

Original Article

Evaluation of Paramedical Student's Knowledge on COVID-19: A Comparative Study

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ABSTRACT

Background & Objectives: The COVID-19 pandemic has presented the world community with its greatest challenges so far. Paramedics play a crucial role in providing pre-hospital care to patients who require urgent medical attention in clinical settings. Therefore, the aim of the study was to evaluate the knowledge on COVID-19 among health assistant (HA) students studying in different paramedical colleges in Janakpurdham.

Material and Methods: A descriptive cross-sectional study was performed utilizing a structured questionnaire to acquire responses from HA Students studying in different colleges of Janakpurdham in the months of April and May 2022. Descriptive analysis was applied to calculate

the frequencies and proportions. A p-value less than 0.05 were considered as significant.

Results: Out of total 360 students, 280 were enrolled. The majority of students were under 20 years old. All of the students were aware of the COVID-19 infection at National Human Resource Development Academy (NHRDA) and Mithila Technical Academy (MTA) colleges, with the exception of 3.61% Care Medical Center (CMC) students. A large percentage of students (52.80% boys, 47.19% girls) responded that the respiratory tract is the primary route by which COVID-19 infections are spread, followed by the students from NHRDA and CMC. Most of the students from all colleges received satisfactory scores on the COVID-19 knowledge test. There was negative association of score of knowledge between 1st, 2nd and 3rd year students of CMC and MTA ($p=0.96$ and $p=0.11$) respectively. However, there was positive association of score of knowledge between 1st, 2nd and 3rd year NHRDA students ($p=0.01$).

Conclusion: The majority of college students studying at different colleges had satisfactory knowledge, while a moderate number of students had poor and just a few had good knowledge scores on the COVID-19. In order to increase knowledge, various kinds of strategies, regulations, and initiatives should be accomplished and implemented effectively throughout the lower to higher level education.

Keywords: COVID-19, Health Assistant, Knowledge, Pandemic, Respiratory syndrome

INTRODUCTION

The COVID-19 virus is contagious and can cause acute respiratory distress syndrome. This corona virus may spread from the common cold to severe acute respiratory syndrome [1]. Direct contact with an infected person or airway droplets results in the spread of COVID-19. Clinical sign and symptoms of COVID-19 are variable, but often include sore throat, fever, cough, headache, fatigue, breathing difficulties and loss of smell and taste in individuals with COVID-19 within 14 days of the incubation period [2]. The most effective measure to prevent and control the transmission of COVID-19 remains a safe and effective vaccination [3].

The COVID-19 pandemic had a substantial impact on frontline healthcare workers [4]. Despite the crucial role in reducing morbidity and mortality of COVID-19, healthcare professionals (HCPs) including doctors, nurses, health assistants, laboratory professionals, and pharmacists are directly exposed to patients and causative factors [5]. They are particularly at high risk for cross-infection and contamination. Thousands of healthcare workers have died as a result of the pandemic [4,6,7]. If healthcare workers and other medical professionals, have sufficient awareness, a good perspective, and understanding of best practices addressing COVID-19, they can prevent cross-infection during patients care [8].

The World health organizations (WHO) and the Centers for Disease Control and Prevention (CDC) have issued guidelines for healthcare professionals on managing and preventing COVID-19. The WHO hosted various COVID-19 training sessions and resources online in different languages to

facilitate prevention initiatives including promoting awareness and training among HCPs [9,10].

Health care practitioners with a Proficiency Certificate in General Medicine, also known as Health Assistants (HA) in Nepal have primary duties for providing curative, preventative, and promotional services to the general public in hospitals and clinical settings. The individuals who work in healthcare system still need to be conversant with the relevant knowledge with emerging threats in order to promote correct practices and protection. Scientific literatures suggest that few studies on knowledge about COVID-19 had been conducted in undergraduate medical and dental students in Nepal [11,12], but no studies has been found in HA students so far. Therefore, the purpose of this study was to assess the knowledge about COVID-19 among health assistant students studying in different paramedical colleges in Janakpurdham.

MATERIAL AND METHODS

Study Design

A descriptive cross-sectional study was performed utilizing a structured questionnaire to acquire responses on knowledge about COVID-19 from HA Students studying in different colleges of Janakpurdham.

Study Participants

Interviews were carried out among HA students studying at National Human Resources Development Academy (NHRDA), Care Medical Centre (CMC), and Mithila Technical Academy (MTA), all of which are located in Janakpurdham, Nepal and are affiliated with Council for Technical Education and Vocational Training (CTEVT),

Nepal. The data were collected in the months of April and May 2022.

Inclusion and exclusion criteria

All the available students of 1st, 2nd, and 3rd year studying in three different colleges during data collection were considered eligible. The objectives of the study were explained to all participants, and those who consented to sign the consent form were enrolled. We targeted 120 students from each college studying in 3 years programme of Proficiency Certificate in General medicine. Out of total targeted 360 students, 280 were enrolled. The teaching faculties, non-teaching staffs, nursing and laboratory students studying in these colleges were excluded.

Study Tool

A standardized, self-administered questionnaire was developed by reviewing the relevant available literature to collect data. The questionnaire consisted socio-demographic characteristics and 62 knowledge based questions on COVID-19. Knowledge scores for total question asked = 62, and graded as < 20 correctly responded = poor, 20-40 correctly responded = satisfactory, > 40 correctly responded = good. Respondents were given enough time overall to read, comprehend, and answer all of the questions.

Statistics

Data were coded, validated, and analyzed using the Statistical Package for the Social Sciences (SPSS), version 21. Descriptive analysis was applied to calculate the frequencies and proportions. The p-value less than 0.05 were considered significant.

Ethical Consideration

The work approval letters were obtained from the National Human Research Development Academy (Ref: 72/078-079), Mithila Technical Academy (Ref: 115/079), and Care Medical Centre (Ref: 27/079) affiliated with CTEVT, Nepal, before data collection.

RESULTS

In total, 280 students from various paramedical institutions participated in the current study. These included 83 students from CMC, 102 students from NHRDA and 95 students from MTA. 46.98% students were boys while 53.01% were girls from CMC. From NHRDA, there were 44.11% boys and 55.88% girls, but from MTA, there were 50.52% boys and 49.47% girls. The majority of students were under 20 years old with 95 from NHRDA, followed by 84 from MTA and 74 from CMC. 37.8% of boys and 62.22% of girls were from NHRDA, 38.46% of boys and 61.53% of girls were from CMC, while 51.51% of boys and 48.48% girls from MTA were from Dhanusha District, which was followed by Mahottari District. Less number of students belonged to Sarlahi district.

Students from CMC first, second, and third year (42.16%, 32.53%, and 25.30%) as well as MTA first, second, and third year (40%, 34.73%, and 25.26%) participated, while 33.33% of students from each year of NHRDA also participated. A large proportion of CMC students (61.44%) heard about the COVID-19 through social media, while only a small percentage (6.02%) got it through friends.

Table 1: Socio-demographic pattern of study population

Socio-demographic Characteristics	Gender (CMC)		Total N=83	Gender (NHRDA)		Total N=102	Gender (MTA)		Total N=95
	Boys (%)	Girls (%)		Boys (%)	Girls (%)		Boys (%)	Girls (%)	
Age (yrs)									
Less than or equal to 20	32(43.24)	42(56.75)	74	38 (40)	57 (60)	95	39(46.41)	45(53.57)	84
Greater than 20	7 (77.77)	2 (22.22)	9	7 (100)	-	7	9 (81.81)	2 (18.18)	11
District									
Dhanusha	20(38.46)	32(61.53)	52	17 (37.8)	28(62.22)	45	34(51.51)	32(48.48)	66
Mahottari	12 (60)	8 (40)	20	20 (56.6)	18 (47.4)	38	10(66.67)	5 (33.33)	15
Siraha	3 (75)	1 (25)	4	1 (16.7)	5 (83.3)	6	1 (9.09)	10(90.90)	11
Saptari	2 (100)	-	2	3 (75)	1(25)	4	1 (100)	-	1
Sarlahi	2 (40)	3 (60)	5	4 (44.4)	5 (55.6)	9	2 (100)	-	2
HA in Years									
1 st year	11(31.42)	24(68.57)	35	15 (44.1)	19(58.9)	34	16(42.10)	22(57.89)	38
2 nd year	16(59.25)	11(40.74)	27	15 (44.1)	19 (58.9)	34	18(54.54)	15(45.45)	33
3 rd year	12(57.14)	9 (42.85)	21	15 (44.1)	19(58.9)	34	14(58.33)	10(41.67)	24
Type of family									
Nuclear	25(48.07)	27(51.92)	52	31(40.78)	45(59.21)	76	35(60.34)	23(39.65)	58
Joint	14(45.16)	17(54.83)	31	14(53.84)	12(46.15)	26	13(35.13)	24(64.86)	37
Marital status									
Married	2 (25)	6 (75)	8	-	5(100)	5	3 (50)	3(50)	6
Unmarried	37(49.33)	38(50.66)	75	45(46.39)	52(53.60)	97	45(50.56)	44(49.43)	89
Religion									
Hindu	35(48.61)	37(51.38)	72	43(43.43)	56(56.56)	99	42(47.72)	46(52.27)	88
Muslim	4 (44.44)	5 (55.55)	9	2 (66.66)	1 (33.33)	3	5 (83.33)	1 (16.66)	6
Christian	-	2 (100)	2	-	-	-	1 (100)	-	1
Ethnic group									
Yadav	16(53.33)	14(46.66)	30	14 (87.5)	2(12.5)	16	14(42.42)	19(57.57)	33
Sah	4 (33.33)	8 (66.66)	12	3 (18.75)	13(81.25)	16	6 (37.5)	10 (62.5)	16
Mandal	4 (50)	4 (50)	8	14(38.88)	22 (61.1)	36	7 (53.84)	6 (46.15)	13
Khatun	4 (44.44)	5(55.55)	9	4 (40)	6 (60)	10	6 (66.67)	3 (33.33)	9
Pandit	1 (20)	4 (80)	5	10(41.66)	14(58.33)	24	15 (62.5)	9 (37.5)	24
Thakur	-	4 (100)	4	-	-	-	-	-	-
Jha	10(66.66)	5 (33.33)	15	-	-	-	-	-	-
Sources of information about COVID-19									
Radio and TV	14(66.66)	7 (33.33)	21	31 (57.4)	23(42.59)	54	7 (21.21)	26(78.78)	33
Health Professional	3 (60)	2 (40)	5	5 (16.7)	25 (83.3)	30	3 (50)	3 (50)	6
Friends	-	2 (100)	2	7 (50)	7 (50)	14	1 (100)	-	1
Family	4 (100)	-	4	1 (50)	1 (50)	2	37(67.27)	18(32.72)	55
Social media	18(35.29)	33(64.70)	51	1(50)	1 (50)	2	-	-	-

Table 2a: Knowledge regarding COVID-19 among study population

S. No	Knowledge	Gender (CMC)		Total N= 83	Gender (NHRDA)		Total N= 102	Gender (MTA)		Total N= 95
		Boys (%)	Girls (%)		Boys (%)	Girls (%)		Boys (%)	Girls (%)	
1	Have you heard about COVID-19 infection?									
	Yes	36 (44.44)	44 (55.5)	80	45 (44.12)	57(55.88)	102	48 (50.52)	47(49.4)	95
	No	2 (100)	-	2	-	-	-	-	-	-
	Don't know	1 (100)	-	1	-	-	-	-	-	-
2	Corona virus									
	is a large family of virus	8 (42.1)	11(57.8)	19	10 (47.62)	11(52.38)	21	6(35.2)	11(64.7)	17
	belongs to the family Nidovirus	2 (66.66)	1 (33.33)	3	6 (50)	6 (50)	12	4 (80)	1 (20)	5
	Both a and b	16 (48.48)	17(51.5)	33	15 (45.45)	18(54.54)	33	25 (44.64)	31(55.3)	56
	None of these	13(46.42)	15(53.5)	28	14 (38.88)	22(61.11)	36	13 (76.47)	4 (23.57)	17
3	Zoonotic disease means transmission between									
	animal and plants	3 (75)	1 (25)	4	1 (50)	1 (50)	2	-	-	-
	humans and plants	4 (40)	6 (60)	10	-	1 (50)	1	1 (50)	1 (50)	2
	animal and people	29 (43.28)	36(54.5)	66	35 (41.66)	49(58.33)	84	46 (50)	46 (50)	92
	animal and birds	2 (66.66)	1 (33.33)	3	9 (60)	6 (40)	15	1 (100)	-	1
4	Type of nucleic acid present in corona virus									
	RNA	26 (47.27)	29 (52.7)	55	30 (57.69)	22(42.30)	52	26 (45.61)	31 (54.38)	57
	DNA	5(62.5)	3 (37.5)	8	9 (56.25)	7 (43.75)	16	12 (57.14)	9 (42.85)	21
	Both a and b	8 (40)	12 (60)	20	6 (17.6)	28 (82.4)	34	10 (58.82)	7 (41.17)	17
5	Corona virus name announced by WHO is									
	COVID-19	38 (46.91)	43(53.0)	81	45 (45.45)	54(54.54)	99	48 (50.52)	47 (49.47)	95
	COVN-19	1 (50)	1 (50)	2	-	-	-	-	-	-
	CONV-19	-	-	-	-	-	-	-	-	-
	CONVID-19	-	-	-	-	3 (100)	3	-	-	-
6	COVID-19 was declared an epidemic by									
	PHEIC	25 (45.45)	30(54.5)	55	27 (42.18)	37 (57.81)	64	24 (48.97)	25 (51.02)	49
	UNICEF	14 (50)	14(50)	28	18 (47.36)	20 (52.63)	38	24 (52.17)	22 (47.82)	46
7	WHO officially declared COVID-19 as pandemic in									
	January 23,2019	17 (89.47)	2 (10.52)	19	30 (60)	20 (40)	50	16 (59.25)	11 (40.74)	27
	March, 11 2020	13 (38.23)	21(61.7)	34	11 (28.94)	27 (71.1)	38	26 (48.14)	28 (51.85)	54
	Don't know	9 (30)	21 (70)	30	4 (28.57)	10 (71.42)	14	6 (75)	8 (25)	14
8	COVID-19 infection is caused by									
	Bacteria	20 (86.95)	3 (13.04)	23	3 (75)	1 (25)	4	3 (50)	3 (50)	6
	Virus	17(30.35)	39 (69.6)	56	42 (42.85)	56 (57.15)	98	44 (51.16)	42 (48.83)	86
	Don't know	2 (50)	2 (50)	4	-	-	-	1 (33.33)	2(66.66)	3
9	The Virus responsible for COVID-19 is									
	Ebola	20 (90.9)	2 (9.09)	22	6 (75)	2 (25)	8	4 (44.4)	5 (55.55)	9
	SARS-COV-2	6 (23.07)	20(76.9)	26	21 (37.5)	35 (62.5)	56	35	33	68

	None of these	13 (37.14)	22(62.8)	35	18 (47.36)	20 (52.63)	38	(51.4) 9 (50)	(48.52) 9 (50)	18
10	Corona virus was first identified in which decade?									
	1960's	2 (50)	2 (50)	4	5 (55.55)	4 (44.44)	9	18 (45)	22 (55)	40
	1970's	9 (29.03)	22(70.9)	31	18 (54.54)	15 (45.45)	33	14 (51.85)	13 (48.14)	27
	1980's	24(57.1)	18(42.8)	42	15 (40.54)	22 (59.45)	37	15 (62.5)	9 (37.5)	24
	1950's	4 (66.66)	2 (33.33)	6	7 (30.4)	16 (69.6)	23	1 (25)	3 (75)	4
11	Corona virus was first seen in 2002 in									
	China	24(38.0)	39(61.9)	63	37 (44.57)	46 (55.42)	83	37 (45.12)	45 (54.87)	82
	Saudi Arabia	2 (40)	3 (60)	5	3 (50)	3 (50)	6	3 (100)	-	3
	Iran	3 (75)	1(25)	4	2 (50)	2 (50)	4	6 (85.71)	1 (14.28)	7
	America	10 (90.9)	1 (9.09)	11	3 (33.3)	6 (66.7)	9	2 (66.66)	1 (33.33)	3
12	The name of corona virus was originated from									
	English	9 (32.14)	19(67.8)	28	16 (34.70)	30 (65.21)	46	25 (45.45)	30 (54.54)	55
	Hindi	4 (66.66)	2 (33.33)	6	8 (88.88)	1 (11.11)	9	2 (100)	-	2
	Latin	24 (55.8)	19 (44.1)	43	17 (39.53)	26 (60.46)	43	18 (52.94)	16 (47.05)	34
	None	2 (33.33)	4 (66.66)	6	4 (100)	-	4	3 (75)	1 (25)	4
13	Types of corona virus found in humans are									
	HCoV-NL63	1 (16.66)	5 (83.33)	6	4 (14.28)	24 (85.71)	28	5 (71.42)	2 (28.57)	7
	MERS-CoV	2 (66.66)	1 (33.33)	3	11 (81.61)	2 (15.38)	13	4 (100)	-	4
	SARS-CoV	35(47.9)	38(52.0)	73	18 (40.90)	26 (59.10)	44	28 (42.42)	38 (57.57)	66
	All of the above	-	1 (100)	1	12 (70.6)	5 (29.4)	17	11 (61.11)	7 (38.88)	18
14	Corona virus was first spread in									
	Beijing	5 (22.72)	17(77.2)	22	2 (18.18)	9 (81.82)	11	6 (27.27)	16 (72.72)	22
	Shanghai	4 (44.44)	5 (55.55)	9	15 (50)	15 (50)	30	1 (10)	9 (90)	10
	Wuhan, Hubei	27(55.1)	22(44.8)	49	24 (43.63)	31(56.3)	55	41 (67.21)	20 (32.78)	61
	Tianjin	3(100)	-	3	4(66.66)	2 (33.33)	6	-	2(100)	2
15	Corona virus is related to									
	SARS	16(41.0)	23(58.9)	39	26 (41.95)	36(58.0)	62	34 (53.1)	30(46.8)	64
	MERS	2 (50)	2 (50)	4	4 (66.66)	2 (33.34)	6	2 (100)	-	2
	Both a and b	7 (43.75)	9 (56.25)	16	5 (27.77)	13(72.2)	18	8 (42.10)	11(57.8)	19
	None	14 (58.3)	10(41.6)	24	10 (62.5)	6 (37.5)	16	4 (40)	6 (60)	10
16	Declared COVID-19 as a pandemic									
	UN	11 (100)	-	11	6 (66.66)	3 (33.34)	9	19 (63.3)	11(36.6)	30
	UNICEF	8 (36.36)	14(63.6)	22	13 (54.16)	11(45.8)	24	9(40.9)	13(59.0)	22
	UNDP	1 (20)	4 (80)	5	3 (100)	-	3	1 (50)	1 (50)	2
	WHO	17(37.7)	28(62.2)	45	23 (34.84)	43(65.1)	66	38 (95.1)	3 (7.31)	41
17	The structure of corona virus in microscope is viewed like									
	Ring	24(52.1)	22(47.8)	46	12 (37.5)	20 (62.5)	32	15 (48.38)	16 (51.61)	31
	Crown	12 (48)	13 (52)	25	22 (47.8)	24 (52.2)	46	32 (55.17)	26 (44.82)	58

	China map	1 (12.5)	7 (87.5)	8	6 (66.7)	3 (33.3)	9	1 (16.66)	5 (83.33)	6
	Nepal map	1 (25)	3 (75)	4	5 (33.1)	10 (66.7)	15	-	-	-
18	COVID-19 is an infectious disease									
	Yes	30(42.2)	41(57.7)	71	31(37.3)	52 (62.7)	83	40 (45.97)	47 (54.02)	87
	No	5 (71.42)	2 (28.57)	7	11(73.4)	4 (26.6)	15	8 (100)	-	8
	Don't know	3 (60)	2 (40)	5	3 (75)	1 (25)	4	-	-	-
19	The main route of transmission is COVID-19 is									
	Respiratory tract	33 (44)	42 (56)	75	15 (23.1)	50 (76.9)	65	47 (52.8)	42(47.1)	89
	Water	2 (66.6)	1 (33.33)	3	1 (33.3)	2(66.7)	3	-	-	-
	Food	1 (100)	-	1	4 (57.2)	3 (42.8)	7	-	1 (100)	1
	Don't know	4 (100)	-	4	25 (92.6)	2 (7.4)	27	1 (20)	4 (80)	5
20	COVID-19 transmission occurs with contact of contaminated surfaces									
	Yes	31(42.4)	42(66.6)	73	30 (36.58)	52(63.4)	82	32 (45.71)	38 (54.28)	70
	No	5 (83.33)	1 (16.66)	6	11 (73.4)	4 (26.6)	15	10 (71.42)	4(28.5)	14
	Don't know	2 (50)	2 (50)	4	4 (80)	1 (20)	5	6 (54.54)	5(45.4)	11
21	Human becomes infected with a COVID-19 from animal source									
	Yes	18 (40)	27 (60)	45	26 (33.4)	52 (66.6)	78	28(41.7)	39 (58.20)	67
	No	17(51.5)	16(48.4)	33	9 (69.3)	4 (30.7)	13	9 (60)	6 (40)	15
	Don't know	3 (60)	2 (40)	5	10 (90.9)	1 (9.1)	11	6 (46.15)	7(53.8)	13
22	Incubation period of COVID-19 is									
	1-4 days	3 (50)	3 (50)	6	2 (40)	3 (60)	5	8 (80)	2 (20)	10
	5-9 days	12 (80)	3 (20)	15	10 (66.7)	5 (33.3)	15	9(56.25)	7(43.75)	16
	More than 14 days	19(33.3)	38(66.6)	57	24 (32.8)	49 (67.2)	73	30(44.1)	38(55.8)	68
	Don't know	5 (100)	-	5	9 (100)	-	9	1 (100)	-	1
23	COVID-19 appears like the seasonal flu									
	Yes	5 (26.31)	14(73.6)	19	11 (44)	14 (56)	25	14(38.8)	22(61.1)	36
	No	17(60.7)	11(39.2)	28	18 (38.3)	29 (61.7)	47	10(43.4)	13(56.5)	23
	May be	8 (50)	8 (50)	16	5 (83.3)	1 (16.7)	6	24(66.6)	12(33.3)	36
	Don't Know	7 (35)	13 (20)	20	11 (45.8)	13(54.2)	24	-	-	-
24	Corona virus can survive up to 72 hours in									
	Plastics	1 (9.09)	10(90.9)	11	10 (43.5)	13(56.5)	23	16 (55.1)	13(44.8)	29
	Stainless steel	6 (42.85)	8(57.14)	14	13 (52)	12 (48)	25	12 (48)	13 (52)	25
	Paper	3 (37.5)	5 (62.5)	8	9 (64.3)	5 (35.7)	14	3 (100)	-	3
	Clothes	29 (58)	2 (42)	50	7 (17.5)	33(82.5)	40	17 (44.7)	2(55.26)	38
25	The COVID-19 virus is prone to									
	The older	4 (57.14)	3(42.85)	7	2 (25)	6 (75)	8	5 (71.42)	2(28.57)	7
	Younger adult	2 (28.57)	5(71.42)	7	3 (60)	2 (40)	5	15 (55.5)	12(44.4)	27
	People of all age	5 (35.71)	9(64.28)	14	9 (69.3)	4 (30.7)	13	8 (44.44)	10(55.5)	18
	All of the above	5 (35.71)	9(64.28)	14	7 (26.9)	19(73.1)	26	6 (85.71)	1 (14.28)	7
	Don't know	23(56.0)	18(43.9)	41	24 (48)	26 (52)	50	23 (63.3)	13(36.1)	36
26	First case of COVID-19 was discovered in									
	Sep, 2019	6 (46.15)	7(53.84)	13	13 (56.5)	10(43.5)	23	7(58.3)	5 (41.66)	12
	Oct, 2019	4 (50)	4 (50)	8	14 (77.7)	4 (22.3)	18	3 (60)	2 (40)	5

	Dec, 2019	14(37.8)	23(62.1)	37	12 (25.53)	35(74.5)	47	24 (48)	26 (52)	50
	None of these	13 (52)	12 (48)	25	6 (48)	8 (57.1)	14	14 (50)	14 (50)	28
27	COVID-19 affects pregnant women									
	Yes	30(49.1)	31(50.8)	61	30 (54.5)	55(45.5)	85	39 (51.3)	37(48.6)	76
	No	6 (42.85)	8(57.14)	14	-	-	-	8 (47.05)	9 (52.94)	17
	Don't know	4 (50)	4 (50)	8	10 (58.9)	7 (41.2)	17	1 (50)	1 (50)	2
28	Health workers are at higher risk for covid-19 infection									
	Yes	32(47.7)	35(52.2)	67	34 (38.2)	55(61.8)	89	37 (45.6)	44(54.3)	81
	No	1 (50)	1 (50)	2	1(100)	-	1	1 (33.33)	2 (66.66)	3
	Either	4 (57.1)	3(42.85)	7	6 (85.7)	1 (14.3)	7	1 (100)	-	1
	Don't know	3 (42.85)	4(57.14)	7	4 (80)	1 (20)	5	9 (90)	1 (10)	10
29	All infected individuals with COVID-19 develop sign and symptoms									
	Yes	26(48.1)	28(51.8)	54	27 (42.2)	37(57.8)	64	30 (43.4)	39(56.5)	69
	No	11 (44)	14 (56)	25	11 (36.6)	19(63.4)	30	16 (72.7)	6 (27.27)	22
	Don't know	2 (50)	2 (50)	4	7 (87.5)	1 (12.5)	8	1 (25)	3 (75)	4
30	Main clinical manifestations of COVID-19 is									
	Fever and dry cough	34(45.9)	40(54.0)	74	29 (34.6)	52(65.4)	81	44(50)	44 (50)	88
	Fatigue	2 (100)	-	2	3 (42.8)	4 (57.2)	7	-	-	-
	Stuffy and running nose	-	1 (100)	1	6 (85.7)	1 (14.3)	7	2 (50)	2 (50)	4
	Back-pain	-	3 (100)	3	-	-	-	1 (100)	-	1
	Diarrhoea	-	1 (100)	1	2 (100)	-	2	1 (50)	1 (50)	2
	Don't know	2 (100)	-	2	5 (42.8)	-	5			
31	Common cold, stuffy nose, running nose and sneezing are more common in persons infected with covid-19 infections									
	Yes	17(47.2)	19(52.7)	36	27 (42.8)	36(57.2)	63	21 (38.8)	33 (61.11)	54
	No	18(40.9)	2(59.09)	44	14 (43.75)	18(56.2)	32	20 (58.8)	14(41.17)	34
	Don't know	3 (100)	-	3	4 (57.1)	3 (42.9)	7	3 (42.8)	4 (57.14)	7

Likewise, more than half of NHRDA students (52.94%) obtained their knowledge from radio and television, followed by health professionals (29.54%), and only a small percentage (1.96%) through social media. Similarly, 57.89% MTA students got their information from their family, followed by radio and television (34.73%) and friends (1.05%). The results are shown in table 1.

All of the students were aware of the COVID-19 infection at NHRDA and MTA, with the exception of 3.61% CMC students. The majority of students (42.18% of boys and

57.81% of girls) at NHRDA responded correctly to the question "COVID-19 is an epidemic declared by public health emergency of international concern", followed by students at CMC and MTA.

The majority of MTA students correctly answered that the COVID-19 infection is caused by the SARS-COV-2 virus, with 51.47% of males and 48.52% of girls, followed by responses from NHRDA and CMC. More MTA students (42.10% boys and 57.84% girls) correctly identified the corona virus is related to SARS and MERS, which were

followed by the students of at NHRDA and CMC.

A large percentage of MTA students 52.80% boys and 47.19% girls responded that the respiratory tract is the primary route by which COVID-19 infections are spread, followed by the students from CMC and NHRDA. The majority of students from NHRDA (38.2% boys, 61.8% girls), followed by students from MTA and CMC correctly answered the question about how health workers are more likely to contract COVID-19 infection. The majority of MTA research participants correctly responded fever and dry cough as the primary clinical signs of COVID-19, followed by students from NHRDA and CMC. The results are depicted in table 2a.

A majority of MTA students 51.72% boys and 48.27% girls gave the right answer the human corona is attacked in the lungs followed by similar percentage of students from CMC and NHRDA. When asked whether eating or coming into contact with wild animals would cause infection by the COVID-19 virus, more students from MTA 50.76% boys and 49.23% girls responded correctly followed by students from NHRDA and CMC. On the RT-PCR test for the corona virus, the majority of study participants from MTA (52.27% boys and 47.72% girls) gave the correct answer followed by students from NHRDA and CMC. Similarly, the majority of MTA students responded "yes" with the correct response being given by 54.16% of girls and 45.83% of boys on the importance of non-pharmacological methods of prevention for the COVID-19 that was chased by students of NHRDA and CMC.

Majority of the students 52.77% of the boys and 47.22% girls of CMC and equal

percentage of MTA and NHRDA students correctly identified hand washing as rubbing hands in soap and water for 20 seconds as a means of reducing COVID-19 transmission. The majority of MTA participants 59.70% boys and 40.29% girls gave the correct answer to the question on what PPE consists, which includes a hazmat suit, gloves, a face shield, a N95 mask, face shield. Students from NHRDA and CMC followed in second and third, respectively. The majority of students from NHRDA, including 47.9% of boys and 52.1% of girls, correctly answered a question about the PiCoVacc vaccine, which was collaboratively produced by the German company BioNTech followed by the students of MTA and CMC. The majority of students from NHRDA of 54.4% boys and 45.6% girls gave the right answer to the question on plasma therapy, a clinical trial in which blood is transported from recovered COVID-9 patients who are in a critical condition. MTA and CMC students followed in second and third, respectively. Table 2b summarizes results.

Figure 1 display the knowledge scores of HA students from CMC, NHRDA, and MTA. Most students from all colleges received satisfactory scores on the COVID-19 knowledge test, with the highest scores being scored by 22 first-year CMC students, followed by 13 second-year and 11 third-year students.

There was negative association of score of knowledge between 1st, 2nd and 3rd year CMC students and MTA students of $p=0.96$ and $p=0.11$ respectively. However, there was positive association of score of knowledge between 1st, 2nd and 3rd year NHRDA students ($p=0.01$) as depicted in table 4.

Table 2b: Knowledge regarding COVID-19 among study population

S. No.	Knowledge	Gender (CMC)		Total N=83	Gender (NHRDA)		Total N=102	Gender (MTA)		Total N=95
		Boys (%)	Girls (%)		Boys (%)	Girls (%)		Boys (%)	Girls (%)	
1	Immune Cells involved in COVID-19									
	CD4+ T cells	7 (46.66)	8(53.33)	15	7(33.3)	14 (66.7)	21	3 (25)	9 (75)	12
	CD8+ T cells	8 (36.66)	14(63.3)	22	7(58.3)	5 (41.7)	12	14(77.77)	4 (22.22)	18
	NK Cells	10(41.66)	14(58.3)	24	20 (43.5)	26 (56.5)	46	18 (50)	18 (50)	36
	All of the above	12(54.54)	10(45.4)	22	11 (47.8)	12 (52.2)	23	13(44.82)	16 (55.17)	29
2	Part of human is attacked in COVID-19 Infection									
	Brain	3 (75)	1 (25)	4	3 (13.6)	19 (86.4)	22	2 (100)	-	2
	Lungs	31(46.26)	36(53.7)	67	34 (50.7)	33 (49.3)	67	45 (51.72)	42 (48.27)	87
	Heart	3 (30)	7 (70)	10	8 (61.5)	5 (38.5)	13	-	3 (100)	3
	Kidney	1 (50)	1 (50)	2	-	-	-	1 (33.33)	2 (66.66)	3
3	Early symptomatic and supportive treatment can help most patients to recover from COVID-19 infection									
	Yes	28(41.17)	40(58.8)	68	28 (35)	52 (65)	80	44(51.16)	42 (48.83)	86
	No	6 (60)	4 (40)	10	13 (76.5)	4 (23.5)	17	1(16.66)	5(83.33)	6
	Don't know	3 (60)	2 (40)	5	4 (80)	1 (20)	5	3 (100)	-	3
4	Elderly having chronic illness and obese are more susceptible towards severe COVID-19									
	Yes	32(50.79)	31(49.2)	63	24 (36.4)	42 (63.6)	66	41(52.56)	37 (47.43)	78
	No	2 (28.5)	5 (71.4)	7	12 (46.15)	14 (53.8)	26	3 (30)	7 (70)	10
	Don't know	5 (38.46)	8(61.53)	13	9 (90)	1 (10)	10	4 (57.14)	3 (42.85)	7
5	Eating or contacting wild animals would result in COVID -19 infection									
	Yes	18 (46.15)	21 (53.84)	39	22 (34.9)	41 (65.1)	63	33 (50.76)	32 (49.23)	65
	No	16 (53.33)	14 (46.66)	30	20 (64.5)	11 (35.5)	31	8 (42.19)	11 (57.89)	19
	Don't know	7 (50)	7 (50)	14	3 (37.5)	5 (62.5)	8	5 (55.55)	4 (44.44)	9
6	COVID-19 asymptomatic cases cannot spread to others									
	Yes	15 (44.11)	19 (55.88)	34	13 (36.1)	23 (63.9)	36	19 (51.35)	18 (48.64)	37
	No	18 (50)	18 (50)	36	21 (44.6)	26 (55.3)	47	26 (54.16)	22 (45.83)	48
	Don't know	6 (46.15)	7(53.84)	13	11 (57.9)	8 (42.1)	19	3 (30)	7 (70)	10
7	The laboratory test done for corona virus is									
	RT-PCR	28(44.44)	35(55.5)	63	34 (39.5)	52 (60.5)	86	46 (52.27)	42 (47.72)	88
	ELISA	4 (44.44)	5 (55.55)	9	2 (100)	-	2	-	2 (100)	2
	GFR-Test	3 (60)	2 (40)	5	-	-	-	-	-	-
	None of these	4 (66.66)	2(33.33)	6	7 (50)	7 (50)	14	2 (40)	3 (60)	5

8	Potential drug for COVID-19 treatment									
	Hydroxychloroquine	13(48.1)	14(51.8)	27	28 (59.6)	19 (40.4)	47	32(59.25)	22 (40.74)	54
	Remdesivir	6 (33.33)	12(66.6)	18	7 (28)	18 (72)	25	2 (12.5)	10 (83.33)	12
	Azithromycin	19 (50)	19 (50)	38	18 (60)	12 (40)	30	14(48.27)	15 (51.72)	29
9	Non-pharmacological method of prevention is important for COVID-19									
	Yes	16(48.48)	11(33.3)	33	20 (42.6)	27 (57.4)	47	22(45.83)	26 (54.16)	48
	No	14(45.16)	17(54.8)	31	24 (48)	26 (52)	50	19(54.28)	16 (45.71)	35
	Don't know	10(52.63)	9 (47.36)	19	1 (20)	4 (80)	5	7 (58.33)	5(41.66)	12
10	Prevention of COVID-19 can be made by									
	Drinking safe water	8 (40)	12 (60)	20	5 (50)	5 (50)	10	1 (100)	-	1
	Washing hand in proper way	23 (47.91)	25(52.0)	48	10 (55.6)	8 (44.1)	18	5 (35.71)	9 (64.28)	14
	Using mask	8 (53.33)	7 (46.66)	15	15 (37.5)	25 (62.5)	40	30(55.55)	24 (44.44)	54
	Both a and b	-	-	-	15 (44.1)	19 (55.9)	34	12(46.15)	14 (53.84)	26
11	Physical distancing according to WHO recommendation is									
	3 feet	20 (50)	20 (50)	40	6 (21.4)	22 (78.6)	28	20 (40)	30 (60)	50
	2 feet	5 (26.31)	14(73.6)	19	8 (24.2)	25 (75.8)	33	18(56.25)	14 (43.75)	32
	4 feet	5 (45.45)	6 (54.54)	11	17(78.8)	7 (29.2)	24	6 (75)	2 (25)	8
	None of these	7 (70)	3 (30)	10	13(86.7)	2 (13.3)	15	4 (80)	1 (20)	5
	Don't know	2 (66.66)	1 (33.33)	3	1 (50)	1 (50)	2	-	-	-
12	Method of hand hygiene to reduce COVID-19 transmission is									
	Hand rub with soap and water for 20 seconds	19(52.77)	17(47.2)	36	28 (50)	28 (50)	56	23 (50)	23 (50)	56
	Hand rub with soap and water for 1 minutes	21(44.68)	26(55.3)	47	17(36.9)	29 (63.1)	46	25(64.10)	14 (35.89)	39
13	Hand sanitizer is effective against COVID-19									
	Yes	30(43.47)	39(56.5)	69	14(21.2)	52 (78.8)	66	44(52.38)	40 (47.61)	84
	No	7 (63.63)	4 (36.36)	11	3 (37.5)	5 (62.5)	8	3 (30)	7 (70)	10
	Don't know	1 (33.3)	2 (66.66)	3	28 (100)	-	28	1 (100)	-	1
14	Use of gloves can be used as preventive measures during COVID-19									
	Yes	35(46.05)	41(53.9)	76	37 (41.1)	53 (58.9)	90	44 (49.43)	45 (50.56)	89
	No	2 (66.66)	1 (33.33)	3	4 (80)	1 (20)	5	3 (60)	2 (40)	5
	Don't know	2 (50)	2 (50)	4	4 (57.1)	3 (42.9)	7	1 (100)	-	1
15	Prevention of COVID-19 can be made by using disinfectant sprays, wipes, sanitizers or liquids on skin									
	Yes	27(47.36)	30(52.6)	57	27 (40.3)	40 (59.7)	67	42(49.41)	43 (50.58)	85
	No	8 (38.09)	13(61.9)	21	18 (72)	7 (28)	25	5 (100)	-	5
	Don't know	3 (60)	2 (40)	5	-	10 (100)	10	1 (20)	4 (80)	5
16	Personal Protective Equipment (PPE) includes									
	Head cover, shoes cover, N95 mask, goggles, face shield, gloves, hazmat suit	20(54.0)	17(45.9)	37	26 (48.1)	28 (51.9)	54	40(59.70)	27 (40.29)	67

	Head cover, shoes cover, N95 mask	7 (46.66)	8 (53.33)	15	8 (80)	2 (20)	10	2 (33.33)	4 (66.66)	6
	Hazmat suit, gloves, surgical gown, face mask	4 (28.57)	10(71.4)	14	4 (21.1)	15 (78.9)	19	5 (26.31)	14 (73.68)	19
	Triple layer mask, N95 mask, shoe cover	8 (47.05)	9 (52.94)	17	7 (36.8)	12 (63.2)	19	1 (33.33)	2 (66.66)	3
17	N95 mask is discarded in									
	Red	12(46.15)	14(53.8)	26	15 (65.2)	8 (34.8)	23	4 (57.14)	3 (42.85)	7
	Yellow	4 (50)	4 (50)	8	6 (50)	6 (50)	12	14(63.63)	8 (36.36)	22
	Blue	10(37.03)	17(62.9)	27	8 (47.1)	9 (52.9)	17	10(55.55)	8 (44.44)	18
	White	12(54.54)	10(45.4)	22	16 (32)	34 (68)	50	20(41.66)	28 (58.33)	48
18	General surgical masks can prevent the infection from COVID-19 virus									
	Yes	32(42.66)	43(57.3)	75	25 (32.1)	53 (67.9)	78	4 (49.39)	4 (50.60)	83
	No	4 (100)	0	4	20 (83.3)	4 (16.7)	24	3 (42.85)	4 (57.14)	7
	Don't know	2 (50)	2 (50)	4	-	-	-	4 (80)	1 (20)	5
19	Effective COVID-19 vaccines, treatments, and prevention measures are available									
	Yes	27(46.55)	31(53.4)	58	21 (32.81)	43 (67.18)	64	33(53.22)	29 (46.77)	62
	No	7 (36.84)	12(63.1)	19	19 (73.1)	7 (26.9)	26	7 (33.33)	14 (66.66)	21
	Don't know	4 (66.66)	2 (33.33)	6	10 (83.3)	2 (16.7)	12	7 (63.63)	4 (36.36)	11
20	Eating garlic and onions can prevent transmission of COVID-19									
	Yes	13(40.62)	19(59.3)	32	12 (24)	38 (76)	50	27(40.90)	39 (59.09)	66
	No	23(56.09)	18 (43.9)	41	23 (63.9)	13 (36.1)	36	17(94.44)	1 (5.55)	18
	Don't know	3 (30)	7 (70)	10	12 (75)	4 (25)	16	4 (36.36)	7 (63.63)	11
21	1st case of COVID-19 was found in Nepal on									
	Jan-23, 2020	11 (50)	11 (50)	22	11 (39.3)	17 (60.7)	28	19(52.77)	17 (47.22)	36
	May-24, 2020	9 (47.36)	10(52.6)	19	22 (44.9)	27 (55.1)	49	19(44.18)	24 (51.16)	43
	Don't know	18(42.85)	24 (57.1)	42	22 (88)	3 (12)	25	8 (50)	8 (50)	16
22	Fatality rate of COVID-19 is									
	9.6%	11 (40.74)	16 (59.25)	27	6 (31.6)	13 (68.4)	19	11 (50)	11 (50)	22
	10%	9 (50)	9 (50)	18	19 (50)	9 (50)	38	9 (40.90)	13 (59.09)	22
	8%	5 (55.55)	4 (44.44)	9	15 (57.8)	11 (42.3)	26	16(50.25)	11 (40.74)	27
	Don't know	13(44.82)	16(55.1)	29	5 (26.3)	14 (73.7)	19	12 (50)	12 (50)	24
23	In which country maximum number of people died due to COVID-19 infection									
	Nepal	5 (62.5)	3 (37.5)	8	1 (50)	1 (50)	2	2 (100)	-	2
	India	3 (60)	2 (40)	5	5 (35.7)	9 (64.3)	14	-	5 (100)	5
	Italy	17(44.7)	21(55.2)	38	13 (29.5)	31 (70.5)	44	26(53.06)	23 (46.93)	49
	United States (US)	13(40.62)	19(59.3)	32	26	16 (38.1)	42	20(51.28)	19 (48.71)	39

					(61.9)					
24	Globally mortality rate from COVID-19 is below 5%									
	Yes	13(56.52)	10(43.4)	23	25 (61)	16 (39)	41	19(52.77)	17 (47.22)	36
	No	14(51.85)	13(48.1)	27	14 (28)	36 (72)	50	25 (62.5)	15 (37.5)	40
	Don't know	10(30.30)	23(69.6)	33	6 (54.5)	5 (45.5)	11	4 (21.05)	15 (78.94)	19
25	The place more vulnerable towards COVID-19 in Nepal									
	Pokhara	4 (66.66)	2 (33.33)	6	2 (3.5)	55 (96.5)	57	39(95.12)	2 (4.8)	41
	Kathmandu	18(31.57)	39(68.4)	57	27 (96.4)	1 (3.6)	28	5 (13.15)	33 (86.84)	38
	Birgunj	14 (87.5)	2 (12.5)	16	1 (50)	1 (50)	2	4 (26.66)	11 (73.33)	15
	Janakpur	2 (50)	2 (50)	4	15(100)	-	15	-	1 (100)	1
26	Countries suffering from novel corona virus outbreak in the world are									
	More than 25	9 (42.85)	12 (57.14)	21	2 (11.1)	16 (88.9)	18	8 (66.66)	4 (33.33)	12
	More than 50	16(48.48)	17(51.5)	33	21 (56.8)	16 (43.2)	37	13(48.14)	14 (51.85)	27
	More than 100	4 (33.33)	8 (66.66)	12	4 (22.2)	14 (77.8)	18	8 (47.05)	9 (52.94)	17
	More than 150	9 (52.94)	8 (47.05)	17	18 (62.1)	11 (37.9)	29	19(48.71)	20 (51.28)	39
27	The discovery of first COVID-19 vaccine was announced by									
	India	3 (60)	2 (400)	5	-	17 (100)	17	-	-	-
	USA	3 (25)	9 (75)	12	5 (17.8)	23 (82.1)	28	10 (62.5)	6 (37.5)	16
	United Kingdom	9 (56.25)	7(43.7)	16	11 (39.3)	17 (60.7)	28	21 (70)	9 (30)	30
	China	23 (46)	27 (54)	50	29(100)	-	29	17(34.69)	32 (65.3)	49
28	The vaccine jointly developed by the German company BioNTech is									
	BNT 162	18(46.15)	21 (53.84)	39	13 (50)	13 (50)	26	16 (40)	24 (60)	40
	PiCoVacc	8 (47.05)	9 (52.94)	17	23 (47.9)	25 (52.1)	48	19 (82.6)	4 (17.39)	23
	Both a and b	12(44.44)	15(55.5)	27	9 (32.1)	19 (67.9)	28	13(40.62)	19 (59.37)	32
29	Clinical trial in which blood is transport from recovered COVID-19 patients is known as									
	Plasma therapy	17(38.63)	27(61.3)	44	37 (54.4)	31 (45.6)	68	26(44.82)	32 (55.17)	58
	Gene therapy	4 (66.66)	2 (33.33)	6	8 (100)	0	8	4 (57.14)	3 (42.85)	7
	Blood Transfusion	5 (62.5)	3 (37.5)	8	3 (30)	7 (70)	10	1 (50)	1 (50)	2
	Immunoglobulin replacement therapy	15 (60)	10 (40)	25	4 (25)	11 (75)	16	17(65.38)	9 (34.61)	26
30	Lockdown in Nepal due to COVID-19 pandemic started on									
	24 March, 2020	7 (63.63)	4 (36.36)	11	9 (32.1)	19 (67.9)	28	21 (84)	4 (16)	25
	23 March, 2020	18(38.29)	29 (61.7)	47	24 (42.9)	32 (57.1)	56	12(30.76)	27 (69.23)	39
	25 March, 2020	10(58.82)	7 (41.17)	17	6 (60)	4 (40)	10	11 (55)	9 (45)	20
	Don't know	4 (50)	4 (50)	8	6 (75)	2 (25)	8	4(36.3)	7 (63.63)	11
31	The Zone referred as hotspot during corona									
	Red zone	30(45.45)	36(54.5)	66	25(33.8)	49 (66.2)	74	40(52.63)	36 (47.36)	76
	Orange zone	3 (33.33)	6 (66.66)	9	9 (75)	3 (25)	12	11 (25)	3 (75)	4
	Green zone	5 (62.5)	3(37.5)	8	5 (50)	5 (50)	10	4 (36.36)	7 (63.63)	11
	Yellow zone	-	-	-	6 (100)	-	6	3 (75)	1 (25)	4

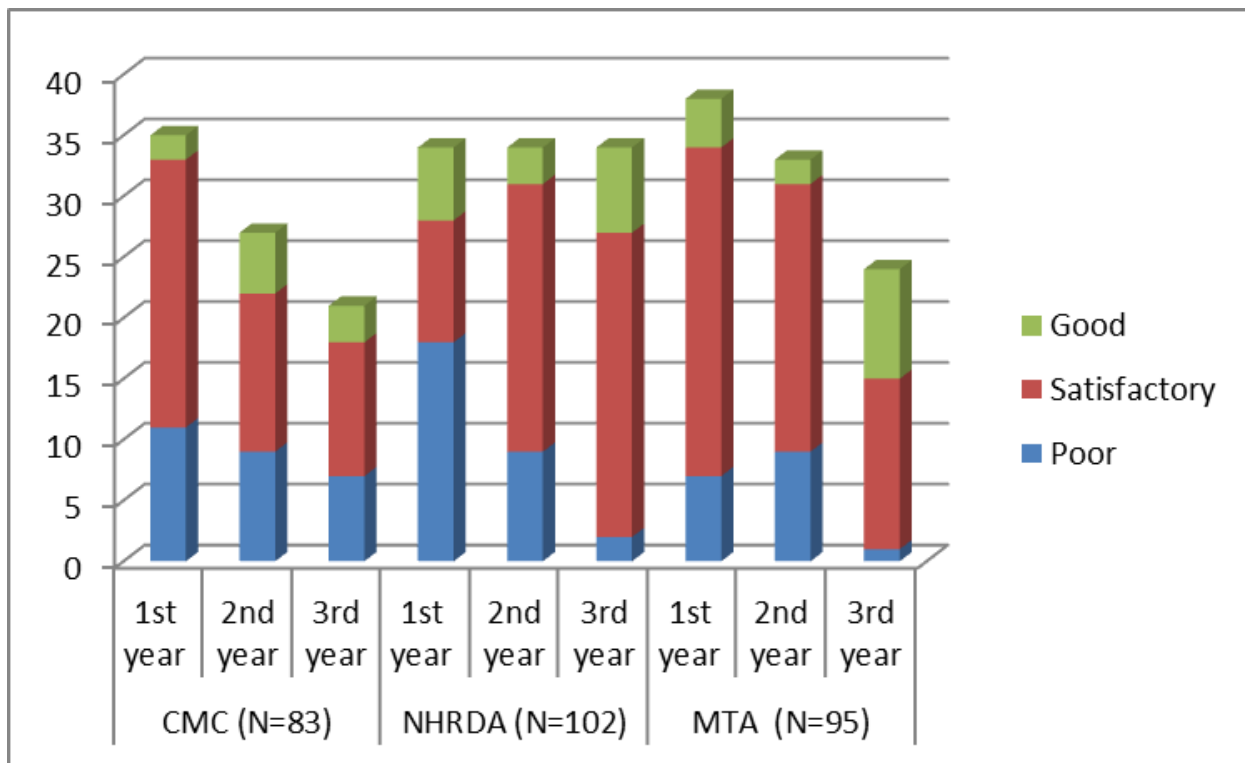


Fig 1: Comparative status of knowledge among different years of HA student

Table 4: Association of knowledge score in the different year HA students

Score	CMC HA students			Total	p-value
	1st year	2nd year	3rd year		
Poor	11	9	7	27	0.96
Satisfactory	22	13	11	46	
Good	2	5	3	10	
Total	35	27	21	83	
NHRDA HA students					
Poor	18	9	2	29	0.01
Satisfactory	10	22	25	57	
Good	6	3	7	16	
Total	34	34	34	102	
MTA'S HA students					
Poor	7	9	1	17	0.11
Satisfactory	27	22	14	63	
Good	4	2	9	15	
Total	38	33	24	95	

DISCUSSION

The World Health Organization (WHO) stated the Chinese outbreak of Novel corona virus as a public health emergency globally. Doctors, nurses, and paramedics working in the healthcare industry are more likely to acquire an infection while treating COVID patients [13]. The goal of this study was to evaluate the knowledge of the COVID-19 among health assistant students.

In the current study, a total of 280 students were enrolled, of them 95 were from MTA, 102 were from NHRDA, and 83 were from CMC. In total, there were 46.98% boys and 53.01% girls from CMC, 44.11% boys and 55.88% girls of NHRDA, while 50.52% boys and 49.47% girls of MTA. Due to the absence of students on the day of data collection, there may be a discrepancy between that study populations. The vast majority of CMC and NHRDA were female participants, with the exception of MTA. This could be attributed to the slogan "*Beti Bachau, Beti Padhau*," in the Madhesh Province of Nepal, which raises parent's awareness on the importance of female education. Similar type of study was carried out by Khedr et al., [14] among paramedical undergraduate and supplemental education students at Benha Health Technical Institute in Egypt. This is in line with our findings as well as those of Jha et al., [11] among undergraduate medical and dentistry students at KIST Medical College in Lalitpur, Nepal and Umar et al., [15] among students at Baptist High School in Lafia, Nigeria.

Nearly all of students who studied at NHRDA were under 20 years old, followed by those at MTA and CMC. The current study is compatible with a study of Umar et al., [15] but in contrast to Jha et al., [11]. The prospect

might be that CTEVT, Nepal offers admittance to short-term programs focusing on skill development for the production of technical competent workforce and skillful human resources required to the nation. Students here typically pass the Secondary Education Examination (SEE) exam between the ages of 15 and 16 years and after completing the HA course, individuals are eligible for registration in grade "B" in the Nepal Health Professional Council (NHPC), which authorizes them to work as a mid-level health worker in any government or non-government hospitals, nursing homes, and health institutions.

The current study reveals that more CMC students heard about COVID-19 from social media, while most NHRDA and MTA students knew about it from radio and television rather than from friends and health professionals. This is in line with the research conducted in 2020 by Umar S et al., [15]. It's possible that after the pandemic crisis, the world embraced digital revolution and quickly switched to social media to find support and information about health care and its related information through online networks and communities through Instagram, Whats app, Twitter, Facebook and its linked Messenger, WeChat, etc. However, the WHO asserted that fighting an epidemic is more difficult than fighting an infodemic. Social media fake news is just as dangerous and spreads quicker and more readily than the COVID-19 virus [16,17]. Likewise, radio and television are the particularly important means of mass media for the community and its cultural life. In the event of a disaster or an emergency situation, radio and television is the first and often the reliable medium for informing the public. The COVID pandemic makes it very clear that especially radio,

television and quality media are important in disaster situations to inform the population [18].

All students were aware of the COVID-19 infection at various colleges, except few students at CMC. The majority of NHRDA students responded correctly to the question about the COVID-19 epidemic being a public health emergency of global importance. The findings are in accordance with Khedr et al.; Saefi et al.; Padmanaban et al., [12,14,19]. This may be related with the notion that as the number of laboratory-confirmed cases and fatalities from COVID-19 continue to raise, researchers, doctors, and other healthcare professionals are being compelled to learn more about the epidemiology of the novel virus and the pandemic situation.

The majority of MTA students (51.47% boys and 48.52% girls) correctly identified the SARS-CoV-2 virus as the source of the COVID-19 infection followed by students of NHRDA and CMC. Contrarily, a study by Khedr et al., [14] found that students in complementary education had a much larger proportion of accurate answers than undergraduates regarding the causative agent. The possibility is due to the fact that the first human cases of COVID-19, the corona virus disease caused by SARS-CoV-2, were first reported from Wuhan City, China, in December 2019 [20]. SARS-CoV-2 has a higher reproductive number (R0) than SARS-CoV-1, indicating much more efficient spread [21]. Most clinical presentations are mild, and the typical pattern of covid-19 more resembles an influenza-like illness which includes fever, cough, malaise, myalgia, headache, and taste and smell disturbance rather than severe pneumonia [22]. Several characteristics of SARS-CoV-2 may help to explain this

enhanced transmission. While both SARS-CoV-1 and SARS-CoV-2 preferentially interact with the angiotensin-converting enzyme 2 (ACE-2) receptor, SARS-CoV-2 has structural differences in its surface proteins that enable stronger binding to the ACE 2 receptor [23] and greater efficiency at invading host cells [24]. SARS-CoV-2 also has greater affinity for the upper respiratory tract and conjunctiva [25], thus can infect the upper respiratory tract and can conduct airways more easily [26].

The study demonstrates that a greater percentage of MTA students correctly comprehended how the corona virus is related to the MERS and SARS outbreaks followed by NHRDA and CMC students. This might be as a result of students' knowledge with MERS and SARS. Middle East respiratory syndrome corona virus (MERS-CoV) causes MERS, whereas SARS is brought on by the SARS-associated corona virus (SARS-CoV). SARS-CoV first appeared in China around 20 years ago and quickly spread to other countries. MERS-CoV emerged for the first time in 2012 in Saudi Arabia, spread throughout the Middle East, and was brought by travelers to other countries, including the US, Europe, Africa, and Asia [27].

The majority of MTA students 52.80% of boys and 47.19% of girls replied that the respiratory tract is the primary mode of COVID-19 virus transmission, followed by the students from NHRDA and CMC. Khedr et al., [14] demonstrated that complementary education students had a significantly higher proportion of correct answers compared to undergraduates regarding the mode of transmission of the disease (83.3% Vs 71.5%). This runs counter to the present findings. This may be due to fact that the gut

microbiota is essential for pulmonary immunity and the host's ability to fight against viral respiratory infections [28]. Like other corona viruses, SARS-CoV-2 spreads primarily by contaminated respiratory droplets, with viral infection occurring through direct or indirect contact with nasal, conjunctival, or oral mucosa. The human respiratory tract epithelium, comprising the oropharynx and upper airway, comprises the majority of target host receptors. Infections can also spread through the gastrointestinal and conjunctival tracts and these areas might serve as transmission portals [26]. The probability of transmission is impacted by a wide range of factors, including socioeconomic status, contact history, environment, and host infectiousness [21]. A greater percentage of students from NHRDA followed by MTA and CMC responded correctly when asked whether health workers are at higher risk for COVID-19 infection. This is related to the fact that HCWs served as frontline "Superheroes" during the battle against coronavirus and lost their lives. Understanding and managing their fears and anxieties may hold lessons for handling future outbreaks.

This study shows more number of the study participants of MTA gave correct response of 50% boys and 50% girls on main clinical manifestations of COVID-19 is fever and cough followed by the students of NHRDA and CMC. This is comparable to the studies conducted by Fatah et al., [29], Aldukhayel et al., [30], Maheshwari et al., [31], Quisao et al., [32], Rahman et al., [33] in Egypt, Saudi Arabia, India, Philippines and Bangladesh respectively. Although fever is the most common symptom in COVID-19 patients, the absence of fever at the time of initial screening does not exclude COVID-19 [34].

Fever is a complex cytokine-mediated physiological response that stimulates both the innate and adaptive arms of immunity involving adrenergic stimulation pathways [35]. Regular high fever in COVID-19 is considered to be an indicator of severe infection [36]. Likewise, fever may also have a differential impact in relation to the prognosis during the viral and inflammatory stage of the disease, mimicking the relationship of different stages of immunity to the outcomes [37]. However, the role of fever in COVID-19 has not been studied in large studies [34].

The majority of MTA students (51.72% boys and 48.27% girls) correctly answered the question on how the human corona is assaulted in the lungs, followed by an equal number of students from CMC and NHRDA. The findings are in contrast to Khedr et al., [14]. This can be related to the fact that acute respiratory distress syndrome, also known as ARDS, and pneumonia are two lung problems that COVID-19 may bring on. The lungs and other organs may also suffer long-term damage from sepsis as another potential COVID-19 consequence [38]. The other prospects might be the students had studied about the patho-physiology of COVID-19.

When asked whether eating or coming into contact with wild animals would cause infection by the COVID-19 virus, more students from MTA 50.76% of boys and 49.23% of girls responded correctly. Students from NHRDA and CMC were closest. The study carried out by Maheshwari et al., [31] is in contradiction to present findings. This could be as a result of human encroachment on wildlife habitats, livestock, exotic pet trade, wildlife farming and trade, and livestock trade as pandemic risk factors. The

associations of 226 viruses are known to cause zoonotic diseases in humans across more than 800 mammal species. One of the previous study found that mammals employed in the trade of wild animals harboured about 75% of the zoonotic viruses. The risk of pathogens spilling over from wildlife trade and farmed animals into humans should be key considerations in efforts to prevent the next pandemic [39].

On the RT-PCR test for the corona virus, the majority of study participants from MTA gave the correct answer (52.27% boys and 47.72% girls), followed by students from NHRDA and CMC. The findings are in line with the study of Khedr et al., [14]. This could be as a result of the fact that, out of all the diagnostic methods based on viral RNA amplification, RT-PCR examination of nasal and oropharyngeal swabs, nasopharyngeal washing, or aspiration is recommended as the gold standard for the diagnosis of COVID-19 infected persons [40]. However, the RT-PCR test for SARS-CoV-2 virus does have some pitfalls that necessitate improvements in the way the method is used [41].

This study demonstrates that the majority of MTA students responded "yes," with the right response being given by 45.83% of boys and 54.16% of girls on the importance of non-pharmacological methods of prevention for COVID-19 as pursued by students of NHRDA and CMC. Due to the fact that COVID-19 still lacks a specific medication, it is possible that the pharmacological effects of the treatment did not provide satisfactory outcomes. Some of the proposed WHO measures, such as quarantine and physical distancing as well as the ban on large gatherings, have further endangered the social and mental health of every human being. In such cases, the

adequate use of non-pharmacological measures such as sleep control, spending time in nature, healthy diet, and physical activity may improve the immune response to COVID-19 [42].

A higher percentage of CMC students, as well as similar proportions of MTA and NHRDA students, correctly recognized that hand washing involves rubbing hands together for 20 seconds in soapy water to reduce the spread of COVID-19. Jha et al., [11] in 2020 also made a finding of a comparable pattern. It's possible that the World Health Organization (WHO) advised routinely washing hands with soap and water or using an alcohol-based rub to kill viruses that may be on hands. Additionally, hand washing is the cheapest, simplest, and most effective technique to prevent the spread of COVID-19 [43, 44].

With 59.70% of boys and 40.29% of girls from MTA, the students from NHRDA and CMC were the subsequent group of study participants to properly answer the question regarding whether PPE contains head cover, shoes cover, N95 mask, goggles, face shield, gloves, and hazmat suit. The findings are in line with a study conducted Jha et al., [11]. This may be because it is well-known that personal protective equipment (PPE) is frequently regarded as the last line of defense against risks [45]. A healthcare worker's strict commitment to PPE use is essential for preventing exposure to blood-borne diseases and infection transmission in the workplace [46]. This study shows majority of students of NHRDA gave correct response of 47.9% boys and 52.1% girls on PiCoVacc vaccine that is jointly developed by the German company bioNTECH followed by students of MTA and CMC. They may be aware of the

importance of vaccinations as biologics that promote active adaptive immunity against specific diseases [47] and also about PiCoVacc's in mitigating COVID-19.

The majority students from NHRDA (54.4% of boys and 45.6% of girls) correctly answered the question on plasma therapy, a clinical trial in which blood is transported from recovered COVID-19 patients who are in critical condition. Students from MTA and CMC came in second and third, respectively. This is because it is widely accepted that Convalescent Plasma (CP) therapy has been approved as an empirical treatment during outbreaks as well as an alternative for COVID-19 patient's treatment [48]. With the administration of Convalescent Covid Plasma (CCP) in severe COVID-19, improvements in clinical status, radiological lesions, laboratory parameters, increased neutralizing antibodies, and loss of SARS-CoV-2 RNA has been reported [49,50].

This study depicted that the majority of college students received satisfactory knowledge scores on the COVID-19, while a moderate number of students received poor scores and just a few received good scores. In contrast, a study conducted in 2020 among students of Baptist High School Lafia, Nigeria, found that most respondents had adequate knowledge of COVID-19, the least had moderate knowledge, and only one had inadequate knowledge [15]. The results depicted by Reuben et al., [51], are consistent with the current study. This may be because developed countries have a high incidence of COVID-19, which indicates a great deal of interest and concern in the education sector. This can also be attributed to variations in the timing of data collection, differences in the tools used, and variations in the location from

which the data were collected, which depend largely on the degree to which each country had utilized educational advertisements to improve the knowledge of its local citizen.

The results of this study reveals negative association of score of knowledge between 1st, 2nd and 3rd year CMC students and MTA students of $p=0.96$ and $p=0.11$ respectively while positive association of score of knowledge between 1st, 2nd and 3rd year NHRDA students with $p=0.01$. The findings are in accordance with the study conducted by Jha et al., [11] found the scores for the medical and dental students were significantly different according to years of study ($p=0.033$). The possibility is that the subjects covered and the curricula followed by health assistant students over the years of study improved their understanding of diseases. Access to a variety of information sources is also necessary for knowledge development, including social media and public health organizations [52]. Due to time restraint, the study was only undertaken in selected diploma level paramedical colleges. Only a questionnaire was used to assess student knowledge, and some respondents may have chosen answers at random to take the least amount of time to complete. Hence, it could not be generalized to all the health assistant students studying at Janakpurdham or all over the Nepal.

CONCLUSION

The majority of college students had satisfactory knowledge, while a moderate number of students had poor and just a few received good knowledge scores on the COVID-19. Most of the girl students had good knowledge than the boys. The knowledge score between first, second and third year CMC students and MTA students showed a

negative association. However, the results indicate a positive association between the knowledge scores of first, second, and third year NHRDA students. In order to enhance the standard of knowledge, multiple types of strategies, regulations, and initiatives should be conducted and implemented in lower to higher level education.

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ABBREVIATIONS

RNA-Ribonucleic acid; DNA-Deoxyribonucleic acid; PHEIC-Public Health Emergency of International Concern; UNICEF-United Nations Children's Fund; UN-United Nations; UNDP-United Nations Development Program; WHO-World Health Organization

Conflict of interest

The authors declare that they have no conflict of interest.

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