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Original Article

Study department and gender affects the knowledge and attitude of students towards cardio pulmonary resuscitation procedure at the University of Gondar, northwest Ethiopia, 2019

Destaye Guadie Kassie[1], Mohamed Hassen Salih[2]

[1]*Department of Pediatrics and Child Health Nursing, School of Nursing, College of Medicine and Health Sciences, University of Gondar, Ethiopia;* [2]*Department of Medical Nursing, School of Nursing, College of Medicine and Health Sciences, University of Gondar, Ethiopia*

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Abstract: Cardiopulmonary Resuscitation (CPR) life-saving procedures, for emergency case purposes, to increase the victim's blood circulation and oxygen for vital organs. The World Health Organization and American Heart Association recommended that CPR learns from schools to increase the rate and reduce mortality. There is no known level of Knowledge and attitude acquisition towards CPR for graduate medical and health science students at the University of Gondar. This study aimed to assess knowledge, attitude, and associated factors towards CPR among final year undergraduate students at the University of Gondar, Northwest Ethiopia. Methods: An institution-based prospective cross-sectional study was conducted among 422 participants. A simple random sampling technique was used to draw the study participants. A pre-tested self-administered questioner was used to collect the data. Data was entered into Epi-info version7 and analysis by SPSS version20. Descriptive statics of frequency and percentage was done and presented by tables and figures. Logistic regression analysis was done. In bi-variable logistic regression analysis, variables P.V<0.2 were entered to multivariable analysis and statistical significance was declared at P.V<0.05 with 95% Confidence Interval (CI). Results: In this study; more than half of the participants, 58.8% were males. The mean ages were 24.5 ± (SD2.48). The knowledge and attitude levels of the study participant for CPR were [44.1%, 95% CI: (39.3-49.3)], and [45.7%, 95% CI: (41.0-50.5)], respectively. Age ranges from 20-24; [AOR = 1.73 (1.06-2.84)], medical students [AOR = 9.69 (5.06-18.56)], and advance nursing students [AOR = 4.63 (1.71-9.48)] were significantly associated to Knowledge. Male participants [AOR = 2.00 (1.32-3.01)], and age ≥25 years old [AOR = 1.90 (1.27-2.86)] were significantly associated with the attitude of CPR. Conclusions: The level of knowledge and attitude of this study was not sufficient and favorable. Age and department are associated with knowledge of CPR, in turn, sex and age are also similarly associated with attitude. The authors recommended that CPR should be given an in the common course for all departments by revising their curriculum with up-to-date information, engaged female students to participate in life-saving procedure to adapt and perform at the health care, community, or whatever the causality founds.

Keywords: CPR, knowledge, attitude, undergraduate, students, UOG, Ethiopia

Introduction

Cardiopulmonary Resuscitation (CPR) is a life-saving procedure applied for life threatening patients during an emergency. They do so when the victim has ceased breathing or/and their heart rate has stopped, which a fundamental skills acquired through learning and training [1]. Early CPR applications can prevent the victim's brain cell death by assisting oxygen to deliver the tissues till further measures are taken by health personals [2].

When the heart ceases its function, brain cell death will be occurred within four minutes due to the lack of oxygen. Cardiac arrest is the cause of millions of death, and an estimated 15-20% of total death worldwide, which remains the major public health problem [3, 4]. International Liaison Committee on Resusci-

tation (ILCR), typically recommended that CPR attained from the comprehensive schools and through short training to increased professional practices to progressively reduce community problems [5].

Adequately understanding the anatomical locations, the proper ratios, and unique positions of the innocent victim during proper CPR utilization are crucial. In 2010, the American Heart Association and International Liaison Committee on Resuscitation (AHA) and (ILCR) emphasized that ordinarily doing high-quality CPR with a nominal rate of sufficient depth chest compression and breathing assists the patient progression [1, 6, 7].

Subsequently, the efficient utilization of essential quality CPR typically depends on the practical knowledge and cultural attitude of local health professionals as well as the local facilities to notice an increase in patient survival [7, 8].

Hence, nearly 92% of cardiac arrest occurs out of the hospital without assisted by CPR. Since a cardiac arrest is the most cause of sudden cardiac deaths in the world but CPR assists to reduce mortality. Different studies in the different area revealed that there is insufficient knowledge and arts of health personal towards CPR procedures [9-12].

So final year undergraduate medical and health science students are the front line healthcare professions that enter and serve the communities. To realize that they had developed adequate knowledge and attitude towards CPR procedure. In the study area, we did not understand the levels of knowledge and attitude towards CPR for the final year undergraduate medical and health science students at the University of Gondar.

Therefore, this academic study objectively assessed the practical knowledge, cultural attitude, and associated factors among final year graduate students towards CPR at the University of Gondar. Consequently, it is valuable to provide information for local planners, academic institutes, and chief programmers in typically preventing cardiac arrest and its possible association by gently encouraging the specific behavior of modern CPR education and training to responsible students in Gondar and its surrounding.

Methods

An institutional-based self-administrative interviewed based cross-sectional study was conducted among 422 study participants to assess the knowledge, attitude, and associated factors among undergraduate students at the University of Gondar from April to June 2019.

Study area

The study had conducted at the University of Gondar (UoG) College of Medicine and Health Science (CMHS) among undergraduate final year regular students. The University of Gondar (UoG) founds in Gondar town far 727 km from the capital city Addis Ababa. It is one of the oldest Universities in Ethiopia, established in 1954 as a public health college and training center. It is steadily growing and evolving from the top educational intuitions in the country today. UoG has five campuses, of which CMHS is one of them. It has four schools and one institution with 5,106 regular undergraduate students, of these 3,186 males and 1,920 females projected from the CMHS register office in the 2018/2019 academic year (physical year). From the total numbers of undergraduate students, the final year students (graduate ceremony) were 1,265 of them 791 males, and 474 females.

Source and study population

The source of the study population was regular undergraduate students who were studied at the University of Gondar. And the study population was regular undergraduate final year students who were studied at the college of medicine and health science.

Inclusion and exclusion criteria

Inclusion criteria: We were included in the study the final year (graduate) undergraduate students who were studied at the College of Medicine and Health Sciences at the University of Gondar available during the data collection.

Exclusion criteria: We were excluded the study participants who were studied at the College of Medicine and Health Sciences at the University

of Gondar those night-time study (Extension), absent and critically ill at the time of data collection.

Variable of study

Dependent variables: Knowledge and attitude about CPR.

Independent variables: Age, sex, marital status, religion, study department, training, training duration, information about CPR, source of information and family of students economic status, educational status, and residence.

Operational definition

Cardiac arrest: Is unexpected cessation of heartbeat and blood circulation [13].

Basic life support: Maintain airway, breathing and circulation for cardiac arrest patients without drug administration [3].

Good knowledge: Participants who answers from the 20 knowledge questions the mean and above.

Poor knowledge: Participants who answers from the 20 knowledge questions below the mean.

Favorable attitude: Participants who answers from the 8 attitude questions the mean and above.

Unfavorable attitude: Participants who answers from the 8 attitude questions below the mean.

Sample size determination

The sample size was determined using a single proportion estimate by taking a 50% proportion rate, 95% confidence interval, 5% marginal errors, and 10% non-response rate to get the sample size.

$$n = \frac{z^2_{\alpha/2} p\ (1 - p)}{w^2}$$

Where, n = required sample size, Z = critical value for normal distribution at 95% confidence level which equals to 1.96, w = margin of error = 0.05 (5%) and P = proportion = 50%. n = (1.96)2 0.5 (1-0.5)/(0.05)2 = 384. By adding 10% of non-response rate the final sample size was = 422.

Sampling technique

A simple random sampling technique was employed to select the study participants. There were 18 departments, and the proportional sample allocation was applying for each department. And the study participants were taking by using simple random sampling through the lottery method.

Data collection tool and procedure

A self-administer questionnaire was developing in the English language which was adapted from the previous studies [14-16]. The tool contains three parts of socio-demographic, knowledge, and attitude. The data was collected by using a pretested self-administered questionnaire.

Data quality assurance

The recruited data collectors were obtained two days training about the objective, information confidentiality and the relevance of the study. Before the actual data collection a 21 (5%) pretest was done at "Debre Tabor" University for their consistency of the tool. Close supervision of the data collection, and checking of the questionnaires for completeness and consistency were done by investigators.

Data processing and analysis

After collecting the data, we checked their completeness and consistency clean and coded to enter into Epi-info version 7, and exported to statistical package for social science (SPSS) version 20 for analysis. We computed descriptive statistics of percentage with frequency and results presented by text, table, and figures. Logistic regression analysis was done, and in bi-variable logistic regression analysis variables reaching P.V<0.2 considered further analysis by multivariable logistic regression and the statistical significance was declared at P<0.05 with 95% CI.

Results

Socio-demographic characteristics of the study participants

In this study 422 participants, were enrolled and 100% of the response rate. More than half

Table 1. Scio-demographic characteristics of undergraduate regular students in CMHS at the University of Gondar Northwest Ethiopia, 2019 (n = 422)

Variables	Categories	Frequency (n = 422)	Percent (100%)
Sex	Male	248	58.8
	Female	174	41.2
Age	20-24	229	54.3
	≥25	193	45.7
Religion	Orthodox	320	75.8
	Muslim	65	15.4
	Protestant	37	8.8
Marital status	Single	369	87.4
	Married	53	12.6
Study department	Medicine	83	19.7
	Post basic	28	6.6
	Health science	311	73.6
Family residence	Rural	203	48.1
	Urban	219	51.9
Paternal educational status	Unable to read and write	64	15.2
	Informal education	121	28.7
	Primary education	93	22.0
	High school	41	9.7
	College and above	103	24.4
Maternal educational status	Unable to read and write	113	26.8
	Informal education	110	26.1
	Primary education	104	24.6
	High school	17	4.0
	College and above	78	18.5
Family monthly income	<3200	190	45.0
	3201-5250	103	24.4
	5251-7800	95	22.5
	>7800	34	8.1

of the participants, 58.8%, were males. The mean ages of the respondents were 24.5 ± (SD2.48), and nearly fifty-five percent of the participants, 54.3%, were found age ranges from 20-24 years old (**Table 1**).

The levels of knowledge of the study participants towards cardio pulmonary resuscitations (CPR)

We assessed the level of participant's knowledge towards Cardio Pulmonary Resuscitations, and the calculated mean score was 5.41 (SD ± 2.5). In the knowledge assessment question from the participants, 200 (47.4%), were known the indications of CPR, 126 (29.9%), were known the locations of Cardio Pulmonary Resuscitations (CPR) application, and 107 (25.4%) knew the current order of CPR (**Table 2**).

In this study, the level of study participants' knowledge towards Cardio Pulmonary Resuscitation, was displayed in (**Figure 1**), and the source of information of Cardio Pulmonary Resuscitations was also presented in (**Figure 2**).

The level of participant's attitude towards cardiopulmonary resuscitation

We computed the mean scores of the attitude questions and founded 23.2 ± (3.31SD) and displayed in (**Table 3**). And the level of attitude towards Cardiopulmonary Resuscitation also presented by (**Figure 3**).

Factors affecting the knowledge of study participants towards cardiopulmonary resuscitation (CPR)

Bi-variable and multivariable logistic regression analyses were applied and in bi-variable logistic regression analysis age, sex, and study department were statistically associated with Knowledge of CPR, while in multivariable logistic regression analysis age and department continued significantly associated with a *p*-value of <0.05 with 95% CI.

The knowledge of CPR among respondents whose age from 20-24 years old were nearly two times [AOR = 1.73, 95% CI = (1.06-2.84)] higher than those respondent's age was ≥25. The Knowledge of CPR in medical students were ten times [AOR = 9.69, 95% CI = (5.06, 18.56)] higher than other health science students and the knowledge of CPR in advanced nursing students were four times [AOR = 4.03,

Table 2. Correct responses to knowledge questions by undergraduate regular students towards CPR in CMHS at the University of Gondar, northwest Ethiopia, 2019 (n = 422)

Variables in the knowledge question	Frequency	percentage
The cause of reversible cardiac arrest	102	24.2
Importance of chest compression during CPR	98	23.2
The suitable surface for performing CPR	100	23.7
An indication to stop CPR	200	47.4
The location of hands during chest compression for adult victim	126	29.9
The location for chest compressions for infant	89	21.1
The way of giving rescue breaths for infants	77	18.3
Site of pulse check in an adult cardiac arrest	104	24.7
The optimal depth (cm) to which an adult chest should be compressed	75	17.8
The correct depth of compression for children	89	21.2
The recommended rate of effective chest compression rate for adults & children	98	23.2
The correct ratio of CPR for an adult when there is a single rescuer	84	19.9
The correct chest compression: ventilation ratio for a neonate	80	19.0
The current order of updated cardiopulmonary resuscitation (CPR)	107	25.4
The appropriate maneuver used for opening airway	103	24.4
The recommended chest compression depth for adults according to AHA 2015	101	23.9
The maneuver used to open airway	98	23.2
The rescuers switch roles when performing two-rescuer CPR	78	18.5
The recommended intravenous fluid during CPR	105	24.9
The recommended drugs used for cardiac arrest	92	21.8

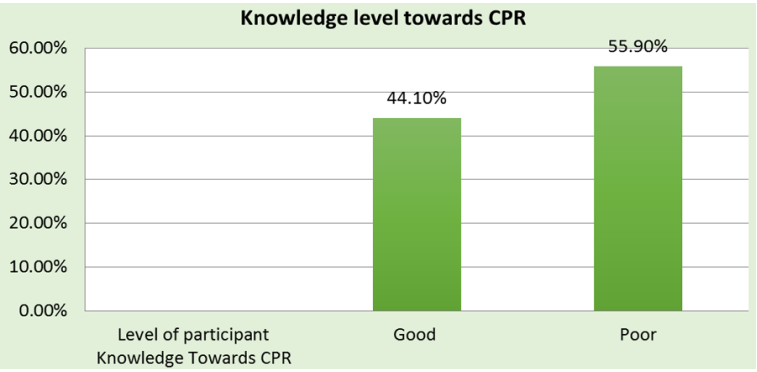

Figure 1. The level of participant knowledge towards CPR undergraduate regular students in CMHS at the University of Gondar Northwest Ethiopia, 2019 (n = 422).

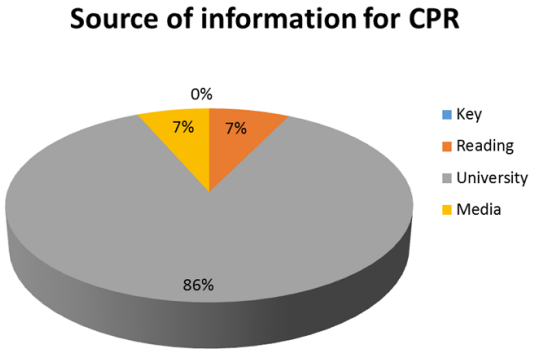

Figure 2. The source of information to know CPR undergraduate regular students in CMHS at the University of Gondar Northwest Ethiopia, 2019 (n = 422).

95% CI = (1.71, 9.48)] higher than generic health science students (**Table 4**).

Factor affecting the attitude of respondents towards CPR

We have done the bi-variable and multivariable logistic analysis, and in bi-variable logistic regression analysis age, sex, and department were associated with the attitude of CPR. However, in multivariable logistic regression analysis, age and sex were remain significantly associated to attitude at a *p*-value of <0.05 with 95% CI. The attitude towards CPR among male respondents were two times [AOR = 1.99, 95% CI = (1.32, 3.019)] higher than female, and the respondents' attitude whose age ≥25 were 1.3 times [AOR = 1.90, 95% CI = (1.27-2.86)] higher than age from 20-24 years old (**Table 5**).

Table 3. The mean of correct Attitude undergraduate students towards cardiopulmonary resuscitation in CMHS at the University of Gondar, northwest Ethiopia, 2019 (n = 422)

Attitude question	Mean scores	Standard deviations
Want to perform mouth to mouth ventilation during CPR	2.62	0.866
I feel my knowledge is sufficient to perform CPR	2.26	0.812
Want to learn CPR techniques	3.28	0.787
Want perform CPR on trauma victim	2.6	0.908
CPR training is mandatory for all health science students	3.47	0.775
Fear of transmission of disease influences the decision to begin resuscitation?	2.81	0.885
Lack of training influence the initiating of resuscitation	3.02	0.802
Students are responsible for initiating CPR	3.14	0.780

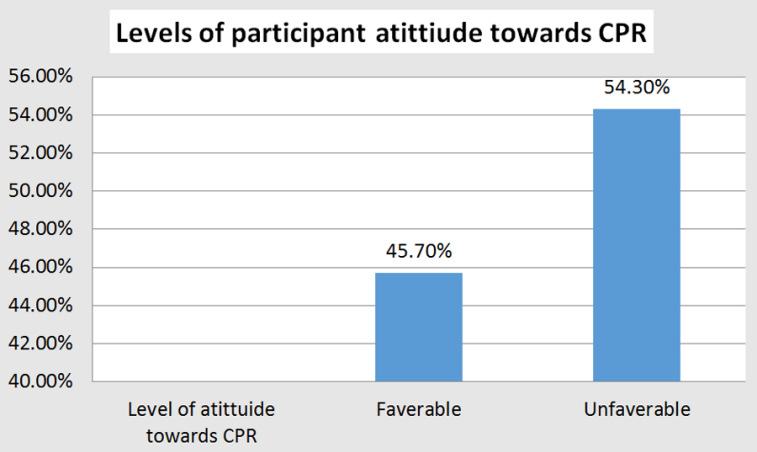

Figure 3. The level of participant attitude towards CPR undergraduate regular students in CMHS at the University of Gondar Northwest Ethiopia, 2019 (n = 422).

Discussion

CPR has performed to maintain the victim's blood circulation and breathing until the health providers reached. It is a crucial procedure to save the victims life and acquired through learning by First Aid and training [17]. This study showed that study participants knowledge and attitude towards CPR was significantly influenced by age, gender, and study departments.

The current study participant knowledge was [44.1%, 95% CI: (39.6-49.1)], which is in line with Northwest, Ethiopia (41.1%) [9]. This finding is lower than studies conducted in Jimma (93.3%) [3], and Mirpur in South Asia (66.7%) [18]. The possible reason might be training, curriculum difference, and sample size difference.

This finding is also higher than studies done in the Amhara region (8.6%) [19], Addis Ababa (6.7%) [3], Nigeria (36.4%) [16], Erbil, Iraq (1.2%) [20], and Port Harcourt, Nigeria (25.4%) [10]. Thepossible reasons might be different study participants, socio-demographic characteristics, and also the measurement of knowledge level in specified department's for instance in Addis Ababa, the knowledge level was assess by using the AHA reference certification with the cut points ≥ of 84%.

Medical intern students and advanced health science students were 10 and 4 times more likely to know about CPR procedure compared to generic health science students, respectively. This finding is similar to a study at Qassim University, Saudi Arabia [21]. The possible reason might be the students have a long practicum or clinical attachment to acquired good knowledge. Respondents age from 20-24 years old were nearly two times knowledgeable about CPR than those aged ≥25 years old. This is controversial with the study conducted in Kuwait, Western, Asia whose age ≥25 were significantly associated with CPR knowledge as age increase knowledge of CPR also increase [22]. The possible reason might be knowledge of CPR is influenced by practice, training and information.

This study revealed that the attitude of the study participant was [45.7%, 95% CI: (41.0-50.7)], which is similar in Nigeria (45%) [16]. The current finding is 45.7% which is lower than studies conducted in Iran (56%) [15], Jimma

Table 4. Bi-variable and multivariable logistic regression analysis for factors associated with knowledge towards CPR among undergraduate CMHS students at the University of Gondar, northwest Ethiopia, 2019 (n = 422)

Variables		Level of knowledge		COR (95% CI)	AOR (95% CI)
		Knowledgeable	Not knowledgeable		
Sex	Male	98 (39.5%)	150 (60.5%)	1	1
	Female	88 (50.6%)	86 (49.4%)	1.66 (1.06-2.32)	1.51 (0.98-2.31)
Age	20-24	94 (41%)	135 (59%)	0.76 (0.52-1.13)	1.73 (1.06-2.84)**
	≥25	92 (47.7%)	101 (52.3%)	1	1
Marital status	Single	161 (43.6%)	208 (56.4%)	1	-
	Married	25 (47.2%)	28 (52.8%)	1.15 (0.65-2.05)	
Department	Medicine	66 (79.5%)	17 (20.5%)	7.84 (4.38-14.05)*	9.69 (5.06-18.56)**
	Advanced H.s	17 (60.7%)	11 (39.3%)	3.12 (1.41-6.91)*	4.03 (1.71-9.48)**
	Generic H.s	103 (33.1%)	208 (66.9%)	1	1
Monthly income	0-600	73 (32.2%)	154 (67.8%)	1	1
	601-1650	25 (36.8%)	43 (63.2%)	1.23 (0.70-2.16)	1.08 (0.60-1.96)
	>1651	88 (69.3%)	39 (30.7%)	4.76 (2.98-7.61)	1.38 (0.59-3.24)
Family residence	Rural	90 (44.3%)	113 (55.7%)	1	
	Urban	96 (43.8%)	123 (56.2%)	0.98 (0.67-1.44)	
Fathers' educational status	Unable to read & write	26 (40.6%)	38 (59.4%)	1	-
	Informal education	57 (47.1%)	64 (52.9%)	1.30 (0.71-2.40)	
	Primary education	35 (37.6%)	58 (62.4%)	0.88 (0.46-1.69)	
	High school	17 (41.5%)	24 (58.5%)	1.04 (0.47-2.30)	
	College & above	51 (49.5%)	52 (50.5%)	1.43 (0.76-2.69)	
Mothers' educational status	Unable to read & write	46 (40.7%)	67 (59.3%)	1	-
	Informal education	52 (47.3%)	58 (52.7%)	1.31 (0.77-2.22)	
	Primary education	44 (42.3%)	60 (57.7%)	1.07 (0.62-1.83)	
	High school	9 (52%)	8 (47.1%)	1.64 (0.59-4.56)	
	College & above	35 (44.9%)	43 (55.1%)	1.19 (0.66-2.12)	
Family income	<3200	85 (44.7%)	105 (53.3%)	1	-
	3201-5250	44 (42.7%)	59 (57.3%)	0.92 (0.57-1.50)	
	5251-7800	46 (48.4%)	49 (51.6%)	1.16 (0.71-1.90)	
	>7800	11 (33.5%)	23 (67.6%)	0.59 (0.27-1.28)	
Have you take CPR training	Yes	6 (54.5%)	5 (45.5%)	1.54 (0.46-5.13	
	No	180 (43.8%)	231 (56.2%)	1	-

Key * = significantly associated in COR, ** = significantly associated in AOR, EB = monthly income in Ethiopian Birr, *COR = crudes odd ratio, *AOR = adjusted odds ratio. Hs = health science student.

(93.8%) [3], Kuwait, Western Asia (99%) [22] and, India (94%) [22]. The possible reason might be due to different study participant socio-cultural, training, and practical exposure.

The attitude of male respondents towards CPR was two times higher than compared to the female. But no gender difference revealed in other study [23]. The possible reason might be due to the exhausted nature of the procedure to perform. The attitudes of study participants of those age ≥25 were 1.3 times higher than the respondents whose age was from 20-24 years old. The supported study was conducted in China [24]. The possible reason might be as age increases awareness, and changing of attitude also increases.

Limitation

The study was done on undergraduate students at the University of Gondar CMHS may lack comparability. And, also focuses on final year students, and the minimum study years were four might be recall bias.

Conclusion and recommendation

In this study, the knowledge and attitude level about CPR was not satisfactory and favorable, respectively. For knowledge department and age and also for attitude age and sex were significantly associated with CPR. The authors recommended that CPR courses should be given to all students by revised the curriculum with

Table 5. Bi-variable and multivariable logistic regression analysis for factors associated to attitude on CPR among undergraduate students in CMHS at the University of Gondar, Northwest Ethiopia, 2019 (n = 422)

Variable	Categories	Level of attitude		COR (95% CI)	AOR (95% CI)
		Favorableattitude	Un-favorable attitude		
Sex	Male	131 (52.8%)	117 (47.2%)	2.02 (1.36-3.01)*	2.00 (1.32-3.01)**
	Female	62 (35.6%)	112 (64.4%)	1	1
Age	20-24	91 (39.7%)	138 (60.3%)	1	1
	≥25	102 (52.8%)	91 (47.2%)	1.70 (1.15-2.50)*	1.90 (1.27-2.86)**
Marital status	Single	174 (47.2%)	195 (52.8)	1.60 (0.88-2.90)	1.81 (0.95-3.45)
	Married	19 (35.8%)	34 (64.2%)	1	1
Department	Medicine	48 (57.8%)	35 (42.2%)	1.86 (1.139-3.04)	1.69 (0.97-2.95)
	Advance H.s	13 (46.4%)	15 (53.6%)	1.17 (0.54-2.55)	1.14 (0.47-2.80)
	Generic H.s	132 (42.4%)	179 (57.6%)	1	1
Family residence	Rural	95 (46.8%)	108 (53.2%)	1.09 (0.74-1.59)	
	Urban	98 (44.7%)	121 (55.3%)	1	
Father educational status	Unable to read and write	33 (51.6%)	31 (48.4%)	0.70 (0.37-1.31)	0.99 (0.50-1.96)
	Informal education	61 (50.4%)	60 (64.5%)	0.91 (0.54-1.59)	0.92 (0.52-1.64)
	Primary school	33 (35.5%)	60 (64.5%)	0.62 (0.35-1.09)	0.48 (0.26-0.89)
	High school	17 (41.5%)	24 (58.5%)	0.72 (0.35-1.50)	0.63 (0.29-1.36)
	College & above	17 (41.5%)	24 (58.5%)	1	1
Mother educational status	Unable to read and write	58 (51.3%)	55 (48.7%)	1.53 (0.85-2.72)	
	Informal education	54 (49.1%)	56 (50.9%)	1.39 (0.77-2.49)	
	Primary school	39 (37.5%)	65 (62.5%)	0.86 (0.47_1.57)	
	High school	10 (58.8%)	7 (41.2%)	2.05 (0.71-5.93)	
	College & above	32 (41.0%)	46 (59.0%)	1	
Family income	<3200	92 (48.4%)	98 (51.8%)	1.96 (0.91-4.25)	2.03 (0.84-4.88)
	3201-5250	45 (43.7%)	58 (56.3%)	1.62 (0.72-3.67)	1.62 (0.66-3.99)
	5251-7800	45 (47.4%)	50 (52.6%)	1.88 (0.83-4.29)	1.78 (0.73-4.33)
	>7800	11 (32.4%)	23 (67.6%)	1	1
Taking of CPR training	Yes	7 (63.6%)	4 (36.4%)	2.12 (0.61-1.34)	
	No	186 (45.3%)	225 (54.7%)	1	

Key * = significantly associated in COR, ** = significantly associated in AOR, EB = monthly income in Ethiopian Birr, *COR = crudes odd ratio, *AOR = adjusted odds ratio. Hs = health science student.

up-to-date information and encouraged the female students to participate in this life-saving procedure to adapt and perform in the community or whatever the causality found.

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Disclosure of conflict of interest

None.

Abbreviations

ABC, Airway, Breathing, Circulation; AHA, American Heart Association; ALS, Adult Life Support; BLS, Basic Life Support; CMHS, College of Medicine and Health Science; CPR, Cardiopulmonary Resuscitation; SCD, Sudden Cardiac Death; UOG, University of Gondar.

Address correspondence to: Destaye Guadie Kassie, Department of Pediatrics and Child Health Nursing, University of Gondar, Ethiopia, P.o.box 196 UoG, Gondar. Tel: +251918400180; E-mail: dstgd32@gmail.com

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