Epidemiology and Determinants of Knowledge, Attitude and Practice of Preventing COVID-19 Positive Patients at Southern Tigray Ethiopia: A Facility Based Cross-Sectional Study.

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Abstract

Background: The novel corona virus is a serious health problem world widely and is spreading in an immune naive population. Deaths are rising sharply, and health systems are under strain. There are confirmed cases of the virus in Ethiopia that found to have the problem. Therefore, the present study intended to assess epidemiology and determinant of knowledge, attitude, and practice of preventing COVID-19 positive patients at Southern Tigray Ethiopia.

Methods: A facility based cross-sectional study was conducted from August 6, to October 26, 2020 in selected health care facilities of south Tigray. Multi-stage sampling technique was employed. Descriptive statistics were employed to describe the characteristics of the cross-section and to estimate the prevalence of clients having knowledge, attitude and practice of prevention. Bivariate analysis was performed using binary logistic regression.

Results: A total of 170 COVID-19 positive patients were involved and eligible on the survey with the response rate of 98%. Of these participants, 106(62.4%) were male. Over half (51.2%) of the COVID-19 positive patients had good knowledge on transmission of COVID-19; about 64.4% had more accurate knowledge on prevention; ; about 62.9% had more positive attitude on prevention; and about half, 47.1% had poor practices of the precautionary measures against COVID-19. Participants who had more accurate knowledge for preventing COVID-19and more positive attitude of preventing COVID-19were 95%times (AOR=0.05, 95% CI =0.012 − 0.18) and 68% (AOR=0.32, 95% CI = 0.1 - 1.02) less likely, respectively, to implement the precautionary measures of COVID-19.

Conclusion: Our findings suggest the need for effective and tailored health education programs aimed at improving COVID-19 knowledge, thereby leading to more favorable attitudes and to implementation and maintenance of safe practices.

Background

The novel coronavirus is a serious health problem world widely and is spreading in an immune naive population. Deaths are rising sharply, and health systems are under strain.The first cases of novel coronavirus were reported by the World Health Organization (WHO), on 31 December 2019, when a few patients were diagnosed with pneumonia in the city of Wuhan in China [1, 2].

In Africa, over 2,134,290 cases and 51,033 deaths were reported until 27 November 2020 [3]. In Ethiopiaalso,253,120 total cases and 3,570 deaths in the country until 27 April 2021. There are confirmed cases of the virus in Ethiopia that found to have the problem while being treated for other medical problem. Individuals who neither have contact nor travel history were found to have the problem. This cautions the spread of the virus to the community [4].

Worldwide, the major challenges lie in delivering proper care to COVID-19 patients and to prevent the spread of infection among healthcare personnel and the general public. The proper preventive measures

for COVID-19 infection have not been effectively implemented in all places and adherence to them is not consistent [5–7]. Additionally, the implementation of new guidelines brings its own set of challenges related to the communication of the guidelines, availability of resources, access to equipment, and the practice of use of equipment, simulation sessions and desire to participate [8].

In order to declare and install effective prevention strategies, having knowledge about basic hygiene principles and modes of disease transmission, and measures in such an environment is, therefore, of vitally importance. To achieve an ultimate success against the ongoing encounter against COVID-19 in Ethiopia, people's commitment to these control measures is necessary [9, 10]. Health system of Ethiopia is not as developed as other countries so if the virus is not contained it will cost the country many things. Knowledge, attitude, and practice (KAP) investigation are important to collect information on what is known, believed, and done by a specific population; But in Ethiopia those types of research is not available like other countries. Therefore, the present study intended to assessepidemiology and determinant ofknowledge, attitude, and practice of preventing COVID-19 positive patients at Southern Tigray Ethiopia.

Methods

Study design and setting

A facility based cross-sectional study was conducted from August 6, to October 26, 2020 in selected health care facilities of south Tigray which is located approximately 660 km away from Addis Ababa, Ethiopia. In this zone there are 3 general hospitals, 6 primary hospitals, 5 health centers and around 25 health posts with 1582 health care workers. All patients and their attendants in southern Tigray treatment center were considered as source population and the study population was selected patients and attendants in southern Tigray treatment center who fulfilled the inclusion criteria.Health care workers and hospital and unit manager who avail during the data collection periodwere included. All clients who avail during data collection period within the southern Tigray treatment center were included. However, clients who were mentally incompetent or critically ill or unable to give information during data collection were excluded from the study.

Sample size and sampling procedure

In order to have representative respondents from the urban and rural districts, multi-stage sampling technique was used; after the proportional allocation to each Wereda or town, respondents were selected using Random sampling method to identify the study participants.

Variables and source of data

The data was collected for the large-scale COVID-19 screening in southern Tigray Ethiopia treatment center. The main outcome variable was COVID-19 positive client's having knowledge, attitude, and practice on prevention of coronavirus. Predictor variables considered were socio-demographic

characteristics, Hospital and individual related factors, Knowledge of clients on COVID-19, Attitude of clients on COVID-19, practice of clients on COVID-19 prevention. We extracted data on these predictor variables from semi-structured questionnaires, register, follow-up forms, and other clinical records. These registers and forms are regularly filled as part of a routine paper-based patient record system. The data were extracted by a trained nurse.

Data Quality Control

To preserve the quality of the data, training was provided for data collectors on the aim of the study and methods of data collection. A computer-based data collection was used to control entry errors. Field level conquest was done to control the data collection and data quality.

Data processing and analysis

Data was first checked manually for completeness and then entered into Epi-Info software ver. 3.1. After data entry and cleaning, the data was transferred to STATA software ver.13.for statistical analysis. Descriptive statistics were employed to describe the characteristics of the cross-section and to estimate the prevalence of clients having knowledge, attitude and practice of prevention. Bivariate analysis was performed using binary logistic regression. Variables which showed significant association in the bivariate analyses (P-value < 0.25) were candidates for the multivariate logistic regression model. To control for the effect of confounding variables, multivariate logistic regressions adjustments were used. Explanatory variables significantly associated with the outcome variable with p-value < 0.05 in multivariate logistic regression were determined as independent predictors.

Results

Socio-demographic characteristics

A total of 170 COVID-19 positive patients were involved and eligible on the survey with the response rate of 98%. Of these participants, 106(62.4%) were male. At the time of enrollment to treatment center, there were 150 (88.2%) patients at the age of 18-44 years. Majority of a patient were placed on Alamata and Maichew respectively. Most of the patients (42.4%) had an income of 3001 – 10,000 ETB. The popular of COVID-19 positive patients had education qualification diploma and degree respectively. The predominant of COVID-19 positive patients (87.1%) had religion of orthodox.Health care professionals were the popularoccupation of COVID-19 positive patients (40%).

Determining experience of COVID -19 related illness

The experiences of COVID-19 related illness and its predictors were assessed. Among the study participants, 7.3% had a history of fever and an experience of respiratory illness before the study. Of those who had an experience of respiratory illness, 7.1% had a cough, 5.9% had pain, 2.9% had a sore throat, 6.5%, had shortness of breath, 5.3%, had generalized body weakness, 8.8%, had under line co-morbidity and conditions.

Epidemiology of knowledge, attitude and practice (KAP) for the prevention of COVID-19

Findings demonstrated that COVID-19 positive patients had knowledge on transmission modes, prevention methods, attitude and practice for prevention of COVID-19. Over half (51.2%) of the COVID-19 positive patients had good knowledge on transmission of COVID-19; about 64.4% had more accurate knowledge on prevention; ; about 62.9% had more positive attitude on prevention; and about half, 47.1% had poor practices of the precautionary measures against COVID-19 (**Fig 1**).

Determinants factors associated with Knowledge of preventing COVID-19 positive patient

Based on the results of bivariate logistic regression analysis shown in Table-3, variables which showed significant association with knowledge of preventing COVID-19 positive patient at 5% significant level were selected for multivariate analysis. In multivariate logistic regression result, odds ratio is the estimated multiplicative change in the odds for a unit change in the predictor variables, controlling for the effects of other predictors.

The significant predictors of knowledge of preventing COVID-19 positive patient at 5% significant level after controlling for the effects of others predictors were; income, occupation, knowledge of transmission COVID-19, underline co-morbidity and conditions (Table-3).

Hence, those who had good knowledge of transmission were 94% times (AOR=0.06, 95%CI =0.018 – 0.19) less likely to be knowledgeable about the prevention methods of COVID-19 than those who did not hadknowledge of transmission. Regarding the occupation of respondents, health workers were 99.4% times less likely, to be knowledgeable on the prevention methods of COVID-19 than other occupants (Table-3).Those participants who under line co-morbidity and conditions were 94% times (AOR=0.6, 95% CI =0.006 – 0.065) less likely to be knowledgeable about the prevention methods of COVID-19 than those who did not(Table-3).

Determinants factors associated with attitude of preventing COVID-19 positive patient

The significant predictors of attitude of preventing COVID-19 positive patient at 5% significant level after controlling for the effects of others predictors were; knowledge of transmission COVID-19,wash hands and face after coming outsides, treated at home,use a facemask in crowded place(Table-4).

Hence, those who had good knowledge of transmission were 95% times (AOR=0.05, 95% CI =0.016 – 0.17) less likely to have an attitude about the prevention methods of COVID-19 than those who did not hadan attitude of prevention.In addition to those whoagreewashing hands and face after coming outsides were 79% times less likely to have an attitude on the prevention methods of COVID-19 than those who did not hadan attitude of prevention. Thoseparticipants who agree treated at homewere 90% times (AOR=0.1, 95% CI =0.028 – 0.32) less likely to have an attitude on the prevention methods of COVID-19 than those who did not hadan attitude of prevention. Furthermore, those participants who were agree touse facemask in crowded place were 98.4% times (AOR=0.016, 95% CI =0.001 – 0.3) less likely to

have an attitude on the prevention methods of COVID-19 than those who did not hadan attitude of prevention(Table-4).

Determinants factors associated with practice of preventing COVID-19 positive patient

The significant predictors of practice of preventing COVID-19 positive patient at 5% significant level after controlling for the effects of others predictors were; Experience of respiratory illness, Knowledge for preventing COVID-19, Attitude of transmission COVID-19, Maintain social distance, Obeying governmental rules related to COVID-19, Maintain a healthy lifestyle focusing on outbreak, Use tissues or hanker chips during coughing/sneezing(Table-5).

Hence, those who had Experience of respiratory illnesswere 96% times (AOR=0.04, 95% CI =0.007 − 0.27) less likely to implement the precautionary measures of COVID-19.Participantswhohadmore accurateknowledge for preventing COVID-19and more positive attitude of preventing COVID-19were 95%times (AOR=0.05, 95% CI =0.012 − 0.18) and 68% (AOR=0.32, 95% CI = 0.1 - 1.02)lesslikely, respectively, to implement the precautionary measures of COVID-19. In addition to those who Maintain social distance were 98.3% times (AOR = 0.017 95%CI=0.001 - 0.21)less likely to implement the precautionary measures of COVID-19.Furthermore, those participants who obeying governmental rules related to COVID-19,Maintain a healthy lifestyle focusing on outbreak and Use tissues or hanker chips during coughing/sneezing were90.5% times(AOR = 0.0095 95%CI=0.009 − 1.03), 80% times(AOR = 0.2 95%CI=0.04−1.04) and 91% times(AOR = 0.09 95%CI=0.008 − 1.1)less likely, respectively,to implement the precautionary measures of COVID-19(Table-5).

Discussion

The findings reveal a considerable number of socio-demographic factors that affect KAP and should prove valuable when planning health education programs about emerging infectious diseases.

The study found 64.4% and 51.2% overall knowledge of the respondents about transmission and prevention of COVID-19, respectively, attitude of the respondents about prevention of COVID-19 was 62.9%. The practice of the prevention of COVID-19 was low (47.1%).Concerning the determinant factors, income, and occupation, knowledge of transmission COVID-19, underline co-morbidity and conditionswere the factors associated with knowledge on the prevention of COVID-19. Knowledge of transmission COVID-19,wash hands and face after coming outsides, treated at home,use a facemask in crowded placewere significantly associated with attitude on the prevention of COVID-19. The study found that Experience of respiratory illness, Knowledge for preventing COVID-19, Attitude of transmission COVID-19, Maintain social distance, Obeying governmental rules related to COVID-19, Maintain a healthy lifestyle focusing on outbreak, Use tissues or hanker chips during coughing/sneezingwere associated with the practice of precautionary measures against COVID-19.this finding was consistent with cross-sectional study done in Bangladesh and Ethiopia [11, 12].

This study was conducted three months after the first COVID-19 positive case was reported in the country; thus we expect the study community to have higher awareness now. However, the epidemiology of knowledge was unexpectedly low. The Ethiopian study is compared and contrasted to some others globally. A study conducted in Iran revealed that knowledge about the mode of transmission of the disease found a similar figure of 56% [13]. In contrast, a study conducted in China revealed that the overall knowledge of COVID-19 was high at 90% [14]. Our study has found better knowledge on the prevention of COVID-19 than a study conducted in Thailand with a result of, 73.4% on the knowledge on prevention and control of COVID-19 [15].

The epidemiologyof practices for the prevention of COVID-19 in southern Tigray Ethiopia was 47.1%, which was lower than the study conducted in Iran, 71%, [13],but much higher than the study conducted in Thailand, 17%, [15].

The findings revealed virtually universal agreement among the participants towards reporting to health authorities cases of COVID-19, on the issue wearing a face mask before going to a crowded place, and in following other recommendations. These findings were in line to a very recent study conducted in China; during the rapid rise of COVID-19 outbreak [16]. Saqlain et al. also reported positive attitudes among the vast majority of health care professionals towards wearing protective gear [17]. Similarly, the overall attitude towards actions such wash hands and face after coming from outside and health education can play an important role for COVID-19 prevention was universally favorable. Like in this study, Saqlain et al reported that more than 80% participants strongly agreed that transmission of COVID-19 could be prevented by following universal precautions given by WHO or CDC [18].

Being a health professional was associated with less accurateknowledge about COVID-19. This finding is supported by the study conducted in Iran [19]. The strength of this study was large and had a broad scope with several strengths. It was based on a randomization sample size and focused on participants from areas that were likely to be high risk; therefore, the findings can be generalized across the city's population.This study has some limitations that are shared with most studies.The cross-sectional nature of the study design limited to include other associated determinant factors that may influence the risk of co-morbidity and mortality inCOVID-19 positive patients. We use dalimited number of questions to measure the epidemiology of knowledge, attitude, and practice. Thus, additional assessments would be important, using all aspects of KAP towards COVID-19, to determine the actual extent of KAP in the general population. Additionally, the unstandardized and inadequate assessment of attitudes and practices towards COVID should be developed via focus group discussion and in-depth interviews and constructed as multi-dimensional measures.

Conclusion

The study revealed that respondents had moderate knowledge, attitude about preventions mechanisms and practice on the prevention of COVID-19 areas of high risk in Southern Tigray Ethiopia. Our findings suggest the need for effective and tailored health education programs aimed at improving COVID-19

knowledge, thereby leading to more favorable attitudes and to implementation and maintenance of safe practices.

Abbreviations

CI: Confidence Interval

COVID-19: Corona virus disease 2019

ETB: Ethiopian Birr

KAP: Knowledge, Attitude and Practice

Declarations

Ethics approval and consent

Ethical approval was obtained from the institutional review board of Lemlem Karl Hospital. Accordingly, permission letter was secured from medical directors at Lemlem Karl Hospital. All the collected patient information was stored anonymous and data was kept confidential.

Consent for publication

Not applicable.

Availability of data and materials

All data relevant to our findings are contained within the manuscript. Requests for further details on the dataset and queries concerning data sharing shall be arranged based on a reasonable request to abdukadirnigus@gmail.com.

Competing interests

The authors declare that they have no competing interests.

Funding

Not applicable.

Authors' contributions

AN brought the original idea, was involved in the proposal writing, designed the study, and participated in all the implementation stages of the project. AN, RH also analyzed data and wrote the initial version of the manuscript. AN, RH, participated in the conception of the original idea and were involved in proposal

writing. AN, and SM were involved with data analysis. SM checked and reran data analyses and extensively rewrote the manuscript prior to submission. AN, RH, and SM critically revised the manuscript for important intellectual content. All the authors read and approved the final version of the manuscript.

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Supplementary information

The online version contains supplementary material available.

Additional file1.

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Tables

Table-1: Socio-demographic characteristics COVID -19 Positive patients at Southern Tigray, North Ethiopia.

characteristics	Categories	Frequency (n)	Percent (%)
Sex	Male	106	62.4%
	Female	64	37.6%
Age in years	Less than 18	07	4.1%
	18 – 44	150	88.2%
	45- 64	08	4.7%
	65+	05	2.9%
Religion	Orthodox	148	87.1%
	Muslim	13	7.6%
	Protestant	08	4.7%
	Others	01	0.6%
Income in ETB	Less than or equal 1000	20	11.8%
	1001 – 3000	41	24.1%
	3001 – 10,000	72	42.4%
	>10,000	37	21.8%
Education Qualification	Diploma	92	54.1%
	Degree	74	43.5%
	Masters and Above	04	2.4%
Occupation	Health care professional	68	40%
	Driver	08	4.7%
	Student	12	7.1%
	Grocery worker	14	8.2%
	Banker	12	7.1%
	Governmental employee	18	10.6%
	Business man	17	10%
	Other	21	12.4%

Table: 2- Magnitude of knowledge, attitude, and practice of preventing COVID-19 positive patients at Southern Tigray Ethiopia, 2020.

characteristics	Categories	Frequency (n)	Percent (%)
Knowledge on the transmission mode of COVID-19	Direct contact with COVID-19 patient	130	76.5%
	Breathing	118	69.4%
	Coughing/sneezing	113	66.5%
	Eating and drinking	70	41.2%
	Others	20	11.8%
Knowledge on the prevention mode of COVID-19	Maintain Social distance	143	84.1%
	Hand washing frequently	136	80%
	Use face mask in crowded place	131	77.1%
	Maintain Isolation/quarantine	67	39.4%
Attitude on the prevention mode of COVID-19	Health education can play an important role	98	57.6%
	It can be treated at home	135	79.4%
	COVID-19 is a preventable disease	143	84.1%
	It is important to use a facemask in crowded place.	151	88.8%
	It is important to wash hands and face after coming outsides.	138	81.2%
Practice on the prevention mode of COVID-19	Obey governmental rules	60	35.3%
	Hanker chips during coughing/sneezing	137	80.6%
	Eat healthy food focusing on outbreak	56	32.9%
	Maintain healthy life style focusing on outbreak	115	67.9%
	Avoid touching face and eyes	118	69.4%
	Maintain social distance	151	88.8%
	Wash hands frequently	138	81.2%
	Use a face mask in crowded place	55	32.4%

Table3. *Crude and Adjusted Odds ratio for determinant factors associated with knowledge for preventing COVID-19 positive patients at Southern Tigray Ethiopia, 2020.*

Variables	Knowledge		COR (95%CI)	AOR (95%CI)
	Less accurate	More accurate		
Income in ETB				
<=1,000	08	12	0.41(0.133, 1.24) *	0.11(0.016, 0.73) **
1,001-3,000	11	30	0.22(0.09, 0.058) ****	0.58(0.09, 3.75)
3,001-10,000	17	55	0.19(0.08, 0.44) ***	0.19(0.34, 0.92) **
>10,000	23	14	1	1
Occupation				
HCW	02	68	0.007(0.001, 0.04) ***	0.006(0.001, 0.06) ****
Driver	03	08	0.14(0.023, 0.85) **	0.08(0.003, 1.7) *
Student	07	12	0.33(0.068, 1.6) *	0.57(0.065, 5.02) *
Grocery worker	08	14	0.31(0.069, 1.4) *	0.11(0.01, 1.3) *
Business man	07	17	0.17(0.038, 0.71) **	0.17(0.022, 0.1.3) *
Banker	04	12	0.12(0.023, 0.6) **	0.23(0.03, 2.1) *
Governmental employee	11	18	0.37(0.087, 1.6) *	0.24(0.03, 1.9) *
Others	17	21	1	1
Knowledge of transmission				
Good	08	79	0.06(0.03, 0.15) ****	0.06(0.018, 0.19) ****
Poor	51	32	1	1
Experience of respiratory illness				
Symptomatic	03	56	0.28(0.078, 0.98) **	0.19 (0.023, 1.6) *
Asymptomatic	56	93	1	1
Under line co-morbidity and				

conditions				
Yes	01	14	0.12(0.015, 0.93) **	0.06(0.006, 0.65) **
No	97	58		
			1	1

Significant at: *P<0.25; ** P<0.05; *** P<0.01; **** P<0.001; COR: Crude Odd Ratio; AOR: Adjusted Odd Ratio; CI: Confidence Interval; 1=Reference category.

Table4. *Crude and Adjusted Odds ratio for determinant factors associated with attitude for preventing COVID-19 positive patients at Southern Tigray Ethiopia, 2020.*

Variables	Attitude		COR (95%CI)	AOR (95%CI)
	Less positive	More positive		
Income in ETB				
<=1,000	12	08	1.4(0.47, 4.3)	2.5(0.54, 11.5)
1,001-3,000	11	30	0.35(0.14, 0.89) **	0.6(0.15, 2.5)
3,001-10,000	21	51	0.39(0.17, 0.89) **	1.0(0.28, 3.7)
>10,000	19	18	1	1
Knowledge of transmission				
Good	12	75	0.1(0.05, 0.21) ****	0.05(0.016, 0.17) ****
Poor	51	32	1	1
Washing hands and face after coming outsides.				
Agree	44	94	3.7(1.04, 13.4) **	0.21 (0.05, 0.84) **
Undecided	07	04	2.8(1.12, 7.3) **	2.6 (0.28, 4.4)
Disagree	12	09	1	1
Treated at home.				
Agree	25	73	0.35(0.14, 0.9) **	0.1(0.028, 0.32) ****
Undecided	05	14	1.3(0.29, 5.9)	0.12(0.03, 0.58) ***
Disagree	33	20	1	1
Use a facemask in crowded place.				
Agree				
Undecided	56	95	0.3(0.07, 1.23) *	0.016(0.001, 0.3) ***
Disagree	01	09	0.06(0.05, 0.67) **	0.57(0.07, 4.6)
	06	03		

	1		1	

Significant at: *P<0.25; ** P<0.05; *** P<0.01; **** P<0.001; COR: Crude Odd Ratio; AOR: Adjusted Odd Ratio; CI: Confidence Interval; 1=Reference category.

Table5. *Crude and Adjusted Odds ratio for determinant factors associated with practice for preventing COVID-19 positive patients at Southern Tigray Ethiopia, 2020.*

Variables	Practice		COR (95%CI)	AOR (95%CI)
	Less frequent	More frequent		
Income in ETB				
<=1,000	08	12	1.12(0.35, 3.6)	0.74(0.125, 4.3)
1,001-3,000	11	30	0.46(0.18, 1.1) **	0.71(0.13, 4.0)
3,001-10,000	17	55	0.34(0.15, 0.79) **	0.46(0.11, 2.0)
>10,000	23	14	1	1
Knowledge for transmission				
Good	33	54	0.3(0.16, 0.55) ****	1.2(0.45, 3.2)
Poor	56	27	1	1
Experience of respiratory illness				
Symptomatic	02	19	0.08(0.017, 0.33) ****	0.043 (0.007, 0.27) ****
Asymptomatic	87	62	1	1
Under line co-morbidity and conditions				
Yes	11	04	2.7 (0.83, 8.9) **	2.7(0.74, 9.7) *
No	78	77	1	1
Knowledge for preventing COVID-19				
More accurate				
Less accurate	35	76	0.04(0.016, 0.12) ****	0.05(0.012, 0.18) ****
	54	05	1	1
Attitude for preventing COVID-19				
More positive				
Less positive	38	69		

	51	12	0.1(0.06, 0.27) ****	0.32(0.1, 1.02) **
			1	1

Maintain social distance				
Yes	02	58	0.006(0.001, 0.03) ***	0.017(0.001, 0.21) ****
Sometimes	55	17	0.61(0.22, 1.7)	0.37(0.082, 1.67) *
No	32	06	1	1

Obeying governmental rules related to COVID-19				
Yes	03	57	0.005(0.001, 0.02) ****	0.095(0.009, 1.03) **
Sometimes	41	20	0.18(0.06, 0.58) ***	0.039(0.007, 0.24) ****
No	45	04	1	1

Eat healthy food focusing on outbreak				
Yes	01	55	0.005(0.001, 0.04) ****	0.12(0.009, 1.62) *
No	88	26	1	1

Maintain a healthy lifestyle focusing on outbreak				
Yes	48	67	0.14(0.05, 0.4) ****	0.2(0.04, 1.04) **
Sometimes	16	09	0.36(0.1, 1.3) *	0.7(0.14, 3.7)
No	25	05	1	1

Use tissues or hanker chips during coughing/sneezing				
Yes	59	78	0.04(0.005, 0.3) ***	0.09(0.008, 1.1) **
Sometimes	11	02	0.29(0.02, 3.6)	0.31(0.012, 8.1)
No	19	01	1	1

Significant at: *P<0.25; ** P<0.05; *** P<0.01; **** P<0.001; COR: Crude Odd Ratio; AOR: Adjusted Odd Ratio; CI: Confidence Interval; 1=Reference category.

Supplementary

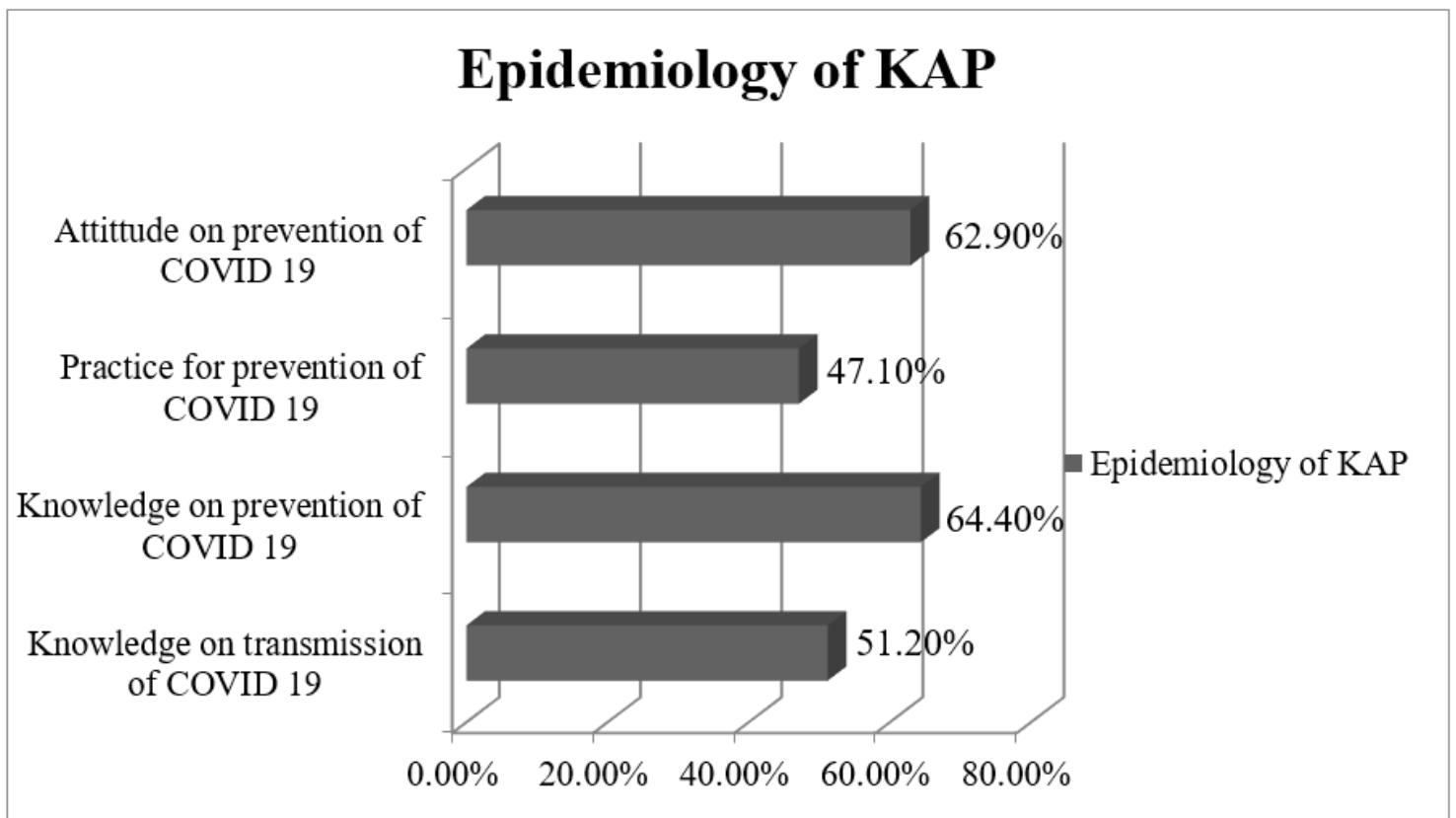Additional File 1 is not available with this version.

Figures

Figure 1

Epidemiology of knowledge on the transmission, prevention, attitude and practice of precautionary measure of COVID-19