic

Instructions

Please take your time to carefully complete the information below.

Hospital registration number _____ Date ____/___/___

Part I– Sociodemographic Information

1. Sex of child
   a. Male
   b. Female
2. Age of child _____year
3. Weight _____Kg Height _____ M BMI of the child _____kg/m2
6. School Grade of the child_____
7. Family size _____no of children in the family_____ birth order of the child _____
10. Educational status of primary care giver

    Mother _____ father _____

    a. No formal or informal education
    b. 1-8(Primary school)including informal education
    c. 9-12(high school)
    d. Collage/ university education
11. Household income
    a. <1200 birr/ month
    b. 1200 – 9000 birr /month
    c. >9000 birr/ month
12. Residency
    a. Urban
    b. Rural

Part II–Information on the Child's Medical Condition

1. Type of congenital heart defect the child have (record all the defects if there are more than

2. Is your child having symptomatic treatment?

   a. Yes

   b. No

3. Is the child adherent to his medication?

   a. Yes

   b. No

4 did he /she had surgical correction of the CHD

   a. Yes

   b. No

Part III– School Performance Questioner

1. is your child /are you a drop out from school because of heart disease

a. Yes

b. No

2. has your child ever withdrawn from school because of heart disease

a. Yes

b. No

2. Has your child ever repeated a grade because of poor score?

a. Yes

b. No

3. How many school days did your child/you miss during the last school year?

   a. <5 days

   b. 5-9 days

   c. >10 days

4. How many school days did your child/you miss because of heart disease related symptoms?

   a. <5 days

   b. 5-9 days

   c. >10days

6. What is the last academic year average score) of your child out of 100? _____

7. Her or his rank in class------- out of ----------students

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