Knowledge regarding 2019 novel coronavirus (2019-nCoV) infection among final year health science students at Arbaminch College of Health Sciences, Southern Ethiopia: a cross-sectional study

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Research Article

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Knowledge regarding 2019 novel coronavirus (2019-nCoV) infection among final year health science students at Arbaminch College of Health Sciences, Southern Ethiopia: a cross-sectional study

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Abstract

Introduction

In January 2020, World Health Organization declared the outbreak of novel coronavirus a pandemic (global health emergency). The aim of this study was to assess the knowledge about novel coronavirus and its determinant factors among health science students at Arbaminch Health Sciences College, Southwest Ethiopia.

Method

A cross-sectional study design was employed to assess the level knowledge about novel coronavirus among 304 graduating class students in Arbaminch Health Science College. The study participants were selected using a simple random sampling technique. The data collection tool consisted of 33 items (10 items about demographic and education related and 23 items about knowledge on novel coronavirus). Multivariable logistic regression was performed using SPSS.

Results

The vast majority of students 228(75%) scored below 50% and were considered to have poor knowledge on COVID-19. Only 7.6% of participants knew that muscle pain is a symptom of 2019-nCoV infection. One hundred forty three (47%) of the participants did not know any symptoms of COVID-19. Only 24.3% of the respondents answered correctly that rubbing hands with alcohol based sanitizers can help in prevention of disease transmission. Sex, residence and social media use were significantly associated with adequate knowledge on novel coronavirus ($p < 0.05$).

Conclusion

Health science students had poor knowledge on COVID-19. The health science college and health authorities should re-examine their capability to manage the deadly virus

Key words

Pandemic, Novel coronavirus, Knowledge, Health science students, Ethiopia

Introduction

Coronaviruses are a huge group of viruses that can cause a variety of diseases in humans, from the common cold to severe acute respiratory syndrome (SARS) [1]. In December 2019, the first case of the novel corona virus (the seventh type coronavirus) reported in Wuhan city, Eastern China was presented by acute respiratory symptoms [2]. The novel coronavirus also named as SARS-CoV-2. In February 2020, World Health Organization (WHO) named the infection coronavirus disease 2019(COVID-19) [3]. Shortly, the disease has spread throughout the globe. In January 2020, WHO declared the outbreak of novel coronavirus a pandemic (global health emergency) [4]. As of March 13, 2020, a total of 132, 758 laboratory-confirmed cases and 4955 deaths had been documented globally. The WHO situational report-53 also revealed that 80,9991 cases in China, 7979 cases in Republic of Korea, 15,113 cases in Iran, 2965 cases in Spain, 15,113 cases in Italy and 25 cases in Algeria[5].

February 24, 2020, 2055 healthcare professionals had confirmed infected with novel coronavirus infection, with 1.1% deaths in China [6]. A study conducted by Gilbert and colleagues revealed that Ethiopia and Nigeria were the countries with second highest importation risk [7].

March 13, 2020, the Federal Ministry of Health reported on one individual with confirmed coronavirus disease from the capital city of the country, Addis Abba [8]. The number of confirmed cases of novel coronavirus disease in Ethiopia has since increased.

Health care professionals are at the first line of outbreak response and as such are exposed to corona virus. Special consideration should be paid to health science students seeing their contribution to the nation's workforce in near future in a particular nation. Moreover, there is no any study assess the knowledge level on novel coronavirus among health science students in Ethiopia. Therefore, the objective of this study was to assess the knowledge about novel corona virus and its determinant factors among health science students at Arbaminch Health Science College, South west Ethiopia.

Methods

Study setting and period

The study was conducted from March 14 to April 05, 2020 in Arbaminch Health Science College. Arbaminch Health Science College was established in 2005 and found in Arbaminch city, southern part of Ethiopia. The college has six departments (Pharmacy, Medical laboratory, Health extension, Clinical nurse, Health informatics and Midwifery). The mission of the college is to train qualified mid-level health care professionals or technicians. There were 980 graduate class students in regular and private program during the study period.

Study design

A cross-sectional study design was employed to assess the level knowledge about novel coronavirus among graduating class students in Arbaminch Health Science College.

Study participants

Our source population was all final year (3rd year) health science students in Arbaminch Health Science College. The study population was all final year health science students in the College who were available in the college during the data collection period.

Inclusion and exclusion criteria

Inclusion criteria

Final year students who were registered in Arbaminch Health Science College in the first semester of 2019/2020 academic year.

Exclusion criteria

Graduating class students who were not physically capable of being interviewed at the period of data collection were excluded from the study.

Sample size and sampling procedures

Since there is no previous research on knowledge about novel coronavirus in similar areas, to get most favorable sample size, calculation was performed using the assumption of proportion (p) of students without sufficient knowledge on corona virus 50%, with 95% CI and 5% marginal error.

$$\mathrm{n} = \frac{\mathrm{Z}^2\alpha_{/2}\mathrm{p}(\mathrm{p}-1)}{\mathrm{d}^2} = 384$$

Since the number of graduating class students in the college is less than 10, 000, correction formula was employed.

$$nf = \frac{n}{1 + n/N} = {}^{384}/_{1 + 384/980} = 276$$

Hence, the minimum sufficient computed sample size was 304 including 10% non-response rate. Strata were made based on departments and sampling frame was organized using identification numbers of graduating class students taking from the college registrar office. The study participants were taken from the six departments (Pharmacy, Medical laboratory, Clinical nurse, Midwifery, Health extension and Health informatics department) using stratified random sampling with proportional allocation. The study participants were selected using a simple random sampling technique (Figure 1).

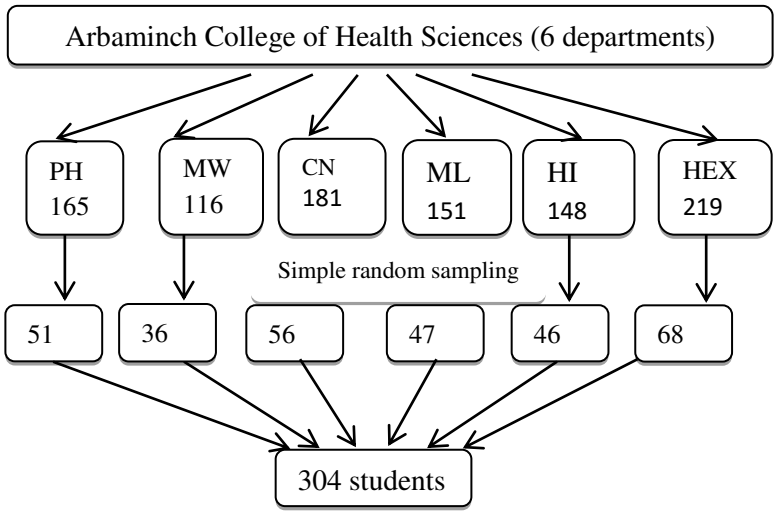

Figure 1: Schematic presentation of sampling procedure
PH-Pharmacy, MW-Midwifery, CN-Clinical nurse, ML-Medical laboratory, HI-Health informatics, HEX-Health extension department

Data collection tool and procedure

The questioner was structured, which was developed after several literature reviews [2, 9-12]. The questionnaire consisted of 33 items (10 items about demographic and education related and 23 items about knowledge on Novel Coronavirus). The tool was validated by performing pre-test on 10% of the sample before the real data collection time. Necessary adjustment of the questioner was carried out based on the pre-test results. Moreover, the reliability of the tool was tested, and their Cronbach Alpha value was 0.92. Data was collected by seven trained bachelor nurses employed from outside Arbaminch College of Health Sciences staffs who are fluent speaker of local language (Amharic) through face to face interview technique. To minimize bias data collectors were trained and emphasized to follow a standardize procedure. The data collectors collected the data using a structured interviewer administered Amharic version data

collection tool. Two supervisors (MSc in Public health) and principal investigator closely oversaw the process of data collection and confirms.

Data analysis

After the data collected, data were checked for fullness edited, coded and entered into Epi data 3.1 and exported to Statistical Packages for Social Science version 20 for windows for analysis. Descriptive analysis was performed on the socio-demographic, academic and knowledge related variables such as sex, age, religion, marital status, last semester cumulative grade, department, living arrangement, club participation, social media use and knowledge on the transmission, prevention and control of novel coronavirus. Multivariable logistic regression analysis using, backward stepwise method was used to choice independent variables to be involved in the last model to identify the predictors that were independently related with the level of knowledge on novel coronavirus. Odds ratios at 95 % CI were calculated to quantity the intensity of the association between the dependent and independent variables. P-values less than 0.05 were assumed as statistical significant in the multi variable logistic regression analysis.

Operational definition

Knowledge was measured by items concentrating on prevention, transmission, sign and symptoms, severity and treatment of the novel coronavirus infection. Each response was scored as 'yes (1)' or 'no/I don't know (0)'. The knowledge scoring range of the data collection tool was 23 (largest) to 0 (smallest). A cut off level of less than 11.5 (<50%) was considered as poor whereas greater than or equal to 11.5 (≥50%) was considered as good knowledge about novel coronavirus infection.

Results

Socio-demographic and college related characteristics of study participants

The socio-demographic and college related characteristics of the students were presented in Table 1.In the current study, we assessed the knowledge about COVID-19 of 304 college students, among them 167(54.9%) and 137(45.1%) were female and male, respectively.

The mean age (±SD) of the respondents was 21.80 (±3.21) years, with 11 (3.6%) students above 30 years old. Most respondents came from rural area (68.4%) and 69.7% reported followers of Protestant religion. Majority of respondents were single (71.7%).The majority of participants 172(56.6) were use social media and 217(71.4%) were non-members of the college clubs. More than three fourth of the students (87.8%) had cumulative grade greater than or equal 60%. Sixty one percent of the respondents were residing with their friends. Regarding department, 68 (22.4%) of participants were Health Extension department and the lowest study participants 36 (11.8%) were Midwifery departments.

Table 1 Socio-demographic characteristics of the study participants at Arbaminch Health Science College, Southwest Ethiopia, 2020.

Variables	Number	Percent (%)
Age(years) mean±SD (21.80±3.21)		
15-19	49	16.1
20-24	209	68.8
25-29	35	11.5
≥30	11	3.6
Sex		
Male	137	45.1
Female	167	54.9
Department		
Pharmacy	51	16.8
Health extension/Public health	68	22.4
Midwifery	36	11.8
Medical laboratory	47	15.5
Clinical nursing	56	18.4
Health informatics	46	15.1
Marital status		
Married	86	28.3
Single	218	71.7
Residence		
Rural	208	68.4
Urban	96	31.6
Religion		
Orthodox Christian	74	24.3
Muslim	18	5.9
Protestant	212	69.7
Use of social media		
Yes	172	56.6
No	132	43.4
Living		
Alone	65	21.4
With friend	187	61.5
Family	52	17.1
Club participation		
Yes	87	28.6
No	217	71.4
Cumulative grade		
<60	37	12.2
≥60	267	87.8

SD-Standard Deviation

Knowledge of 2019-nCoV infection

Only 97(31.9) of our respondents correctly knew that 2019-nCoV is a viral infection and only 22% knew its origin. In terms of awareness on transmission of COVID-19, only 43.4% of the participants were aware of 2019 novel coronavirus can transmitted by respiratory droplets when a diseased person sneeze or cough. Only 5.3% of participants were able to response all the symptom knowledge items correctly (Q5 to Q8). In some detail cases, only 7.6% of participants knew that muscle pain is a symptom of 2019-nCoV infection. One hundred forty three (47%) of the participants did not know any symptoms of COVID-19. The vast majority (75.5%) of the participants did not aware asymptomatic nature of the disease. The vast majority of students (78.3%) had no knowledge of novel corona virus infection incubation period. Regarding the diagnosis of disease, only 33.9% of the participants correctly recognized that 2019-nCoV infection diagnosed my molecular assays. Only 17.4% of the participants knew that novel corona vaccine is not available. In total, only 29.9% of the participants knew that a confirmed novel corona virus case should remain in isolation until retrieval from clinical symptoms of the infection.

Moreover, 249 (81.9%) of the students had no information about the older people appear to be more vulnerable to becoming severely ill with the 2019-nCoV infection. Only 33.9% of students knew that patients with underlying chronic diseases at a higher risk of 2019-nCoV infection. Only 38.8% of students knew that washing hands with regular soap and water can help in prevention of disease transmission. Interestingly, only 24.3% of the respondents answered correctly that rubbing hands with alcohol based sanitizers can help in prevention of disease transmission. In terms of knowledge on prevention, only 26.3% of the students were aware of social-distancing (at least six feet) from anyone who is coughing or sneezing (Table 2).

254 Table 2. Responses of the study participants to 2019-nCoV infection knowledge items,
255 Arbaminch College of Health Sciences (N =304), Southwest Ethiopia, 2020.

2019-nCoV infection knowledge items	Number (correct response)	Percent (correct response)
Q1.2019-nCoV is a viral infection	97	31.9
Q2.2019-nCoV has its origin in bats	67	22.0
Q3.The first case of 2019-nCoV infection was first identified in Wuhan, China	150	49.3
Q4.The virus can transmitted by respiratory droplets when an infected person sneeze or cough	132	43.4
Q5.Fever is a symptom of 2019-nCoV infection	76	25.0
Q6.Cough is a symptom of 2019-nCoV infection	87	28.6
Q7.Shortness of breath is a symptom of 2019-nCoV infection	109	35.9
Q8.Muscle pain is a symptom of 2019-nCoV infection	23	7.60
Q9.Diarrhea is a possible symptom of 2019-nCoV infection	64	21.1
Q10.Some individuals infected with virus can be asymptomatic	74	24.3
Q11.The incubation period is 2-14 days	66	21.7
Q12.2019-nCoV infection diagnosed my molecular assays	103	33.9
Q13.Antibiotics is not the first-line treatment	75	24.7
Q14.2019-nCoV vaccine is not available	53	17.4
Q15.Confirmed novel corona virus cases should remain in isolation until retrieval from clinical symptoms of COVID-19	91	29.9
Q16.Individuals should be monitored for symptoms of COVID-19 for 14 days after the contact with a patient with proofed COVID-19.	91	29.9
Q17.Older people appear to be more vulnerable to becoming severely ill with the 2019-nCoV	55	18.1
Q18.Patients with underlying chronic diseases at a higher risk of 2019-nCoV infection	103	33.9
Q19.Health care professionals face high risk of exposure to COVID-19	104	34.2
Q20.Washing hands with soap and water can help in prevention of disease transmission	118	38.8
Q21. Rubbing hands with alcohol based sanitizers can help in prevention of disease transmission	74	24.3
Q22.To prevent the spread of disease maintain at least 6 feet distance from anyone who is coughing or sneezing is mandatory	80	26.3
Q23.Health care professional providing care to 2019-nCoV cases should ware personal protective (masks, gloves and shoe cover, hair cover and aprons)	132	43.4

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The vast majority of students 228(75%) scored below 50% and were considered to have poor knowledge on COVID-19. Only 25% had good knowledge on COVID-19(Figure 2).

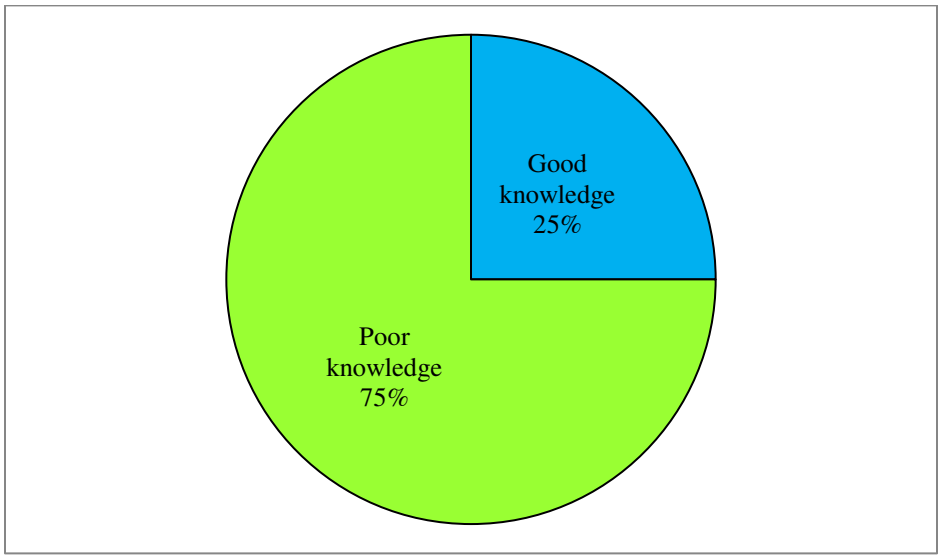
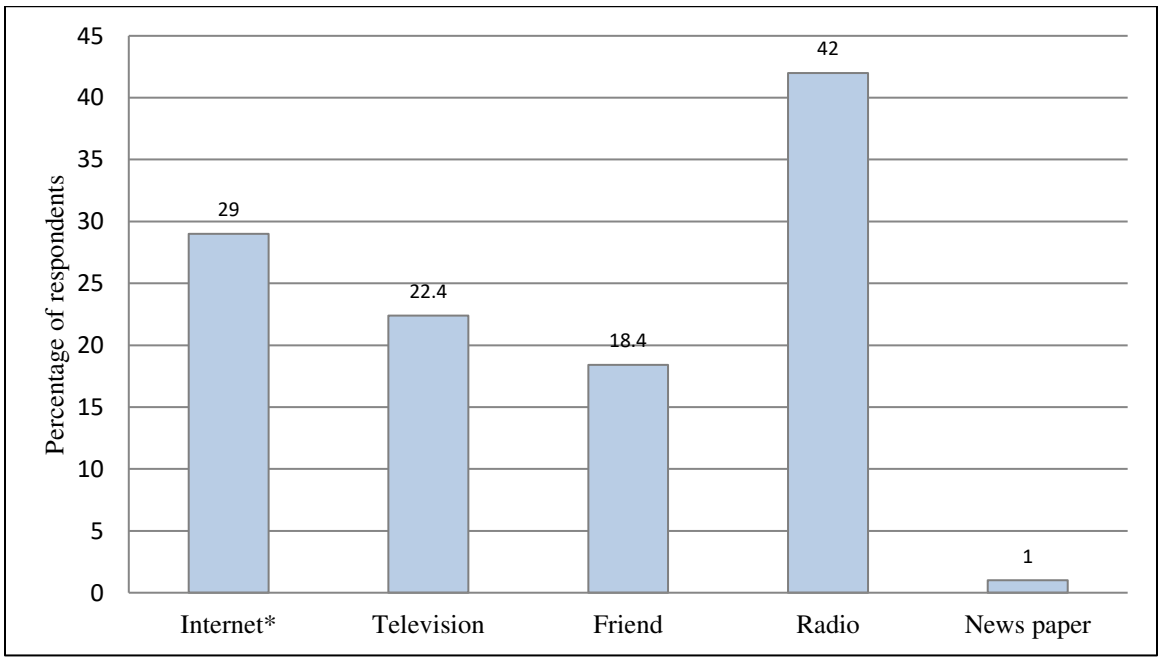


Figure 2: Knowledge level of respondents on novel corona virus, ACHS, 2020

The commonest source of information about novel coronavirus was from radio (42%). Moreover, internet, television, friend and newspaper accounted for 29%, 22.4%, 18.4% and 1%, respectively (Figure 3).



Internet* (social media and different websites) and multiple response data

Figure 3: Source of information about novel coronavirus among health science students in Arbaminch College of Health Sciences, southwest Ethiopia

Factors associated with knowledge of 2019-nCoV infection

Table 3 displays the effect of factors on the COVID-19 knowledge adjusted for the other covariates. Socio-demographic and educational related predictors were tested using multi variable logistic regression for potential association. Female students were less likely to have good knowledge score as compared with male students [AOR: 0.3, 95%CI: (0.2-0.6)]. Students who came from rural areas were less likely to have good knowledge scores as compared with students who were from the urban areas [AOR: 0.5, 95%CI: (0.2-0.9)]. Students who were Muslim religion followers were 5.7 times more likely for having good knowledge score as compared to those who were Orthodox Christian students[AOR: 5.7, 95%CI: (1.8-18.1)]. Students who were single were less likely to have good knowledge on novel corona virus infection than those students who were married [AOR: 0.4, 95%CI: (0.2-0.9)].

Students with a high cumulative grade were more likely to have good knowledge on COVID-19 than those with a low commutative grade [AOR: 2.9, 95%CI: (1.1-8.4)]. Those that were grouped as non-club participation were about 2.3 times more likely to have good knowledge on COVID-19 when compared to those who are members of the club [AOR: 2.3, 95%CI: (1.1-4.6)]. Students who did not use social media were less likely to have good knowledge score when compared to those who used social media [AOR: 0.2, 95%CI: (0.1-0.5)]. Students who were living with their family were 3.1 times [AOR: 3.1, 95%CI: (1.2-7.7)] more likely to have good knowledge score as compared with students who were living alone.

Table 3 Multi variable logistic regression analysis output of factors associated with knowledge of 2019-nCoV infection among ACHS students, Southwest Ethiopia, 2020(n=304)

Characteristics	Knowledge on COVID-19		Adjusted odd ratio (95%CI)	*p*-value
	Good n(%)	Poor n(%)		
Sex				
Male	45(32.8)	92(67.2)	1	
Female	31(18.6)	136(81.4)	0.3(0.2-0.6)	0.001**
Age				
15-19	14(28.6)	35(71.4)	-	-
20-24	50(23.9)	159(76.1)	-	-
≥25	12(26.1)	34(73.9)	-	-
Residence				
Urban	30(31.2)	66(68.8)	1	
Rural	46(22.1)	162(77.9)	0.5(0.2-0.9)	0.043*
Religion				
Orthodox Christian	22(29.7)	52(70.3)	1	
Protestant	48(22.7)	163(77.3)	0.7(0.3-1.3)	0.235
Muslim	6(31.6)	13(68.4)	5.7(1.8-18.1)	0.003**
Marital status				
Married	19(22.1)	67(77.9)	1	
Single	57(26.1)	161(73.9)	0.4(0.2-0.9)	0.030*
Sponsor type				
Self	9(20.9)	34(79.1)	-	-
Government	67(26.1)	190(73.9)	-	-
Department				
Midwifery	7(19.4)	29(80.6)	-	-
Pharmacy	15(29.4)	36(70.6)	-	-
Health extension/Public health	12(17.6)	56(82.4)	-	-
Medical laboratory	13(27.7)	34(72.3)	-	-
Clinical nursing	10(17.9)	46(82.1)	-	-
Health informatics	19(41.3)	27(58.7)	-	-
Cumulative grade				
<60	6(16.2)	31(83.8)	1	
≥60	70(26.2)	197(73.8)	2.9(1.1-8.4)	0.041*
Clubs participation				
Yes	20(23.0)	67(77.0)	1	
No	56(25.8)	161(74.2)	2.3(1.1-4.6)	0.022*
Social media use				
Yes	55(32)	117(68.0)	1	
No	21(15.9)	111(84.1)	0.2(0.1-0.5)	0.000**
Living with				
Alone	15(23.1)	50(76.9)	1	
Friend	42(22.5)	145(77.7)	0.5(0.2-1.1)	0.098
Family	19(36.5)	33(63.5)	3.1(1.2-7.7)	0.015*

**P<0.05 **p<0.01*

Discussion

Throughout documented history, pandemics have persistently descended on human beings, troubling their existence. By March 13, 2020, a total of 132, 758 laboratory-confirmed cases and 4955 deaths had been documented globally [5]. Special consideration should be paid to health science students seeing their contribution to the nation's workforce in near future in a particular nation. Up to the best of our knowledge, and by exhaustive literature search, our study may be the first study conducted in Ethiopia for measuring knowledge of final year health science students towards novel coronavirus. Our study sought to assess knowledge towards novel coronavirus infection among health sciences students in Arbaminch College of Health Sciences, southwest Ethiopia. The results of this study showed that three fourth (75%) of participating students had inadequate level of comprehensive knowledge score from the composite score concerning natural history of the disease, risky groups, symptoms, treatments and means of prevention of the infection. The possible explanation that can be recognized from the low level of knowledge regarding novel corona virus is that the curriculum of mid-level health students that had been prepared by ministry health has not stated coronavirus as content in the learning modules. Moreover, their teachers did not receive any novel coronavirus related on Job training.

Majority of the students in this study did not know that COVID-19 caused by virus. This result is consistent with other study that reported lack of knowledge about the causative agent among health science students in India [13]. A worrisome result in this research is that more than half of the participants did not know that novel coronavirus can transmitted by respiratory droplets when an infected person sneeze or cough, which is inconsistent with the results of Pranav D. *et al*,[13] who stated that more than 90% of students had knowledge of the transmission of novel coronavirus. Unaware of route of transmission of novel coronavirus infection will have negative influence on the control of the infection.

The WHO has encouraged isolation of persons with symptoms of novel coronavirus infection in order to minimize disease transmission and restrict the spread of the deadly virus in the community [9]. Accordingly, Ethiopian ministry of health rolled into action to stop the spread of the disease. Confirmed cases were isolated to break the transmission cycle. However, more than 70% respondents were not aware that a confirmed novel coronavirus case should remain in isolation until retrieval from clinical symptoms of the infection. This may lead to resistance to

accept isolation/quarantine as one strategy for the virus control. In the present study, only 38% of the respondents did know that washing hands with regular soap and water can help in prevention of disease transmission. However, better finding was reported from the Mumbai study (88.7%) [13].The reason behind such difference may be because some participant of the Mumbai study received hand hygiene training. Another important result revealed that only 26.3% students knew that the spread of the disease prevented by maintaining least 6 feet distance from anyone who is coughing or sneezing. This is consistent with the fact that the majority of students (56.6%) were not aware of the disease transmission.

Only 43.4% of the participants knew that health care professional providing care to 2019-nCoV cases should ware personal protective (masks, gloves and shoe cover, hair cover and aprons), which is again a major sign of concern. On the contrary Pranav D. et al. (2020) in India reported that 86.3% of the respondents had sufficient knowledge towards personal protective use during care to 2019-nCoV cases [13]. Possible reasons that can be attributed to this difference of response are demographic difference of the study population and study area. Knowing that specific prevention option and treatment, such as vaccines and targeted antiviral medicines, were not available for novel coronavirus infection, countries emphasized on traditional health outbreak response strategies (social-distancing, isolation and quarantine) [14, 15]. Therefore wide-ranging health education on the disease prevention and control is required.

Our finding shows that female students need to gain more knowledge about novel corona virus than male students. In this study, respondents who came from rural areas had poor knowledge on COVID-19 as compared with respondents who were from the urban areas. The probable reason for this difference can be that students from rural areas comparatively have lesser access to health information through electronic media. This finding reveals the need to pay attention to the accessibility of electronic media. Students who had cumulative grade greater than or equal 60 were about threefold more likely to have good knowledge scores as compared with students who had less than 60. This might be due to the fact that students who have good academic performance have the capacity to learn about new situation from different sources. The current finding reveals that students who were members of college club had poor knowledge on novel coronavirus compared to those who were non-members. This implies that the college clubs should incorporate health education package on novel coronavirus. Our findings suggest social

media use may be useful for novel corona related knowledge. This finding could be due to the Ethiopia ministry of health's official face book has posted message regarding novel coronavirus. This result is in agreement with United State study where users of social media had more knowledge on health than non-users [16]. The college should encourage students to open their social media account (like face book and twitter) and follow the official social medias.

A number of governments have mentioned that health science students could be used health care systems affected by novel coronavirus [17]. Majority health care systems, like in Spain and Italy [18], are in catastrophe, and the rest expect extensive challenges in the coming months [19]. In this situation, students could be positioned in challenging conditions if requested to help health professionals in providing care. All the above statements suggest that the ministry of health should have been more alert in producing radio programs, television documentaries, newspaper reports and leaflets on this fatal virus to inform the students. Moreover, academic institutions should also make health education posts on this deadly virus through their websites and official face book address. Further, this finding reveals the need to pay consideration to the contents of the curriculum of the health science. The health science colleges should also promote learning of information seeking skills.

Our study has shared the drawbacks of cross-sectional studies (difficulty of determining causal associations between variables). In this study, sampling of students was limited to a single health science college. We do confess that if the study had been done in more health science colleges we would have get a more complete findings. Future studies could be aimed towards assessing attitude and practice toward the novel coronavirus infection among health science students.

Conclusion

Based on the outputs of the current study, it can be concluded that that lack of knowledge about COVID-19 among the health science students. Poor knowledge about COVID-19 was noted among students who were female, came from rural areas and non-user of social media. As the disease prevalence and death toll increase exponentially, health science college and health authorities should re-examine their capability to manage the deadly virus.

Declarations

Ethics approval and consent to participate

We obtained ethical clearance was from Arbaminch Health Science College Ethical Review Committee. Written informed consent was obtained from each participant prior to the interview. For the purpose of confidentiality and ethical issues, names of respondents from which information obtained were recorded and analyzed using uniquely identifying codes.

Consent for publication

Not applicable

Availability of data and materials

All data used to support the findings of this study are available.

Competing interests

No competing interest.

Funding

No financial support was gained.

Authors' contributions

BW participated in all stages of this manuscript development (conceptualization, design of the study, analysis, supervision, validation, visualization, writing original draft, review and editing). WT contributed to the design of the study, investigation, data analysis and writing the original draft. WT, YC and KF participated in the data analysis, supervision and writing the original draft. All authors review and approve the final manuscript.

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Figures

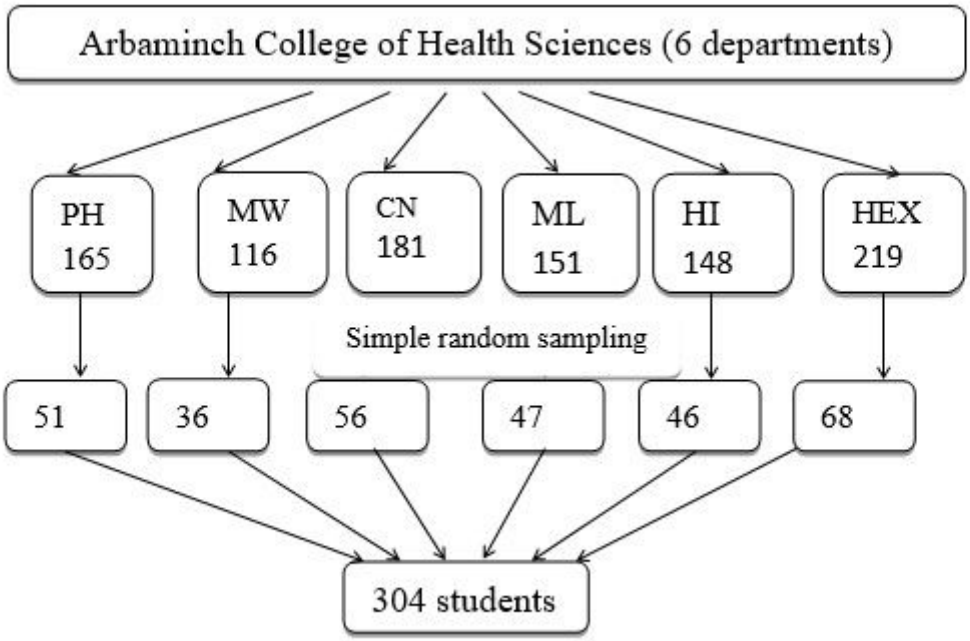

Figure 1

Schematic presentation of sampling procedure PH-Pharmacy, MW-Midwifery, CN-Clinical nurse, ML-Medical laboratory, HI-Health informatics, HEX-Health extension department

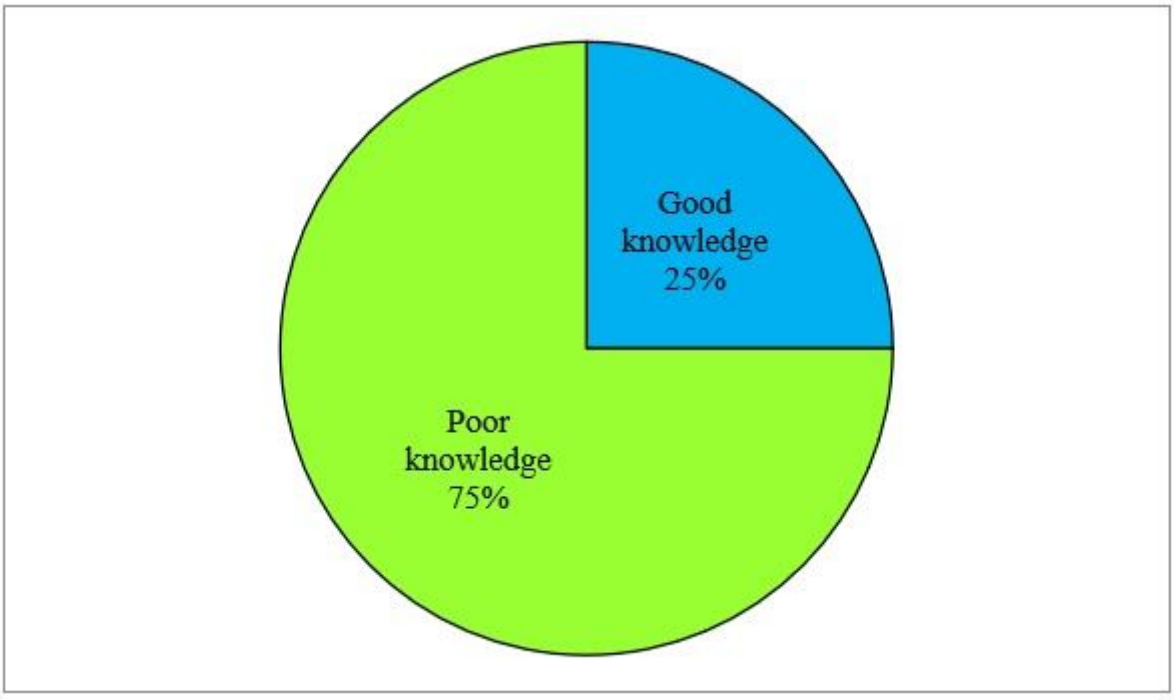

Figure 2

Knowledge level of respondents on novel corona virus, ACHS, 2020 The commonest source of information about novel coronavirus was from radio (42%). Moreover, internet, television, friend and newspaper accounted for 29%, 22.4%, 18.4% and 1%, respectively (Figure 3).

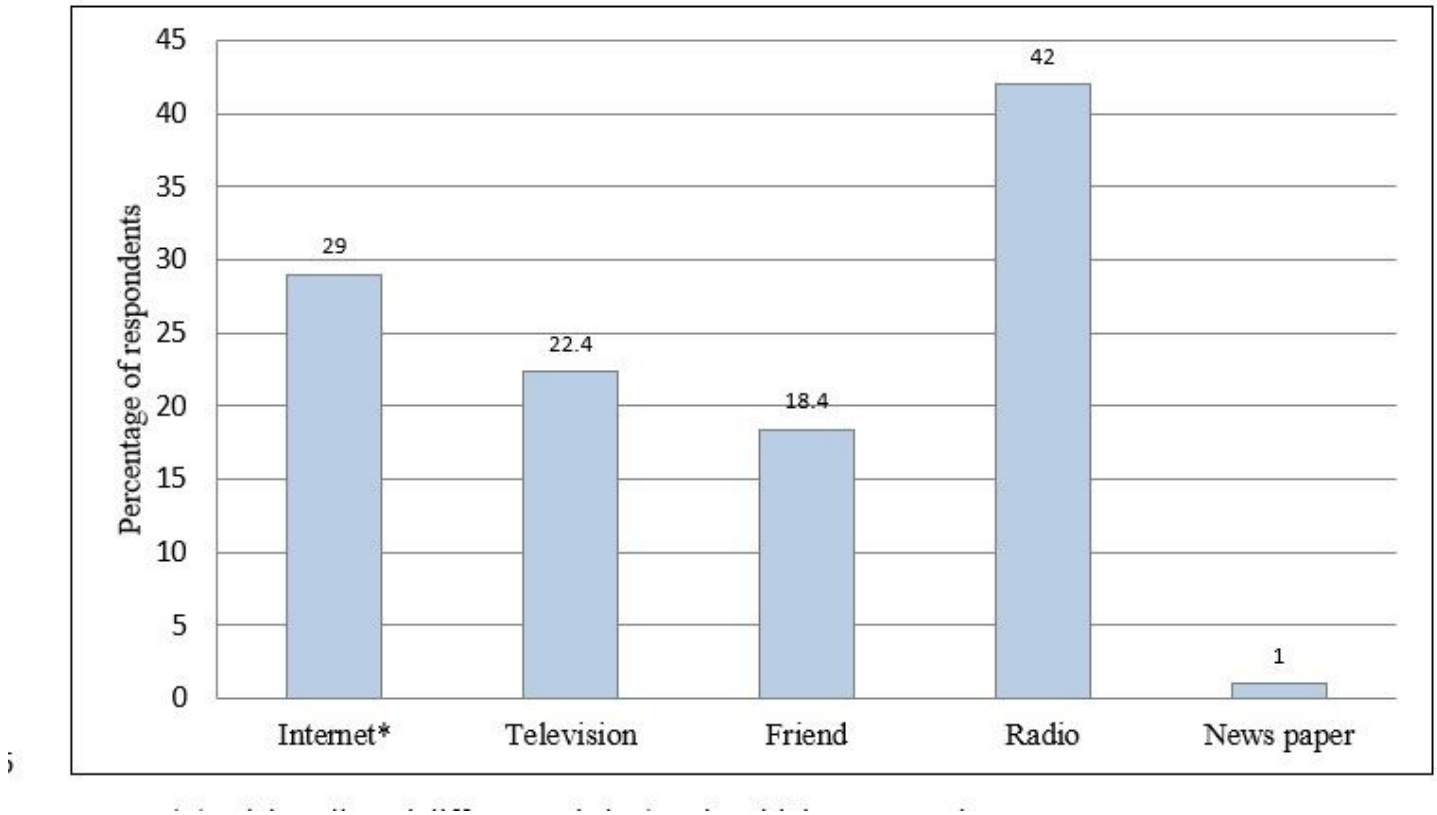

Figure 3

Internet* (social media and different websites) and multiple response data Figure 3: Source of information about novel coronavirus among health science students in Arbaminch College of Health Sciences, southwest Ethiopia