Pupils' Knowledge Level about the Contraindicationsof Cardiovascular Diseases of the Heart like Dilated Cardiomyopathy (DCM), Hypertensive Heart Disease (HHD) and Pulmonary Heart Disease (PHD) as Health Education Strategy in Preventive Health

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Abstract

Aim: The objective of this study was to point out pupils' knowledge level about the contraindications of cardiovascular diseases of the heart like Dilated Cardiomyopathy (DCM), Hypertensive Heart Disease (HHD) and Pulmonary Heart Disease (PHD) as health education strategy in preventive health cased at University Secondary School, Njala. **Method:** The researcher interviewed mainly high school pupils with a sampled number of one hundred and twenty (n=120). 46% (n=55) female and 54% (n=65) male; 67% (n=80) Christians; 33% (n=40) Muslims; were selected using the stratified random sampling. Also stratified were 58% (n=70) from the option Pure Science-to-General Science; 42% (n=50) from the option Social Science-to-Applied Art; 29.2% (n=35) from SSS(One-to-Two); 70.8% (n=85) from SSS(Three-to-Four); 62.8% (n=75) within the age circle of (13-to-17); 37.5% (n=45) within the age circle of (18-to-25+) in years. **Results:** The variables of the finding were tested @ level of significance $p < 0.05$ through a statistical instrument of T-test. Analysis from the study objective, shows negative skewedness in all three variables as placed in tabulated values (t-scores of -0.802, 0.529 and 2.129) of 2, 4 and 6 when tested@$p < 0.05$. **Conclusion:** In summing up due to the negative skewedness in all of the variables tested, the finding has demonstrated majority view of high school pupils' low level of knowledge about the contraindications of cardiovascular diseases of the heart as health education strategy in preventive health cased at University Secondary School.The researchers recommend that health education as a teaching subject be included in the schools' curriculum to help in the teaching of preventive health to school pupils.

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Introduction

Health Education according to World Health Organization (1998), is a composition of consciously constructed opportunities for learning involving some form of communication designed to improve health literacy, including improving knowledge, and developing life skills that are conducive to individual,community and environmental health. A disease is a particular abnormal condition, a disorder of a structure or function that affects part or all of an organism. The causal study of disease is called pathology. Disease is often construed as a medical condition associated with specific symptoms and signs, McWhinney, I. R. (1987). It may be caused by factors originally from an external source, such as infectious disease, or it may be caused by internal dysfunctions, such as

autoimmune diseases, McWhinney, I. R. (1987).Infection on the other hand begins when an organism successfully colonizes by entering the body, growing and multiplying. Most humans are not easily infected. Those who are weak, sick, and malnourished, have cancer or are diabetic have increased susceptibility to chronic or persistent infections. Individuals who have a suppressed immune system are particularly susceptible to opportunistic infections, Reddy, M., et al. (2012). Cardiovascular disease however, includes coronary artery diseases (CAD) such as angina and myocardial infarction (heart attack), Shanthi, M. et al. (2011). Other cardiovascular diseases are angina-coronary artery diseases (CAD), myocardial infection, stroke, hypertensive heart disease, congenital heart disease, rheumatic heart disease, cardiomyopathy, atrial fibrillation, endocarditis, peripheral artery disease and venous thrombosis, Global Burden of Disease Study (2013).

Dilated cardiomyopathy (DCM) under study is a condition in which the heart becomes enlarged and cannot pumpblood efficiently. The decreased heart function can affect the lungs, liver, and other body systems, Jameson, J. N. et al. (2005).Dilated cardiomyopathy (DCM) is one of the cardiomyopathies, a group of diseases that affect primarily the myocardium (muscle of the heart). Different cardiomyopathies have different causes and affect the heart in different ways, Jameson, J. N. et al. (2005). In Dilated cardiomyopathy (DCM), a portion of the myocardium is dilated, often without any obvious cause. Left or right ventricular systolic pump function of the heart is impaired, leading to progressive cardiac enlargement and hypertrophy, a process called remodeling,Jameson, J. N. et al. (2005). Dilated cardiomyopathy is the most common form of non-ischemic cardiomyopathy. It occurs more frequently in men than in women, and is most common between the ages of 20 and 60 years, Robbins, S. L. et al. (2003). About one in three cases of congestive heart failure (CHF) is due to dilated cardiomyopathy, Jameson, J. N. et al. (2005). The progression of heart failure is associated with left ventricular remodeling, which manifests as gradual increases in left ventricular end-diastolic and end-systolic volumes, wall thinning, and a change in chamber geometry to a more spherical, less elongated shape, Pieske, B. (2004). This process is usually associated with a continuous decline in ejection fraction.

Hypertensive heart disease (HHD) on the other hand includes a number of complications of high blood pressure that affect the heart. While there are several definitions of hypertensive heart disease in the medical literature, Alegría-Ezquerra, E. et al. (2006) and Lip, G. Y. et al (2000), the term is most widely used in the context of the International Classification of Diseases (ICD) coding categories. The definition includes heart failure and other cardiac complications of hypertension when a causal relationship between the heart disease and hypertension is stated or implied on the death certificate, Lip, G. Y. et al (2000). However, since high blood pressure is a risk factor for atherosclerosis and ischemic heart disease, Grossman, E. et al. (1996), death rates from hypertensive heart disease provide an incomplete measure of the burden of disease due to high blood pressure, Grossman, E. et al. (1996), In 2013 hypertensive heart disease resulted in 1.07 million deaths up from 630,000 in 1990, Global Burden of Disease Study 2013 Mortality and Causes of Death, Collaborators (2014). Because there are no symptoms with high blood pressure, people can have the condition without knowing it. Diagnosing high blood pressure early can help prevent heart disease, stroke, eye problems, and chronic kidney disease, Maeder, M. T. et al. (2009). Hypertensive heart disease was estimated to be responsible for 1.0 million deaths worldwide in 2004 (or approximately 1.7% of all deaths globally), and was ranked 13th in the leading global causes of death for all ages, World Health Organization (2008). A world map shows the estimated disability-adjusted life years per 100,000 inhabitants lost due to hypertensive heart disease in 2004, "WHO Disease and injury country estimates" (2009).

With Pulmonary Heart Disease (PHD), it is the enlargement and failure of the right ventricle of the heart as a response to increased vascular resistance or high blood pressure in the lungs (pulmonary hypertension), American Medical Network-Pulmonary Heart Disease (2010). Chronic pulmonary

heart disease usually results in right ventricular hypertrophy (RVH), whereas acute pulmonary heart disease usually results in dilatation. Hypertrophy is an adaptive response to a long-term increase in pressure, American Medical Network-Pulmonary Heart Disease (2010). Individual muscle cells grow larger (in thickness) and change to drive the increased contractile force required in moving the blood against greater resistance. Dilatation is a stretching (in length) of the ventricle in response to acute increased pressure, such as when caused by a pulmonary embolism or ARDS (acute respiratory distress syndrome), American Medical Network-Pulmonary Heart Disease (2010). To be classified as pulmonary heart disease, the cause must originate in the pulmonary circulation system. Two major causes are vascular changes as a result of tissue damage (e.g. disease, hypoxic injury, chemical agents, etc.) and chronic hypoxic pulmonary vasoconstriction. If left untreated, then death may result. RVH due to a systemic defect is not classified as pulmonary heart disease, American Medical Network-Pulmonary Heart Disease (2010). The heart and lungs are intricately related. Whenever the heart is affected by disease, the lungs will follow and vice versa. Pulmonary heart disease is by definition a condition when the lungs cause the heart to fail, American Medical Network-Pulmonary Heart Disease (2010).

This study only points out onhigh school pupils' knowledge level about the contraindications of Cardiovascular Diseases of the Heart likeDilated Cardiomyopathy (DCM), Hypertensive Heart Disease (HHD) and Pulmonary Heart Disease (PHD),as health educationstrategy in preventive health, ranging from SSS One-to-Two and SSS Three-to-Fourcased at University Secondary School Njala, Southern Sierra Leone.

Materials and Methods

Selection of Participants: The researchers mainly interviewed high school pupils with asampled number of one hundred and twenty (n=120), of which 46% (n=55) female and 54% (n=65) male; 67% (n=80) Christians; 33% (n=40) Muslims; were selected using the stratified random sampling. Also stratified were 58% (n=70) from the option Pure Science-to-General Science; 42% (n=50) from the option Social Science-to-Applied Art; 29.2% (n=35) from SSS-One-to-Two; 70.8% (n=85) from SSS-Three-to-Four; 62.8% (n=75) within the age circle of (13-to-17); 37.5% (n=45) within the age circle of (18-to-25+) in years.

Instrument for Measuring the Parameters: The survey questionnaire design was adopted for the study. The variables tested were knowledge about Dilated Cardiomyopathy (DCM), Hypertensive Heart Disease (HHD) and Pulmonary Heart Disease (PHD).The restructured but validated pupils' knowledge level about health education strategy in preventive healthquestionnaire (PKHEPHQ) was the adopted instrument for testing the parameters,formally utilized by Bebeley, (2016).Senior colleaguesfrom the School of Community and Clinical Health Sciencesand the School of Education, Njala University validated the questionnaire, which was pre-tested on sixty pupils(n=60) of Saint Andrews Senior Secondary School, BoSouthern Sierra Leone;with an intra-class correlation coefficient (ICC) reliability of0.89-to-0.99 using the ANOVA technique.

Test Procedures: The one hundred and twenty randomly selected using the stratified random samplingmethod of school pupils(n=120) mainly from senior forms at University Secondary School, Njala were interviewedon the School'spremisesby the researchers with the help of some academic staff members of Human Kinetics and Health Education Department, to respond to the"Yes-I-Do" or "No-I-Don't"variablesadopting the face to face technique. Therespondents'views were stratified accordingly for statistical analyses.

Statistical Analysis: The frequency distribution, percentage, mean, standard deviation andT-test werethe statistical instruments used to compute, analyze and to find out any significant differences in the data obtained from high school pupils' knowledge level about the contraindications ofcardiovascular diseases of the heart as health education strategy in preventive health. The results were tested @ level of significance $p<0.05$.

Results

Table 1. High/Senior School pupils' knowledge about Dilated Cardiomyopathy [n=120]

No.	Item-One: Dilated Cardiomyopathy (DCM)	Yes (x)	%	(x-X)	(x-X)²	No (y)	%	(y-X)	(y-X)²
1	Do you know that dilated cardiomyopathy can be linked to shortness of breath, syncope and angina but only in the presence of ischemic heart disease?	95	79.2	44.2	1953.64	25	20.8	-44.2	1953.64
2	Do you know that a person suffering from dilated cardiomyopathy may have an enlarged heart, with pulmonary edema (*a condition characterized by an excess of watery fluid collecting in the cavities or tissues of the body*) and an elevated jugular (neck or throat) venous pressure and a low pulse pressure?	75	62.5	24.2	585.64	45	37.5	-24.2	585.64
3	Do you know that dilated cardiomyopathy is probably the result of damage to the myocardium produced by a variety of toxic, metabolic, or infectious agents?	45	37.5	-5.8	33.64	75	62.5	5.8	33.64
4	Do you know that dilated cardiomyopathy may be as a result of late sequelae (*condition of a previous disease or injury*) of acute viral myocarditis, such as with Coxsackie B virus (*enterovirus causing various respiratory, neurological and muscular diseases*) and other enteroviruses (*causing polio and hepatitis A which occur chiefly in the gastrointestinal track*)?	25	20.8	-25.8	665.64	95	79.2	25.8	665.64
5	Do you know that autoimmune (*denoting disease caused by antibodies or lymphocytes produced against substances naturally present in the body*) mechanisms are also suggested as a cause for dilated cardiomyopathy?	30	25	-20.8	432.64	90	75	20.8	432.64
6	Do you know that individuals subjected with an extremely high occurrence of premature ventricular contractions (*a heartbeat outside the normal rhythm*) can develop dilated cardiomyopathy?	35	29.2	-15.8	249.64	85	70.8	15.8	249.64

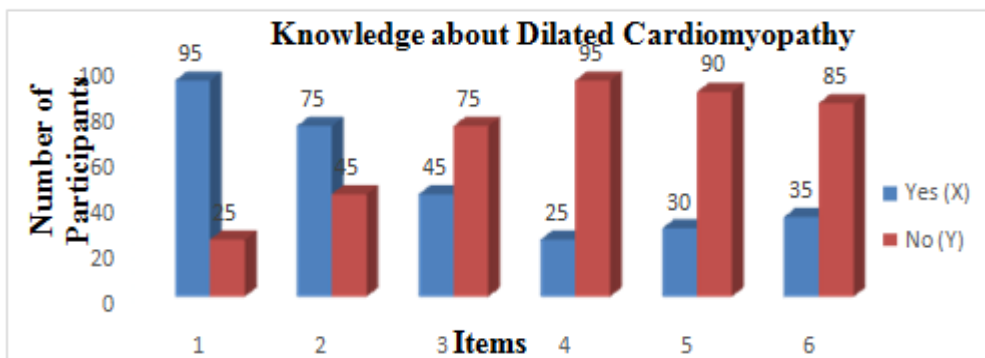| (n=6)	Yes (x) [Mean = 50.8 & SD = 25.6] No (y) [Mean = 69.2 & SD = 25.6]	$\sum X$ = 305	$\sum(x-X)^2$ =3920.84	$\sum Y$ = 415	$\sum(y-X)^2$ =3920.84

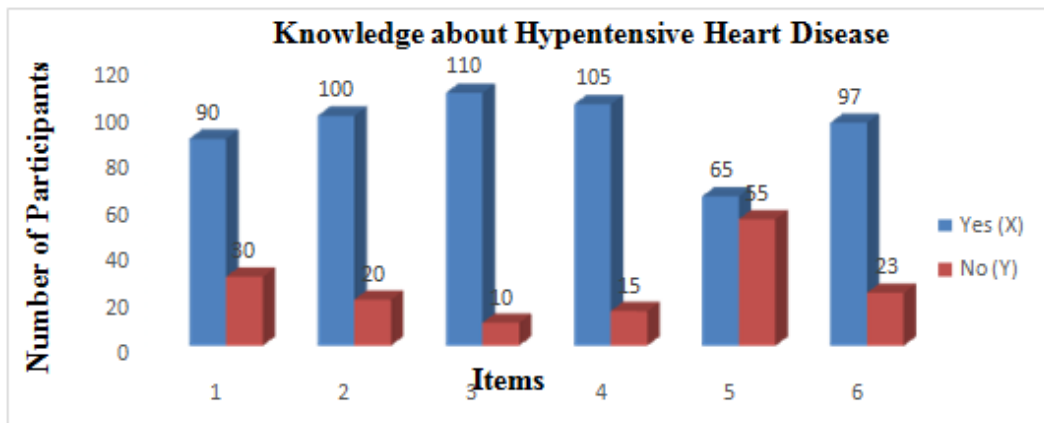**Figure 1.** *A chart showing pupils' knowledge about Dilated Cardiomyopathy[n=120]*

Table 2. Dependent t-test (t) analysis of pupils' knowledge about Dilated Cardiomyopathy [n=120]

Items	Dilated Cardiomyopathy (DCM)		D (X-Y)	D^2
	Yes (X)	No (Y)		
1	95	25	70	4900
2	75	45	30	900
3	45	75	-30	900
4	25	95	-70	4900
5	30	90	-60	3600
6	35	85	-50	2500
			* $\sum D$ = -110	* $\sum D^2$ = 17700
*(n=6)	*$(\sum D)^2$= 12100 *df = 5		*t = -0.802 *c = 2.571	

Table 3. High/Senior School pupils' knowledge about Hypertensive Heart Disease [n=120]

No.	Item-Two: Hypertensive Heart Disease (HHD)	Yes (x)	%	(x-X)	(x-X)²	No (y)	%	(y-X)	(y-X)²
1	Do you know that hypertensive heart disease can be linked to enlargement of the heart (*cardiomegaly*) and heart failure?	90	75	-4.5	20.25	30	25	4.5	20.25
2	Do you know that hypertensive heart disease can also be linked to irregular pulse or palpations and even fatigue?	100	83.3	5.5	30.25	20	16.7	-5.5	30.25

#	Question	X		(x-X)	(x-X)²	Y		(y-X)	(y-X)²
3	Do you know that hypertensive heart disease can be also linked to weight gain and swelling of the foot and ankles?	110	91.7	15.5	240.25	10	8.3	-15.5	240.25
4	Do you know that hypertensive heart disease can be linked to shortness of breath and difficulty in sleeping flat in bed (*orthopnea*)?	105	87.5	10.5	110.25	15	12.5	-10.5	110.25
5	Do you know that hypertensive heart disease can be linked to Bloating (*conditioned by an accumulation of gas in the stomach*) and abdominal pain and greater need to urinate at night?	65	54.2	-29.5	870.25	55	45.8	29.5	870.25
6	Do you know that people with hypertensive heart disease suffers from acutely heart failure and pulmonary edema (*conditioned by an excess watery fluid collecting in the cavities or tissues of the body*) due to sudden failure of pump function of the heart?	97	80.8	2.5	6.25	23	19.2	-2.5	6.25
(n=6)	**Yes (x) [Mean = 94.5& SD =14.6]** **No (y) [Mean = 25.5& SD = 14.6]**	$\sum X$ = 567			$\sum(x-X)^2$ =1277.5	$\sum Y$ = 153			$\sum(y-X)^2$ =1277.5

Figure 2. A chart showing pupils' knowledge about Hypertensive Heart Disease [n=120]
Table 4: Dependent t-test (t) analysis of pupils' knowledge about Hypertensive Heart Disease[n=120]

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Items	Hypertensive Heart Disease (HHD)		D (X-Y)	D^2
	Yes (X)	No (Y)		
1	90	30	60	3600
2	100	20	80	6400
3	110	10	100	10000
4	105	15	90	8100
5	65	55	10	100
6	97	23	74	5476
			* ∑D = 414	*∑D^2 = 33676
*(n=6)	*(∑D)^2= 171396	*df = 5	*t = 0.529	*c = 2.571

Table 5: High/Senior School pupils' knowledge about Pulmonary Heart Disease[n=120]

No.	Item-Three: Pulmonary Heart Disease (PHD)	Yes (x)	%	(x-X)	(x-X)^2	No (y)	%	(y-X)	(y-X)^2
1	Do you know that pulmonary heart disease can be linked to Shortness of breath which occurs on exertion but when severe can occur at rest?	70	58.3	-5.8	33.64	50	41.7	5.8	33.64
2	Do you know that pulmonary heart disease can be linked to wheeze (*whistling or ratting breath sound in the chest, due to obstruction in the air passage*) and chronic wet cough?	55	45.8	-20.8	432.64	65	54.2	20.8	432.64
3	Do you that pulmonary heart disease can be linked to swelling of the abdomen with fluid (*ascites*) and swelling of the ankles and feet (*pedal edema*)?	61	50.8	-14.8	219.04	59	49.2	14.8	219.04
4	Do you know that pulmonary heart disease can be linked to enlargement or prominent neck and facial veins and raised jugular venous pressure (JVP i.e. *pressure in any of the large veins in the neck, carrying blood from the head*)?	73	60.8	-2.8	7.84	47	39.2	2.8	7.84
5	Do you know that pulmonary heart disease can be linked to enlargement of the liver and bluish discoloration of the skin (*cyanosis*)?	100	83.3	24.2	585.64	20	16.7	-24.2	585.64
6	Do you know that pulmonary heart disease can be linked to the presence of abnormal heart sounds and possible bi-phasic atrial response shown on an EKG due to hypertrophy (*enlargement of an organ or tissue resulting from an increase in size of its cells*)?	96	80	20.2	408.04	24	20	-20.2	408.04

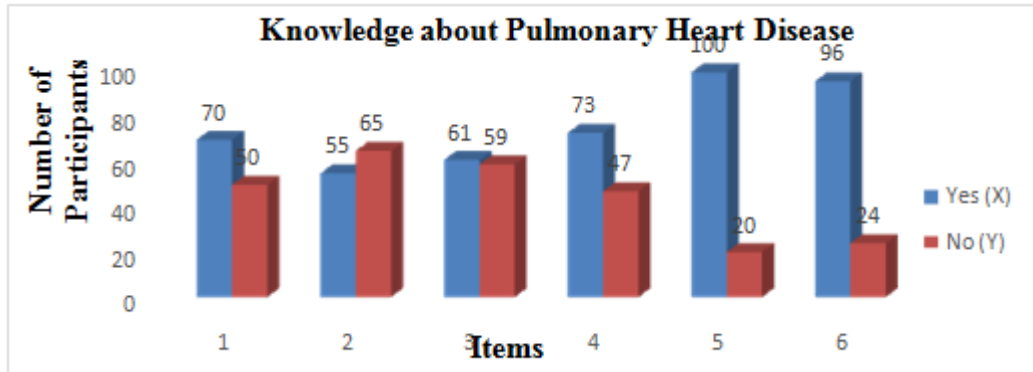| (n=6)	Yes (x) [Mean = 75.8& SD = 16.8] No (y) [Mean = 44.2& SD = 16.8]	$\sum X$ = 455	$\sum(x-X)^2$ =1686.8	$\sum Y$ = 265	$\sum(y-X)^2$ =1686.8

Figure 3: A chart showing pupils' knowledge about Pulmonary Heart Disease [n=120]

Table 6: Dependent t-test (t) analysis of pupils' knowledge about Pulmonary Heart Disease[n=120]

Items	Pulmonary Heart Disease (PHD)		D (X-Y)	D^2
	Yes (X)	**No (Y)**		
1	70	50	20	400
2	55	65	-10	100
3	61	59	02	04
4	73	47	26	676
5	100	20	80	6400
6	96	24	72	5184
			* $\sum D$ = 190	* $\sum D^2$ = 12764
*(n=6)	*($\sum D)^2$= 36100	*df = 5	*t = 2.129	*c = 2.571

Discussion of Results

While not all lung diseases can be prevented, one can reduce the risk of lung disease according to a published report by Living with Pulmonary Heart Disease (2010), through a means of avoiding or discontinuing smoking. Patients with chronic obstructive lung disease always end up with right heart failure. This study mainly focuses on pupils' knowledge level about the contraindications of cardiovascular diseases of the heart likeDilated Cardiomyopathy (DCM), Hypertensive Heart Disease (HHD) and Pulmonary Heart Disease (PHD), ashealth education strategy in preventive health amongst University Secondary School pupils cased at Njala, Sierra Leone. The frequency distribution, percentage (%), mean, standard deviation and Dependent t-test (t) were the statistical instruments used to compute and compare the results of the finding. The t-test results were tested @$p < 0.05$level of significance. In discussion, the result shows complete in significant differences (t-values = -0.802, 0.529and2.129) with regards high school pupils' knowledge level about the contraindications of cardiovascular diseases of the heart as health education strategy in preventive

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health. The finding clearly points out the need for the introduction of Health Education as a teaching subject in schools in other to help disseminate through teaching and sensitizations, the contraindications associated with cardiovascular diseases with respect to dilated cardiomyopathy which has the potential of affecting many individuals even to death of which school pupils are no exception as recorded in the insignificant difference in table2(t-value = -0.802). In conformity, Mitchell, R. S. et al. (2003), reported in their publication that about 25-35% of affected individuals with dilated cardiomyopathy (DCM) have familial forms of the disease, with most mutations affecting genes encoding cytoskeletal proteins, while according to Ross, J. (2002), some affect other proteins involved in contraction. However, death as reported by Pieske, B. (2004), is due to either congestive heart failure or bradycardia (abnormally slow heart action). Educating school pupils about modifying their lifestyle towards physical health will help greatly in preventing and or reducing cardiovascular diseases of the heart as reported by Chobanian, A. V. et al. (2003), that the risk of cardiovascular disease and death could be reduced by lifestyle modifications, including dietary advice, promotion of weight loss and regular aerobic exercise, moderation of alcohol intake and cessation of smoking. However, drug treatment according to Hunt, S. A. et al. (2009), may also be needed to control the hypertension and reduce the risk of cardiovascular disease and manage the heart failure, or as reported by Fuster, V. et al. (2011), can control cardiac arrhythmias. Looking also to educating pupils about environmental health will help eliminate or reduce drastically the contraindications associated cardiovascular diseases of the heart as reported by a published article on Living with Pulmonary Heart Disease (2010),that individuals working in environments where there are chemicals should wear masks to prevent inhalation of dust particles. In conclusion, the published report by Living with Pulmonary Heart Disease (2010) stated that elimination of the cause is the most important intervention, i.e. smoking must be stopped, along with exposure to second-hand smoke. Also exposure to dust, flames, house hold smoke and to cold weather are to be avoided. Finally, the findings are also displayed according to responses of the respondents to the "Yes-I-Do" or "No-I-Don't interview in a frequency distribution, percentages, mean and standard deviation values as indicated in tables 1, 3and5. In tables 1,3and5 holistically, greater number of respondents had little or no knowledge about the contraindications of cardiovascular diseases of the heart as health education strategy in preventive health.

Based on the results, it is therefore recommended that health education as a subject be included in the teaching curriculum in high schools for the teaching of physical health, environmental health and emotional and psychological healthas a strategy in preventive health with special reference to the contraindications ofcardiovascular diseases of the heart likeDilated Cardiomyopathy (DCM), Hypertensive Heart Disease (HHD) and Pulmonary Heart Disease (PHD), of which University Secondary School Njala is no exception**.**

Conclusion

This study was conducted purposely with the focus of pointing out facts about high school pupils' knowledge level about the contraindications ofcardiovascular diseases of the heart likeDilated Cardiomyopathy (DCM), Hypertensive Heart Disease (HHD) and Pulmonary Heart Disease (PHD),as health education strategy in preventive health with the aim of giving appropriate recommendations thereafter. Based on the findings, it is concluded that a good number of respondents had little or no knowledge about the contra indications associated with cardiovascular diseases of the heart as health education strategy in preventive health as displayed in their frequency distribution, percentage responses, mean scores and the calculated t-values tested@$p < 0.05$.

Acknowledgement

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