

Rheumatic heart disease knowledge and associated factors among nurses working in cardiac centers at public and private hospitals of Addis Ababa: cross sectional study

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Abstract

Back ground: It is proposed that the biggest gap in control of rheumatic heart disease is in implementing of ineffective primary and secondary preventive measures. These measures are supposed to be well addressed by nurses. For prevention and proper management, nurses are expected to have full knowledge about rheumatic heart disease. Therefore the main objective of the study was to assess the level of nurse's knowledge and factors behind regarding RHD in the current study.

Method: Institution based cross sectional study was conducted on nurses working in cardiac centers of public and private hospitals at Addis Ababa from April 1 to 30, 2021. Total sample size is **163** selected by purposive sampling method. Data was entered in to Epi-data version 4.5 and exported to SPSS version 25.0 and was checked for missing values. Data was cleaned. Descriptive statistics such as frequency, mean and percentages were calculated, described and displayed in tables, graphs and charts. Binary logistic regression was done to see the crude significant relation of each independent variable with nurse's good knowledge score. Significant factors were identified based on multivariate logistics regression in 95% confidence level at P-value less than 0.05.

Result: In the present study about 154 participants were participated. The mean correct answer response of the nurses for knowledge of RHD questions is 12.2 ± 5.2 . Only 48.7% of the nurses have good knowledge towards RHD. Being male in gender, having history of sore throat, taking formal education in university or collage, taking in-service training on RHD, having higher work experience, have found significantly associated with higher odds of nurses' good knowledge towards RHD.

Conclusion and recommendation: regular training regarding RHD management should be given to nurses who are working in cardiac centers. Rheumatic heart disease early treatment and prevention should be incorporated and reinforced in to nursing and other health related professions curriculums.

Introduction

Rheumatic heart disease (RHD) is a serious disease of the heart involving damage to one or more of the four small heart valves ¹. Rheumatic heart disease is a result of rheumatic fever that follows an untreated group A streptococcal infection of young susceptible individuals ². The disease is arbitrated by inflammatory and autoimmune reactions ³. Numerous genes associated to the human immune system responses are damaged ⁴.

The heart valves injury remains after an illness called acute rheumatic fever, during which the heart valve tissue, also occasionally the heart lining or muscle can become swollen, which leads to carditis ⁵. Subsequently the heart valves remained damaged become scarred ⁶. A scarred heart valves leads to an interruption to normal blood flow through, some blood may flow backward through a leaky valve that does not close properly or blood may be blocked because a tight, scarred valve does not open properly. When the heart is damaged in this way, the heart valve is not able to function effectively ⁷.

The damage can result in narrowing of the valve which leads to decreased blood flow, leak in the valve which causes blood to flow in the wrong direction ⁸, damage to heart muscle which weakens the heart muscle, affecting its ability to pump ⁹. Damage to the mitral valve or other heart valves and tissues can cause problems with the heart ¹⁰, later in life causing an irregular and chaotic heart beat called Atrial Fibrillation (AF)¹¹ and finally Heart Failure (HF) ¹².

Rheumatic heart disease is caused by scarlet fever which consecutively is caused by an infection with streptococcus bacteria¹³. Rheumatic fever most often affects children who are between 5 and 15 years old, though it can develop in younger children and adults. Rheumatic fever causes everlasting harm to the heart which is called (Rheumatic Heart Disease)¹⁴. It generally occurs 10 to 20 years after the first illness, but severe cases of rheumatic fever can cause damage to the heart valves despite having actual symptoms¹⁵.

There are various potential factors that can increase the risk of rheumatic fever¹⁶. Family history and type of streptococcus bacteria are the most frequently mentioned factors^{17,18}. Some people carry a gene that might make them more likely to develop rheumatic fever, certain strains of streptococcus bacteria are more likely to contribute to rheumatic fever than are other strains. However, the greater risk of rheumatic fever is associated with overcrowding, poor sanitation and other conditions that can easily result in the rapid transmission or multiple exposures to streptococcus bacteria^{20,21}. Rheumatic heart disease has been an avoidable but severe public health problem in low- and middle-income countries and in relegated communities in high-income countries, including native populations²¹. More than 30 million people are affected by rheumatic heart disease nowadays worldwide²². According to WHO 2015 report RHD was assessed to have been accountable for 305 000 deaths and 11.5 million disability-adjusted life years lost²³. From these deaths 60% happened precipitately before the age of 70 years²⁴.

The African, South-East Asia and the Western Pacific regions are the worst affected, accounting for 84% of all prevalent cases and 80% of all estimated deaths due to rheumatic heart disease in 2015²⁵. India, in the South-East Asia Region, has the highest global prevalence, with about 27% of all cases globally(27). In the Western Pacific Region, the burden of rheumatic heart disease is especially concentrated in China and indigenous populations living in Australia, New Zealand and the Pacific island States²⁷. In the Eastern Mediterranean Region, rheumatic heart disease persists in certain countries such as Egypt, Sudan and Yemen²⁸.

The prevalence of RHD is very high in our country Ethiopia where an average of 40% cases per 1000 population is affected by RHD²⁹. Although the prevalence did not differ by sex, around 62% of males in Ethiopia have RHD and around 53% of females' population experienced RHD in Ethiopia³⁰.

The possible barriers to prevention, control and elimination of rheumatic heart disease are the neglect of rheumatic fever³¹ and rheumatic heart disease in national health policies and budgets³², lack of data to enable pointing prevention efforts, poor primary and secondary prevention and access to primary health care³³, inadequate numbers, training or knowledge of health workers at all levels³⁴, limited understanding of rheumatic fever and or rheumatic heart disease in affected communities and inaction on the social determinants of the disease and inequities in health³⁵.

It is proposed that the biggest gap in control of rheumatic heart disease is in implementing effective primary and secondary preventive measures. These measures are supposed to be well addressed by health care providers specially nurses³⁶. For prevention and proper management of RHD health care providers are expected to have full understanding of the nature of the disease condition and good assessment knowledge³⁷. Thus, for effective prevention and management of RHD nurses must be well-educated and knowledgeable about the diseases³⁸.

Although RHD can be preventable and effectively managed, the prevalence of the disease is still increasing. Knowledgeable nurses are very crucial in reducing the prevalence of RHD by providing health education and quality care. In Ethiopia little is known about knowledge of nurses to wards RHD. And therefore, the main objective of the

study is to assess nurse's knowledge regarding Rheumatic heart disease in Addis Ababa public and private hospitals with cardiac centers.

Method And Material

Study setting

This study was conducted in Addis Ababa public and private hospitals with cardiac units. According to the data obtained from Addis Ababa City Administration Health Bureau, there are 6 public and private cardiac hospitals in Addis Ababa, which we're giving cardiac care services. All were purposely selected to be the study areas; these are Tikur Anbessa Specialized Hospital (TASH) cardiac center, Saint Peter hospital (SPH), Cardiac Center Ethiopia (CCE), Land Mark Hospital (LMH), Gesund hospital (GH) and Addis Cardiac Hospital (ACH). These hospitals provide cardiac care service to patients with the diverse socio-economic background. Besides, there is a high load of rheumatic heart disease patients in these hospitals and the only places where cardiac nurses are working in the city.

Study design

Health facility based cross sectional study with quantitative research method was employed to address the specific objectives of the study from April 1 to 30 2021.

Inclusion and exclusion criteria

- **Inclusion criteria:** Nurses who are working in Addis Ababa government hospitals with cardiac units and willing to participate in the study were included.
- **Exclusion criteria:** Nurses who were seriously sick and unavailable during data collection period.
- Nurses who are assigned to work in the cardiac wards but never followed a RHD patient.

Sample size determination and sampling procedures

The sample size was determined by using formula for estimating a single population proportion formula. Since the population size is less than 10, 000, the final sample size was estimated using the correction formula. The final sample size obtained including a 10% non-response rate was **(163)**. Then, the number of participants in each selected hospital was determined using the population proportionate sampling (PPS). It is estimated using the formula: $(T) = K * L$, ($K * HL$ in a health facility)/ K , where, HL = proportion of cardiac nurses in the study in a given hospital, T = Final sample size obtained using correction formula (163), K is the total number of cardiac nurses in the selected hospitals.

Finally, nurses were selected using purposive sampling method

Operational definition

Good knowledge

if participants respond mean and above to RHD knowledge questions

Poor knowledge

if the participants respond below mean to RHD knowledge questions

Study Instrument

Data was collected using self-administered questionnaire for nurse's knowledge for RHD, and the tool is adopted from different literatures (^{37 36,39} and adapted for this study. The tool has two parts.

1. Sociodemographic variables include (Age, Sex, Religion, Work experience, Educational level, Salary, etc....
2. RHD knowledge questions of nurses (developed by ³⁶ according to literature content of the questionnaire was approved by the nurse experts; will be used to assess knowledge of nurses; items had "true", "false" or "do not know" choices; scoring will be done as giving "1" point for each correct answer with maximum score of 22).

Pilot testing was done by primary investigator with nurses in another hospital. Necessary revisions were made after pilot testing.

Data analysis

Data was entered in to Epi data version 4.45 software and export to SPSS version 25.0 for analysis, and was checked for missing values. Data was cleaned. Descriptive statistics, such as mean was used to compute continuous variables and counted with percentage for categorical variables. Both bivariate and multivariate logistic regression analyses were used to identify independently associated factors of nurses' knowledge of RHD. The bivariate analysis was exported to multivariate analysis when $P < 0.05$ to control the possible effect of confounders. Adjusted odds ratio (AOR) with 95%CI and P -value < 0.05 were used to select variables associated with nurses knowledge of RHD.

Result

Socio-demographic characteristics of the participants

In the present study about 154 participants were included. Out of these the great majority of them ,128 (83.1%) of the participants were females. The mean age of the participants was 28.8, while the minimum and maximum ages of patient were 21 and 44 years respectively. Majority 92 (59.7%) of participants were in the age group of 21–28 years old category.

One hundred five (68.2%) of the study participants were BSc degree holders whereas only 17 (11%) had Master's degree in the nursing field. Regarding marital status, 80(51.9%) were single and 66 (42.9%) of them were married as few as 8(5.2%) of the study participants were widows or divorced. Majority of the participants were from Land Mark Hospital 8(24.7%) and St. Peter hospital participants 15(9.7%) cover the smallest number.

The nurses working in the selected study area's mean income was 6248.07 ± 2391.5 Ethiopian Birr and majority of the study participants 105(68.2%) earn less the mean income (6248.07 ETH Birr). Most 72(46.8%) of them had work experience from two to five years and 52(33.8%) had a sore throat at least once in their life. Twenty-eight (18.2%) of the nurses had been diagnosed with rheumatic heart disease 92(59.2%) have experience in managing RHD patients. Nearly 80% (123) and 35(22.7%) of the nurses working in the current study area had learned formal education in university about RHD and took in service trainings on RHD after start working respectively (Table 1).

Table 1

Socio demographic characteristics of nurses working in public and private cardiac center hospitals at Addis Ababa, Ethiopia 2021

Variables	Category	Frequency(n)	Percentage (%)
Sex	Male	26	16.9
	Female	128	83.1
Age	21–28 years	92	59.7
	29-36years	44	28.6
	> 37 years	18	11.7
Level of educational	Diploma	32	20.8
	BSc nurse	105	68.2
	MSc nurse	17	11
Religion	Orthodox Christian	90	58.4
	Muslim	34	22.1
	Protestant	27	17.5
	Catholic	3	1.9
Marital status	Single	80	51.9
	Married	66	42.9
	Divorced	4	2.6
	Widowed	4	2.6
Current working place (hospital)	TASH	28	18.2
	St. Peter Hospital	15	9.7
	Cardiac Center Ethiopia	33	21.4
	Gezund Hospital	20	13
	Land Mark Hospital	38	24.7
	Addis Cardiac hospital	20	13
Year of experience in care provision (years)	≤ 1years	31	20.1
	2-5 years	72	46.8
	≥ 6 years	38	24.7
Have you ever had a sore throat?	Yes	52	33.8
	No	102	66.2

Variables	Category	Frequency(n)	Percentage (%)
Have you been diagnosed with rheumatic heart disease?	Yes	28	18.2
	No	126	81.8
Do you have experience in managing RHD patients?	Yes	92	59.2
	No	62	40.3
Have you learned formal education in your university about RHD?	Yes	123	79.9
	No	31	20.1
Have you taken in service trainings on RHD after you start working?	Yes	35	22.7
	No	119	77.3
Monthly income	< 4500 Eth Birr	37	24
	4501–7500 Eth Birr	76	49.4
	> 7501 Eth Birr	41	26.6

Nurses' knowledge towards Rheumatic heart disease (RHD)

As shown in Table 2, majority of the nurses respond question items “What causes rheumatic heart disease?” 84(54.5%), Can a sore throat cause heart disease? 114(74%), Which treatment is appropriate for a bacterial sore throat for prevention of acute rheumatic fever and rheumatic heart disease?” 131 (85.1%), Carditis in acute rheumatic fever most often persists with the resolution of other symptoms 107(69.5%), Rheumatic heart disease can occur without prior evidence of acute rheumatic fever 80(51.9%), Patients with acute rheumatic fever or rheumatic heart disease should be put on secondary prophylactic antibiotics 105 (68.2%), What is the drug of choice for secondary prophylaxis 87(56.5%)?” What is the frequency of prophylaxis with Benzathine Penicillin 96(62.3%), Which valve is most commonly involved in rheumatic heart disease113 (73.4%) Should some patients with rheumatic heart disease be placed on anticoagulants100 (64.9%) Early treatment of bacterial pharyngitis with antibiotics 123 (79.9%), What the problems with benzathine penicillin injections107(69.6%), and Early treatment of bacterial pharyngitis with antibiotics 86(53.8%)?” correctly.

Table 2

Knowledge towards Rheumatic heart disease (RHD) among nurses working in public and private cardiac center hospitals Addis Ababa Ethiopia 2021.

R.n	Knowledge of RHD items	Correct answers		Wrong answers	
		Frequency (n)	Percent (%)	Frequency (n)	Percent (%)
1	What causes rheumatic heart disease?	84	54.5	70	45.5
2	What is the clinical manifestation of acute rheumatic fever?	70	45.5	84	54.5
3	Can a sore throat cause heart disease?	114	74	40	26
4	Which strain of the germ is implicated?	56	36.4	98	63.3
5	What is the duration from a sore throat to the onset of acute rheumatic fever?	46	29.9	108	70.1
6	Within which time range does the treatment of sore throat have to be initiated to reduce the risk of acute rheumatic fever?	36	23.4	118	76.6
7	Which treatment is appropriate for a bacterial sore throat for prevention of acute rheumatic fever and rheumatic heart disease?	131	85.1	23	14.9
8	Carditis in acute rheumatic fever most often persists with the resolution of other symptoms.	107	69.5	47	30.5
9	Rheumatic heart disease can occur without prior evidence of acute rheumatic fever.	80	51.9	74	48.1
10	Which lesion is commonly associated with carditis in acute rheumatic fever?	40	26	114	74
11	Can indolent carditis alone fit the criteria for the diagnosis of acute rheumatic fever?	50	32.5	104	67.5
12	Patients with acute rheumatic fever or rheumatic heart disease should be put on secondary prophylactic antibiotics.	105	68.2	49	31.8
13	What is the drug of choice for secondary prophylaxis?	87	56.5	67	43.5
14	What is the frequency of prophylaxis with Benzathine Penicillin?	96	62.3	58	37.7
15	What is the minimum duration of prophylaxis?	32	20.8	122	79.2
16	What are the complications of rheumatic heart disease?	73	47.4	81	52.6
17	Carditis in acute rheumatic fever is treated with?	41	26.6	113	73.4
18	Which valve is most commonly involved in rheumatic heart disease?	113	73.4	41	26.6
19	which pone is the earliest valve lesion?	57	37	97	63
20	Should some patients with rheumatic heart disease be placed on anticoagulants?	100	64.9	54	35.1

R.n	Knowledge of RHD items	Correct answers		Wrong answers	
		Frequency (n)	Percent (%)	Frequency (n)	Percent (%)
21	Early treatment of bacterial pharyngitis with antibiotics	123	79.9	31	20.1
22	What the problems with benzathine penicillin injections	107	69.6	47	30.5
23	Which of the following is characteristics of bacterial tonsillitis	44	28.6	110	71.4
24	Early treatment of bacterial pharyngitis with antibiotics	86	55.8	68	44.2

Only 32(20.8%) responded correctly to the question item “What is the minimum duration of prophylaxis?”.

Based on this the mean correct answer response of the nurses for knowledge of RHD questions is 12.2 ± 5.2 , with minimum 0 and maximum score 23 out of 24 question items.

And therefore based on the current study 75(48.7%) of the nurses have scored above mean to knowledge of RHD questions and 79(51.3%) have scored below mean to nurses knowledge questions. Only 48.7% of the nurses have good knowledge towards RHD among the nurses who are working in public and private hospitals with cardiac center in Addis Ababa, Ethiopia ([figure1]).

Nurses’ knowledge towards RHD and associated factors

As shown in Table 3, in the bivariate logistics regression analysis, being male in gender has found association with higher odds of good knowledge towards RHD in the current study. The same is true for having history of sore throat any time before, taking formal education in university or college about RHD, taking in-service training on RHD, being diagnosed for RHD, having experience of managing RHD patients are also shown association.

Table 3

Knowledge towards RHD and its associated factors among nurses working in public and private cardiac centers in Addis Ababa, Ethiopia 2021.

Characteristics	Category	Knowledge towards RHD		P-value	COR (Lower and upper limit)	P-value	AOR (Lower and upper limit)
		Poor n (%)	Good n (%)				
Sex	Male	7(4.5%)	19(12.3%)	0.009*	3.5(1.37,8.89)	0.017**	4.6(1.33,16.04)
	Female	72(46.8%)	56(36.4)%				
sore throat	Yes	15(9.7%)	37(24%)	0.00*	4.1(2.01,8.55)	0.001**	5.8(2.04,16.53)
	No	64(41.6%)	38(24.7%)				
Diagnosed with rheumatic heart disease	Yes	8(5.2%)	20(13%)	0.01*	3.2(1.3,7.87)	0.49	1.6(0.42,6.24)
	No	71(46.1%)	55(35.7%)				
Experience in managing RHD patients	Yes	39(25.3%)	53(34.4%)	0.008*	2.47(1.27,4.8)	0.22	1.8(0.69,4.82)
	No	40(26%)	22(14.3%)				
Learned formal education in your university about RHD?	Yes	57(37%)	66(42.9%)	0.017*	2.8(1.27,6.64)	0.039**	4.3(1.07,17.5)
	No	37(14.3%)	9(5.6%)				
Training on RHD	Yes	7(4.5%)	28(18.2%)	0.000*	6.1(2.47,15.1)	0.000**	10.9(2.93,40.6)
	No	72(46.8%)	47(30.8%)				
Age	21–28 years	55(35.7%)	37(24%)	0.045*	.34(.116,.976)	0.995	1(0.16,6.23)
	29–36 years	18(11.7%)	26(16.9%)	0.579	.72(.23,2.28)	0.861	1.16(.21,6.39)
	>37 years	6(3.9%)	12(7.8%)		1		1
Work experience	≤ 1years	26(18.4%)	5(3.5%)	0.000*	.089(.027,.28)	0.001**	.057(.011,0.3)
	2-6 years	31(22%)	41(29.1%)	0.23	.61(.26,1.397)	0.306	0.54(0.17,1.75)
	≥ 6 years	12(8.5%)	26(18.4%)		1		1
Monthly income	< 4500 ETB	25(16.2%)	12(7.8%)	0.001*	.2(.076,0.52)	0.552	0.63(.137,2.89)
	4501–7500	42(27.3%)	34(22.1%)	0.008*	.34(.15,.753)	0.251	.46(.125,1.722)

1: constant, *Significant at p-value of < 0.2, ** Significant at p-value of < 0.05

> 7501 ETB	12(7.8%)	29(18.8%)	1	1
1: constant, *Significant at p-value of < 0.2, ** Significant at p-value of < 0.05				

On the contrary having lessor work experience, being in younger age group, and having lesser monthly income are found to be less likely to be associated with nurse's knowledge towards RHD at p values less than 0.2.

But in the multivariate logistics regression, being male in gender, having history of sore throat any time in life, taking formal education in university or collage about RHD, taking in-service training on RHD, having higher work experience, have found significantly associated with higher odds of nurses' good knowledge towards RHD at p values less or equal to 0.05

As shown in Table 3, male nurses working in the cardiac unit of the current study area were having 4.6 times higher odds of good knowledge towards RHD compared to female nurses ([AOR = 4.6, 95% CI (1.33-16.045)) P = 0.017]).

Nurses who had formal education towards RHD in college or university have 4.3 times more likely higher odds of better knowledge towards RHD ([AOR = 4.3, 95% CI (1.07,17.5)) P = 0.039]). In relation to the nurse previous history of sore throat, the participants who had history of sore throat had also scored more than 5 hands higher knowledge level compared to those who have never feel sore throat previously [AOR = 5.8: 95% CI (2.04–16.53) P = 0.001]).

Participants with in service training towards RHD related courses had nearly 11 times more likely to have higher odds of better knowledge on RHD ([AOR = 10.9: 95% CI (2.93,40.6)) P = 0.001]). The study also indicated that participants with shorter work experience have less likely to be associated with level of nurses' knowledge of RHD compared to those who had longer duration of work experience [AOR = 0.57: 95% CI (.011,0.3) P = 0.001]).

Discussion

The present study assesses the knowledge level of nurses towards Rheumatic Heart Disease (RHD) and associated factors in Addis Ababa public hospitals with cardiac units. Consequently, the mean correct answer response of the nurses for knowledge of RHD questions is 12.2 ± 5.2 , with minimum 0 and maximum score 23 out of 24 question items.

This is consistent compared to a study conducted in four medical schools in Cameroon from February to April 2019 among 509 medical students which showed that the overall knowledge level of the study participants on Rheumatic heart disease was moderate 296 (58.2%), with 159 (31.2%) having a good knowledge level. The mean knowledge score was 11.97 out of 22 ³⁶.

Better knowledge of study subjects was scored on RHD in the current study compared to a prospective hospital based cross sectional study conducted among 87 health care providers in Sudan Khartoum State Gaafar Ibnauf Children's Hospital (GICH) which assessed knowledge about prevention of rheumatic fever and rheumatic heart disease before a teaching session was 38% ³⁵. This discrepancy may be due to better work experience in Cardiac clinics in the current study or exposure to rheumatic disease inflicts a memory towards RHD care knowledge.

According to a prospective follow-up study conducted in Suva, Fiji, in the South Pacific on health workers on teaching focused echocardiography for rheumatic heart disease screening, explored that mean knowledge scores

increased from 8.1 prior to training (range 5–15) to 14.9 (range 14–15) after training⁴⁰. This is congruent compared to our study as the level of mean knowledge.

The current study finds out that 75(48.7%) nurses have scored above mean to knowledge of RHD questions and 79(51.3%) have scored below mean to nurses knowledge questions. This is consistent compared to a cross-sectional and interventional study conducted in Gezira State, Al Managil locality from Nov 2016 to February 2018 on handheld echocardiography for screening and control of rheumatic heart disease study in Gezira state, Sudan: the study assessed knowledge attitude and practice of health care providers regarding RHD and found that majority of the health worker's knowledge towards RHD were found to be poor³⁹.

However, the current study contradicts A prospective hospital based cross sectional study conducted among 87 health care providers in Sudan Khartoum State Gaafar Ibnauf Children's Hospital (GICH) on knowledge about rheumatic heart disease revealed that before and after a teaching session, the nurses' knowledge about RHD and rheumatic fever was increased to 93% after lectures. Knowledge about the different aspects of management had shown significant improvement after the teaching sessions. The average knowledge of these health care providers level of knowledge was average before lecture provision³⁵. This discrepancy may be due to difference in research methodology as the later study is prospective interventional study.

According to a study conducted in Sudan the minimum duration of secondary prophylaxis was known by 14.5% of students, and 84.7% responded that Benzathine penicillin is the drug of choice for the treatment of sore throat to prevent acute rheumatic fever³⁶. This is congruent compared to our study in which What the drug of choice for secondary prophylaxis 87(56.5%), and the frequency of prophylaxis with Benzathine Penicillin 96(62.3%).

Regarding knowledge on prevention of RHD up to 30.1% of students thought that amoxicillin was the drug of choice for secondary prophylaxis for acute rheumatic fever or rheumatic heart disease in the Sudan's study. However, 114(74%), in the current study thought amoxicillin is appropriate for a bacterial sore throat for prevention of acute rheumatic fever and rheumatic heart disease. This discrepancy may be due to difference in socioeconomic status, lack of in-service training and RHD education in their university in the Sudan's study.

According to the world heart federation an Rheach second edition report, health worker training has a central role in RHD control programs that needs to be instituted to all levels of health care personnel including physicians and non-physicians. The study also concludes that provision of training whether in the job or scheduled to health care providers on rheumatic heart diseases have shown to increase the knowledge level of the professionals on rheumatic heart disease⁴¹. This agrees with the current study as taking formal education in university or collage about RHD, taking in-service training on RHD, having higher wok experience, have found significantly associated with higher odds of nurses' good knowledge towards RHD at p values less or equal to 0.05.

In this study male nurses working in the cardiac unit of the current study area were having 4.6 times higher odds of good knowledge towards RHD compared to female nurses ([AOR = 4.6, 95% CI (1.33-16.045)] P = 0.017)]. Most literatures (37–41) didn't support this idea. This may be due to the fact that difference in socio cultural background of the nurses in the studies.

In this study Nurses who had formal education towards RHD in college or university have 4.3 times more likely higher odds of better knowledge towards RHD ([AOR = 4.3, 95% CI (1.07,17.5)] P = 0.039)]. This finding agrees with

studies conducted in Sudan Khartoum State Gaafar Ibnauf Children's Hospital³⁵. And cross-sectional study conducted in Cameroon having a formal lecture on RHD ³⁶.

A cross-sectional and interventional study conducted in Gezira State, to assess knowledge attitude and practice of health care providers regarding RHD showed that health workers knowledge towards ARF/RHD were significantly associated with taking training on RHD, public education about RHD. There was nothing mentioned if age, sex occupation salary and other socio demographic variables could associate with higher knowledge of RHD knowledge or not ³⁹. This is consistent compared to the current study except being male nurse have associated with better knowledge to RHD in the current study.

Nurses participants who had history of sore throat had scored more than 5 hands higher knowledge level compared to those who have never feel sore throat previously [AOR = 5.8: 95% CI (2.04–16.53) P = 0.001]. This is not consistent compared to studies conducted in Fuji, Sudan or Cameron. This inconsistency may be due to the fact that all nurses in the later studies may have been taking the prophylactic treatment before exposed to RHD.

According to a prospective follow-up study conducted in Suva, Fiji, in the South Pacific on health workers on teaching focused echocardiography for rheumatic heart disease screening, explored that training health workers without prior experience to perform basic echocardiography can facilitate RHD screening in settings with limited resources. In addition on the job training of health workers may contribute for higher levels of knowledge scores after training which further can help in better screening of RHD performance ⁴⁰. This is congruent compared to the recent study as expressed by participants with in service training towards RHD related courses had nearly 11 times more likely to have higher odds of better knowledge on RHD ([AOR = 10.9: 95% CI (2.93,40.6)) P = 0.001].

Study participants with short work experience period/ time/ have associations with low level of good nurses' knowledge of RHD. Participants with less work experience had 0.57 times less probability of having better knowledge towards RHD compared to those who had higher long period of work experience [AOR = 0.57: 95% CI (0.57(.011,0.3)) P = 0.001]. This may be due to work experience may expose nurse to multi professional experience exchange, knowing the disease more extensively and knowing more about the disease.

Conclusion And Recommendation

The mean correct answer response of the nurses for knowledge of RHD questions is 12.2 ± 5.2 , with minimum 0 and maximum score 23. In this study 75(48.7%) of the nurses have scored above mean to knowledge of RHD questions and 79(51.3%) have scored below mean to nurses knowledge questions. Only 48.7% of the nurses have good knowledge towards RHD among the nurses who are working in public hospitals with cardiac center in Addis Ababa, Ethiopia.

Being male in gender, having history of sore throat any time in life, taking formal education in university or collage about RHD, taking in-service training on RHD, having higher wok experience, have found significantly associated with higher odds of nurses' good knowledge towards RHD. There is a need to ensure that in service training regarding RHD management should be given to nurses who are working in cardiac centers and RHD early treatment and prevention should be incorporated and reinforced in to nursing profession curriculum.

Abbreviations

ACH: Addis Cardiac Hospital, AF: Atrial Fibrillation, ARF: Acute Rheumatic Fever, CC: Cardiac Center, CCE: Cardiac Center Ethiopia, CI: Confidence Interval, GH: Gesund Hospital, GICH: Gaafar Ibnauf Children Hospital, HF: Heart Failure, KAP: Knowledge, Attitude and Practice, LMH: Land Mark Hospital, RHD: Rheumatic heart disease, SPH: St. Peter Hospital,

TASH: Tikur Anbessa Specialized Hospital, USA: United States of America, WHO: World Health Organization

Declarations

Ethics approval and consent to participate

To conform the Declaration of Helsinki (1964) and Population Screening Act, Addis Ababa University Institutional Review Board approved the study. Participation was voluntary, and information was collected anonymously after obtaining written consent from each respondent. Confidentiality of data was ensured throughout the study.

Consent for publication

Not applicable.

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Availability of data and materials

The data analyzed during the current study is available from the corresponding author on reasonable request.

Authors contribution

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Competing interests

The authors declare that they have no competing interests.

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Figures

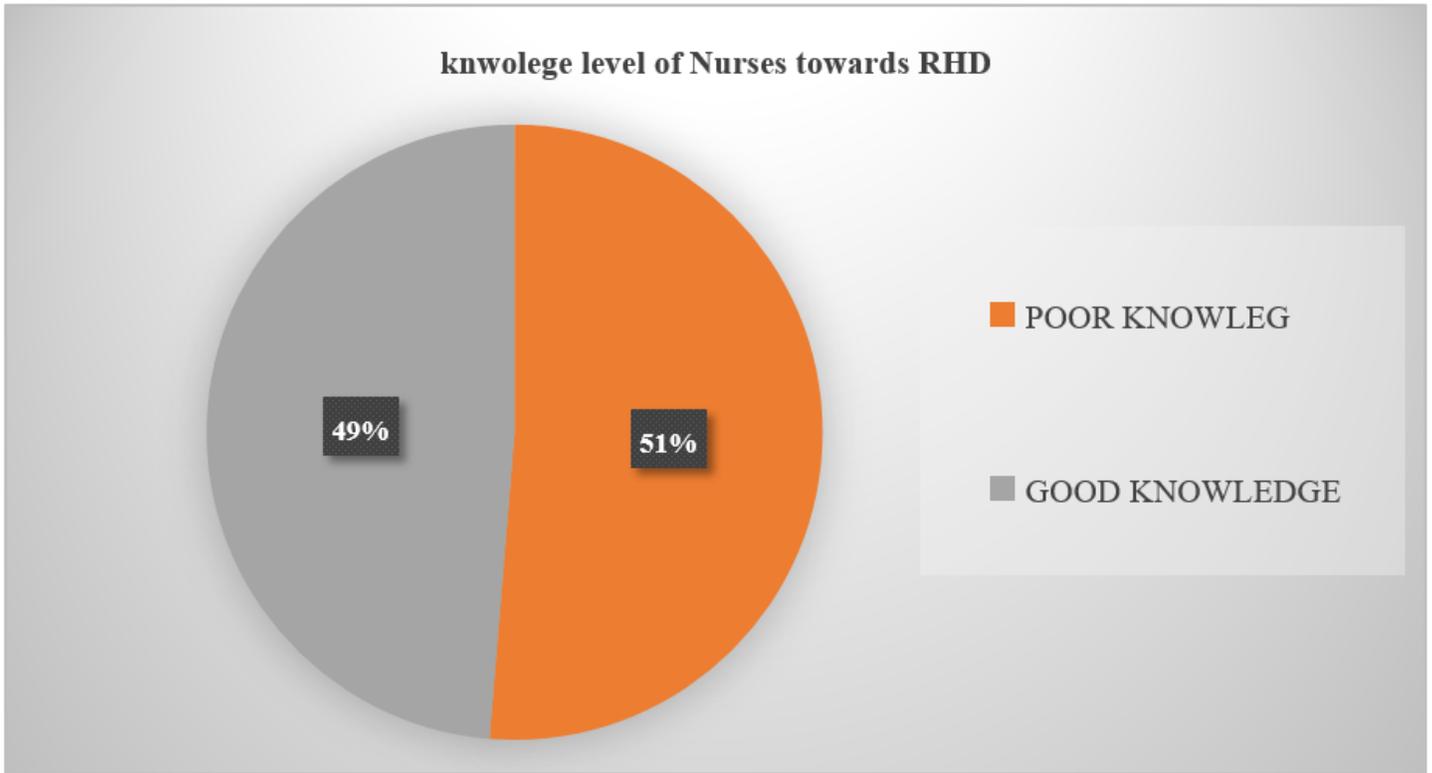


Figure 1

a pie chart showing nurses knowledge towards RHD at public and private hospitals cardiac center in Addis Ababa Ethiopia 2021.