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BEHAVIOURAL PATTERN DURING COVID 19 AND EFFECT OF VARIOUS HYGIENE PROTOCOLS ON DISEASE PREVENTION AMONG SECURITY PERSONNEL IN UNIVERSITY OF MAIDIGURI TEACHING HOSPITAL.

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ABSTRACT

Background: **Human behaviours have huge impact on disease prevention and how the attitudes and behaviour of security personnel in UMTH Maiduguri affect disease prevention during Covid-19 is the core of this study.**

Objective: **To ascertain the knowledge, attitudes, behaviour and effects of disease preventive protocols of security personnel working within University of Maiduguri Teaching Hospital (UMTH) towards Covid-19.**

Methods: **This is a cross-sectional descriptive study which took place from September 2020 to March 2021, approved by the Ethical Review Board of the Borno State Ministry of Health, carried out among security personnel selected through a simple random sampling technique. The data from this study was entered into Statistical Product and Service Solution (SPSS Statistics) soft version 29.0. The data was tested for normality; discreet variables were tested using Chi square while continuous variables were tested using either T-test or Analysis of Variance (ANOVA) for parametric data and their non-parametric equivalent for non-parametric data. P- Value of less than 0.05(P< 0.05) was set as statistically significant.**

Result: **Total of 64 people completed the survey, 57(89.9%) males and 7(10.1%) females. The mean age is 28.1yrs, range of 42yrs, and standard deviation of 9.3yrs. The Prevalence of physical distancing, use of face mask and hand washing before and after onset of Covid-19 pandemic 49(76.6%);53(82.8%), 45(70.3%);56(87.5%), 52(81.3%); 53(82.8%). Majority have one form of misconception or the other for their non-adherent to Covid-19 protocols, there was also statistical significant improvement in the use of face mask and physical distancing when we compared before and after Covid-19 pandemic declaration with P-values of 0.023 and 0.038 respectively but no significant difference in the frequency of hand washing (P-value 0.44) and there was no major change in the level of Covid-19 related signs and symptoms before and after declaration of Covid-19 pandemic in Maiduguri.**

Conclusion: **The study showed a significant improvement in the attitude and behaviour of the security personnel towards Covid-19. There was still a high level of misconception of the security personnel towards Covid-19 as most respondents would rather pray over Covid-19 or visit the herbalist than seek medical care. Overall, there was some level of improvement in their preventive measures towards Covid-19.**

Keywords: Behaviour, Covid-19, Disease, Pandemic, Prevention, Security.

INTRODUCTION

Human behaviors have huge impact on the rate of transmission of infections, and several authors have tried at many points in time to define the concept of human behavior. For the purpose of clarity, one major acceptable definition of human behavior is the total action exhibited by an intact organism.[1] Human

behaviours involve action such as tooth brushing, eating habit, alcohol intake, drug abuse, sexual exhibition and disease preventive behavior during Covid-19 pandemic such as regular and appropriate use of face mask, good hand hygiene practices and maintaining physical distancing.[2]

Security agencies are important component of the front line during Covid-19 pandemic, hence, they of paramount importance of not only maintaining law and order but ensuring adherence to laid down preventive protocol within the society, since Covid-19 is not only social, political, economic problems but also, a threat to national security.[3–7] Although, Corona virus infection during the period of pandemic led to the reduction of organized crime but security agencies had to contain with new form civil disobedience of people not compliant with disease prevention guidelines and other new forms of violence such as domestic violence and cybercrimes.[4–7] Based on the few available theories of human behaviour such as Health Believe Model, Protection Motivation Theory, Transtheoretical Model, Theory of Reasoned action and Social Practice, will be of interest in checking for the pattern of behaviour among security personnel towards Covid-19 in this study.[4,6,7] Since Covid-19 pandemic has a huge impact on our social , economic, political and security situations. Hence, ultimate effect on our security agents.[3–5,7] Besides, studies concerning behavioral pattern of security personnel to Covid-19 in our environment are very scarce and not readily available, hence, there was the need to search for the knowledge and behavior of our security personnel towards Covid-19, making appropriate recommendation when the needed knowledge and/ or behaviours are lacking. Furthermore, this paper tried to find the extent to which our security personnel within the hospital environment aligned themselves with both National and World Health Organization (WHO) guidelines to curb the spread of infection during the period of pandemic on behaviours such as hand hygiene, use of face masks and use of various personal protective equipment as part of the front line during the pandemic. Lastly, the paper tried to find possible challenges encountered during the pandemic by our security personnel and proffering appropriate recommendations.

The main aim of this study is to determine the knowledge, attitude behavioral pattern, effects of hygiene and disease preventive protocols among security personnel in UMTH during Covid-19 pandemic, while the specific

Objectives include, to ascertain the knowledge, attitudes and behavior of securities working within University of Maiduguri Teaching Hospital towards Covid-19,to ascertain the effects of disease prevention protocols on the health of securities working within University of Maiduguri Teaching Hospital towards Covid-19,to ascertain factors which may militate against adherence to good hygiene practices among securities working within University of Maiduguri Teaching Hospital towards Covid-19 pandemic

MATERIALS AND METHOD

Study setting

The study took place at the University of Maiduguri Teaching Hospital. Maiduguri is the largest city in Borno state in the North- Eastern part of Nigeria. The city of Maiduguri is located along the coordinate: 11°N 50´ 13°09´E. According to the Nigeria 2016 population census, Population of the whole of Maiduguri was estimated to be around 800,000 people.[8] But currently, it is estimated that the population of Maiduguri metropolitan local government which forms a substantial part of the population of Maiduguri town should be around 197, 600 people. The large population of people in Maiduguri city is as result of growth in size, rural-urban migration and increased influx of refugees into the town due to the ongoing insurgency being experienced by people of the State. The people of the town are mainly Muslim Kanuri (53.2% of the population), Shuwa, Bura, Marghi and Fulani. There is also a substantial amount of Christian population many of which are people of Igbo, Yoruba and people of Niger-Delta extraction living within the local government.[8] The University of Maiduguri Teaching Hospital is the largest government owned hospital in the North Eastern part of the country and serves as referral to population of close to 30million people from all the general hospitals within the state and other adjoining states of Yobe, Taraba, Gombe, Bauchi and Adamawa.[9–11]

Study Design

This is a form cross sectional descriptive study whereby the participants were asked to fill in a structured questionnaire on their behavioral pattern during Covid-19 Pandemic and the effects of various hygiene preventive protocols on disease prevention among security personnel within the University of Maiduguri Teaching Hospital.

Sample Size Determination And Sampling Technique

The sample size calculation was based on the Taro Yamane formular,

$$n = \frac{N}{(1+Ne^2)}$$

n =Sample size, N= Total Population of Security within UMTH, e = Margin of error

N = 70, e = 5% or 0.05

$$n = \frac{7}{(1+70x0.05^2)}$$

n = 60 subjects, making provision for 10% attrition rate= 6subjects

Total Sample size= n + Attrition

Total Sample size = 60+6

Total sample size is 66 subjects

Selection of study subjects carried out using simple random sampling techniques. The security personnel were required to fill in a structured questionnaire. The questionnaire is as shown in appendix I.

Study Population

The population under study involved the security agents who fulfilled the inclusion and exclusion criteria for the study and consented to the filling of the questionnaire.

Inclusion and Exclusion Criteria

Inclusion criteria

- All study participants must be above 18yrs of age
- Study participants that must have consented to the study

Exclusion Criteria

- Subjects below 18yrs of age
- Subjects who did not consent to study

Interpreter

Interpreters well-grounded in all the major languages: Kanuri, Hausa, Fulfulde, Shuwa, Margi, Babur etc were were to assist in the filling of structured recruited.

Definition Of Important Terms

Physical Distancing

Keeping a distance of at least 1meter apart from each other, avoid spending time in crowded places or in group(s).

Wearing Face Mask

Wearing a protective mask covering the mouth and nose, nose and eyes or mouth, nose and 'eyes.

Hand Washing

The act of cleaning hands with soap and water or alcohol-based hand sanitizer containing at least 60% ethyl alcohol or isopropyl alcohol for at least 30seconds to remove microbes, grease and dirt.

Equipment And Materials

A) Questionnaires and Stationeries
B) Hand Gloves
C) Hand Sanitizers
D) Face Mask
E) Soap and water for hand hygiene

Informed Consent

All the study participants selected were asked to sign an informed consent after proper detailed explanation of the study must have been explained to the study participant. Each participant had right not to participate in the study, even deserved the right to withdraw at any point during filling the questionnaire or any other time during the study. The informed consent is as shown in appendix II along with the questionnaire.

Pilot

A Pilot study was conducted which involved 10 study subjects. Subjects who are involved in the pilot were not part of the total of at least 60people enlisted for the main study. The pilot study was used to simulate real time study situations to foresee future challenges that may be encountered during the study.

Cost Implication/Source Of Funding

The investigators bore all the cost incurred during the study and there was no external source of funding for the research project, there was no financial burden on any of the study participants. Also, there was no form of inducement for any of the study participants during the study. Participation was voluntary.

Data Analysis

The data generated from the study was presented in descriptive form using tables, charts, graphs, percentages and means, using the Statistical Product and Service Solution (SPSS Statistics) version 29.0. Discreet variables were tested using Chi square while continuous variables were tested using Analysis of Variance (ANOVA) for parametric data and its non-parametric equivalent for non-parametric data. P- Value of less than 0.05($P < 0.05$) was set as statistically significant.

Study Period and Duration

The study took place from September 2020 to March 2021, without a maximum study duration of six months.

RESULTS

The result of this study was analyzed based on the stated objectives of this study, the first 17 parameters in the 58 items questionnaire was used to assess the attitude, knowledge and practice of the study participants which eventually culminated into their behaviour towards Covid-19, while the next 21 items of the 58 items questionnaire was used to assess the behaviour of the study participants before the advent of Covid-19 and the last 20items of the 58items questionnaire was used to assess for behaviour of the security personnel after the declaration of a case of Covid-19 in Borno, to determine how the Covid-19

pandemic disease preventive protocols have affected their behaviour.

Biodata

A total of 64 security personnel completed the survey, there were 57males (89.9%) and 7females (10.1%). The mean age of the study participants is 28.1years, range of 42yrs and standard deviation of 9.3yrs. The most frequent age group is 21-30yrs of age which accounted for 34(53.1%) of the study participants as depicted in tables 1. A large portion of the study participants were Muslims 54(84.4%) while 9(14.1%) are Christians and 1(1.6%) of the study participants practice other religion. Table 1.

The first 17 questions assess the general knowledge, attitude and practice of the security workers in UMTH to Covid-19 which eventually determine their behaviour towards Covid-19. A substantial number of the study participants, 58(90.6%) claimed to have heard about Covid-19, while just 2 claimed not to have heard about Covid-19 and 4(6.3%) don't know or not sure if they have heard about Covid-19. When probed further, when each of them got to know about Covid-19, the knowledge of the respondents ranges from1month to 5months at 4(6.3%), 13(20.3%), 9(14.1%), 11(17.2%), 27(42.2%) for 1month, 2months, 3months, 4months, and 5months respectively. Table 2

Table 1: Socio-demographic characteristics/distribution of the study participants

Socio-Demographic Characteristic						
Sex	Male	Female	Others			Total(%)
	57(89.1)	7(10.1)	0(0.0)			64(100)
Age group	11-20	21-30	31-40	41-50	51-60	
	13(20.8)	34(53.1)	11(17.2)	5(7.8)	1(1.6)	64(100)
Religion	Muslim	Christian	Others			
	54(84.4)	9(14.1)	1(1.6)			64(100)
Age statistics	Minimum	Maximum	Age Range	Mean	Standard Deviation	
	18yrs	60yrs	42yrs	28.1YRS	9.4yrs	64(100)

Table 2: Shows general knowledge of Covid-19 among study participants

Test of Knowledge								**Total(%)**
Have you heard about Covid	Yes	No	I don't know					
	58(90.6)	2(3.1)	4(6.1)					64(100)
When did you heard about Covid	1month ago 4(6.3)	2months ago 13(20.3)	3months ago 9(14.1)	4months ago 14(17.2)	5months ago 27(42.2)			64(100)
How did you heard about Covid	Radio 9(14.1)	Television 25(39.1)	Newspaper 3(4.7)	Community Health Worker 5(7.8)	Family and Friends 6(9.4)	Social Media 9(14.1)	All of the above 7(10.9)	64(100)
What caused Covid	Bacteria 1(1.6)	Virus 48(70.0)	Parasite 1(1.6)	Punishment from God 6(9.4)	China 6(9.4)	Other Reasons 1(1.6)		64(100)
What type of disease is Covid	Lung 40(62.5)	Intestine 10(15.6)	Heart 7(10.9)	Kidney 2(3.1)	Liver 0(0.0)	Others 5(7.8)		64(100
Major organ damaged by Covid	Lung 40(64.1)	Intestine 10(15.6)	Heart !2(8.8)	Kidney 6(9.4)	Liver 1(1.6)	Muscle 2(3.1)		64(100
How does Covid spread	Aerosol 6(9.4)	Droplet 16(25.0)	Contaminated Surface 26(40.6)	A-C 10(15.6)	I don't know 6(9.4)			64(100)
Signs and symptoms of Covid	Cough 16(25.0)	Fever 10(15.6)	Difficulty In Breathing 19(29.7)	Headache 5(7.8)	Loss of Smell 1(1.6)	Diarrhea 3(4.7)	All of the above 10(15.6)	64(100)

Most of the respondents got to know about Covid-19 through a wide range of media for information dissemination, with television accounting for 25(39.1%), while just 7(10.9%) got the information through all the available information dissemination media. Refer Table 2. When prompted for the cause of corona virus infection, many the participants knew that it is caused by a virus 48(75.0%) while the other respondents gave a wide range of answers such as bacteria, parasite, punishment from God, China etc. Table 2. Although, most of the participants know the major organ affected by Corona Virus and major organ damage caused by Covid-19 at 40(62.5%) and 41(64.1%) respectively but a reasonable number of the participants do not know the major organ affected nor damaged by Covid-19. Reference Table 2. When asked, how does the disease spread from person to person, only 10(15.6%) agreed with all the possible mode of spread of the infection while 6(9.4%) claimed not to know the mode of spread of the infection. In addition, only a small fraction of the study participants 10(15.6%) claimed to know all the possible signs and symptoms of Covid-19. Table 2.

Another very interesting conversations was when study subjects were asked what they will do if they see or know someone with Covid-19, only 8(12.5%), agreed that they will take the victim to the hospital while the remaining people gave a wide range of answers such as, pray over it 27(42.2%), visit herbalist 14(21.9%), visit the chemist 2(3.1%) and 13(20.3%) claimed they have never come across someone with Covid-19. Refer chart 1.

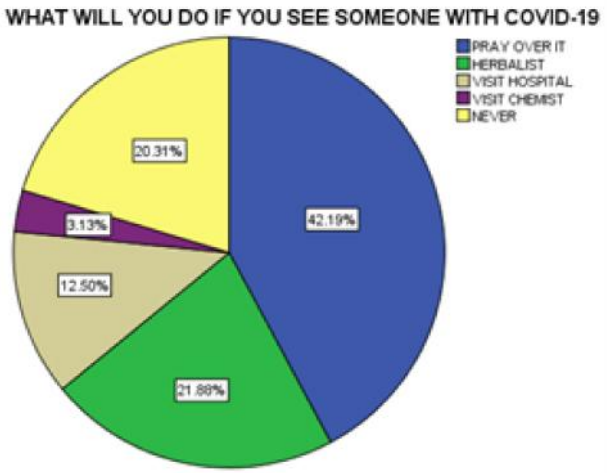

Chart 1: Pie-Chart depicting response of study participants to question on what they will do if they come across someone with Covid-19

Table 3: Behavioural pattern after declaration of Covid-19

							Total (%)
Adherence to Covid-19 Protocol	Yes	No	I Don't Know	Never			
	41(64.1)	12(18.8)	6(9.4)	5(7.4)			64(100)
Frequency of Adherence to COVID-19 Protocols	Every Day	Sometimes	I Don't Know	Never			
	27(42.2	22(34.4)	4(6.3)	11(17.2)			64(100)
Do You Practice	**Physical Distancing**		**Wearing Face Mask**		**Hand Washing**		
	Before ®	**After®**	**Before ≠**	**After ≠**	**Before †**	**After †**	
Yes	49	53	45	56	52	53	
	76.6%	82.8%	70.3%	87.5%	81.3%	82.8%	
No	15	7	14	4	10	6	
	23.4%	10.9%	21.9%	6.3%	15.6%	9.4%	
I don't know	0	2	1	3	0	1	
	0.0	3.1%	1.6%	4.7%	0.0	1.6%	
Never	0	2	4	1	2	4	
	0.0	3.1%	6.3%	1.6%	3.1%	6.3%	
Protocol	**Physical distancing**		**Wearing face mask**		**Hand washing**		
How often	before	after	Before	after	before	After	
Every time	37(57.8)	39(60.9)	35(54.7)	46(71.9)	44(68.8)	37(57.8)	
sometimes	19(29.7)	20(31.3)	16(25.0)	13(20.3)	11(17.2)	19(29.7)	
I don't know	2(3.1)	1(1.6)	1(1.6)	2(3.1)	1(1.6)	1(1.6)	
Never	6(9.4)	4(6.3)	12(18.8)	3(4.7)	8(12.5)	7(11.2)	
Total	64(100)	64(100)	64(100)	64(100)	64(100)	64(100)	
P=0.038®		*P=O.023‘“*	*P=0.44†*				

Many of the respondents 47(73.4%) are aware of a special committee set up by the government to oversee activities during the Covid-19 pandemic, 10(15.6%) claimed that there is none of such committee, while 3(4.7%) do not know or not sure and 4(6.3%) claimed never to have existence of such committee.

The second and third objectives of this study was to try and test the extent to which the security personnel adhered to the various guidelines of disease preventive protocols, effects of adherence to the various guidelines to disease prevention, to know if there is change in the rate of signs and symptoms of Covid-19 related diseases among the security personnel before and after declaration cases of Covid-19 in the city of Maiduguri and factors which may militate against their adherence to Covid-19 protocols.

When the study participants were asked, if they have been adhering to all the disease preventive protocols during Covid-19 pandemic, 41(64.1%) of the respondents actually claimed to have been adherent to all the laid down non-pharmaceutical or pharmacological protocols, while 5(7.5%) of the sampled population claimed to have never adhered to all the laid down protocols. For the level of adherence, when respondents were asked, how often they have been adhering to the protocols as claimed, just 27(42.2%) claimed to have been carrying out the protocols every day, 22(34.4%) said they do it sometimes while 11(17.2%) of the respondents have not been adherent to all the laid down protocols. This is as depicted in table 3.

We tried to compare three of the basic steps in disease prevention during Covid-19 pandemic, physical distancing, use/wearing of face mask and hand washing. In the case of physical distancing, 49(76.6%) of the respondents out rightly claimed they are carrying out physical distancing before Covid-19, 53(82.8%) of the respondent claimed to have been carrying out physical distancing post declaration of Covid-19 as a pandemic. For the use/wearing of face mask, 45(70.3%) claimed to be adherent to the use of face mask pre-Covid-19, while the number increased to 56(87.5%) post declaration of a case of Covid-19 in Borno State. For hand washing, there were no significant changes in the number of people who claimed to have been carrying out regular hand washing pre-52(81.3%) and post Covid-19 56(82.8%). When we compared the three Covid-19 protocols of physical distancing, use of face mask and hand washing using Chi-square test, the result showed (physical distancing, use of face mask and handwashing with a P-value of 0.038, 0.023 and 0.44 respectively. This indicated the result to be statistically significant for physical distancing and use of face mask protocols but not statistically significant for handwashing. This is depicted in table 3. When respondents were asked how often they carry out Covid-19 non pharmacological protocols such as, physical distancing, wearing of face mask and handwashing before and after declaration of a case of Covid-19 in Borno state, 37(57.8%) claimed they practice physical distancing every time even before declaration of a case in Borno state while 39(60.9%) claimed to be practicing physical distancing after Covid-19 declaration in the State. For face mask, 35(54.7%) claimed usage even before declaration of a case of Covid-19 in Borno state while 46(71.9%) of the respondents agree to be using face mask every day. The was a level of reduction in the number of people who claimed to have been carrying out regular handwashing every day before declaration of a case of Covid-19 in Maiduguri 44(68.8%) to 37(57.8%) as shown in table 3.

For the issue of where and when most of the security respondents carry out various disease preventive protocols such as physical distancing and wearing of face mask, majority of the study participants practice more of physical distancing pre-23(35.9%) and post declaration 27(42.27%) of a case of Covid-19 in Maiduguri during religious gathering. More study subjects wear face masks before 29(45.3%) and after

Table 4: Shows various locations where/when study participants carry out Covid-19 preventive protocols

Locations when and where protocols	**Physical distancing**		**Wearing face mask**	
When/where	Before	After	Before	After
Interpersonal interaction	2(3.1)	7(10.9)	24(37.5)	29(45.3)
Religious gathering	23(35.9)	27(42.2)	10(15.5)	9(14.1)
Parties	11(17.2)	3(4.7)	5(7.8)	2(3.1)
Market	12(18.8)	11(17.3)	11(17.2)	13(20.3)
School	6(9.4)	12(18.8)	2(3.1)	4(6.3)
Home	4(6.2)	2(3.1)	3(4.7)	3(4.7)
All the above	1(1.6)	0(0.0)	3(4.7)	0(0.0)
Never	5(7.8)	2(3.1)	6(9.4)	4(6.3)
Total	64(100)	64(100)	64(100)	64(100)

Table 5: Comparing respondent's answers to question on how long they carry out hand washing before and after declaration of a case of Covid-19 in Maiduguri

Time	Hand Washing	
	Before	After
10s®	22 34.4%	13 20.3%
30s®	15 23.4%	25 39.1%
60s	9 14.1%	12 18.8%
120s	11 17.2%	9 14.1%
I don't know	2 3.1%	3 4.7%
Never	5 7.8%	2 3.1%

P= 0.031® (Comparing respondents within the 10seconds and 30seconds domain using Chi-Square test)

24(39.5%) declaration of Covid-19 in Borno state more during interpersonal interaction. Very few or negligible number of security respondents in the study practice physical distancing and wearing of face mask in all the possible listed locations in the town such as religious gathering, during interpersonal interaction, school, markets, parties, home etc as shown in table 4.

When the questionnaire respondents were asked about how long they wash their hands before declaration of a case of Covid-19 in the state and after the first case of Covid-19 was declared, the result showed a reduction in the number of people who washed their hand less than the required minimum of 30seconds (study who use to wash their hand for 10seconds), from 22(34.4%) to 13(20.3%) and an increase in the number of our study respondents who washed their hands for the required 30seconds before and after declaration of a case of Covid-19 from 15(23.4%) to 25(39.1%). When we compared the result of those who claimed to wash their hands before declaration of a case of Covid -19 of those who washed their hands for 10seconds to those who claimed to wash their hands for the required 30seconds using Chi-square, the result is statistically significant with a P-value of 0. 031.This is well depicted by table 6.

We also tried to check if there was either a decrease or an increase in the number of study participants with signs and symptoms related to Covid-19 cases before and after declaration of the first case of Covid-19 in Borno state. The result shows an increase in the number of study participants without cough from 40(62.5%) to 48(75.0%). Refer table 7.

In terms of people who got sick before a case of Covid-19 was declared in the city of Maiduguri, there were no major changes in number, 36(56.8%) before and 38(59.8%) after a case was declared in Borno. There is also a minor reduction in the number of people who claimed not to have fever from 47(73.4%) to 45(70.3%) respectively. Table 6. The number of participants who claimed not to have oral health problems just before the first case of Covid-19 was declared in Borno state and after declaration increased from 48(75.0%) to 52(81.3%) before and after respectively. Difficulty in breathing before 52(81.3%) and 51(79.7%) few months after declaration of the first case of Covid-19. Other Covid-19 related signs and symptoms such as, running nose before 47(73.4%) and after 49(76.6%) and Covid-19 related signs and symptoms like sore throat, loss of sense taste, loss of

Table 6: Shows participants response on the signs and symptoms Covid-19 before and after Covid-19 pandemic declaration in Borno state.

Covid-19 signs and symptoms before and after	Not at all		At least once		Most of the time		I don't know		Never	
Signs and symptoms	Before	After	Before	After	Before	After	Before	After	Before	After
Cough	40 62.5%	48 75.0%	7 10.9%	7 10.9%	6 9.4%	0 0.0	0 0.0	1 1.6%	11 17.2%	8 12.5%
Sickness	36 56.3%	38 59.8%	15 23.4%	12 18.8%	5 7.8%	3 4.7%	3 4.7%	2 3.1%	5 7.8%	9 14.1%
Fever	47 73.4%	45 70.3%	5 7.8%	8 12.5%	1 1.6%	0 0.0	6 9.4%	2 3.1%	5 7.8%	9 14.1%
Oral problems	48 75.0%	52 81.3%	3 4.7%	5 7.8%	5 7.8%	0 0.0	4 6.3%	2 3.1%	4 6.3%	5 7.8%
Breathing difficulty	52 81.3%	51 79.7%	0 0.0	3 4.7%	2 3.1%	0 0.0	2 3.1%	0 0.0	8 12.5%	10 15.6%
Running nose	47 73.4%	49 76.6%	5 7.8%	5 7.8%	3 4.7%	2 3.1%	1 1.6%	1 1.6%	8 12.5%	7 10.9%
Sore throat	50 78.1%	51 79.7%	7 10.9%	5 7.8%	0 0.0	0 0.0	4 6.3%	6 9.4%	3 4.7%	2 3.1%
Diarrhea	41 64.1%	47 73.4%	10 15.6%	7 10.9%	3 4.7%	1 1.6%	1 1.6%	1 1.6%	9 14.1%	8 12.5%
Loss of taste	45 70.3%	47 73.4%	1 1.6%	7 10.9%	3 4.7%	0 0.0	1 1.6%	0 0.0	14 21.9%	10 15.6%
Loss of sense of smell	46 71.9%	46 71.9%	1 1.6%	1 1.6%	3 4.7%	3 4.7%	2 3.1%	2 3.1%	12 18.8%	12 18.8%
Body pain	30 46.9%	32 50.0%	15 23.4%	15 23.4%	8 12.5%	8 12.5%	2 3.1%	0 0.0	9 14.1%	9 14.1%
Headache	50 78.1%	50 78.1%	5 7.8%	7 10.9%	0 0.0	0 0.0	4 6.3%	0 0.0	5 7.8%	7 10.9%

Table 7. Reason for non-adherent to Covid-19 protocol

	Frequency	Percent	Valid Percent	Cumulative Percent
I don't believe in them	22	34.4	34.4	34.4
I don't understand how to carry them out	2	3.1	3.1	37.5
God is my protector	11	17.2	17.2	54.7
I cannot afford most of the materials	4	6.3	6.3	60.9
Corona disease is a scam	21	32.8	32.8	93.8
They are against my cultural and religious practices	3	4.7	4.7	98.4
Others	1	1.6	1.6	100.0
Total	64	100.0	100.0	

sense of smell, body pain and headache, followed practically the same pattern as there was no remarkable changes in the number of study participant among the security personnel who claimed not to have had those signs and symptoms before a case was discovered in Borno and after. But for diarrhoea, there was an increase in the number of people who claimed not to have diarrhoea disease before a case of Covid-19 was discovered in Borno state and after was 41(64.1%) and 47(73.4%) respectively. This is also as depicted in table 6. Another interesting scenario was when study participants were asked why they may or have not been adhering to Covid-19 protocols, 22(34.4%) said they do not believe in them, 2(3.1%) claimed not to know how to carry out the protocols, 11(17.2%), said it was because they believe God is their protector, 4(6.3%) claimed they could not afford the needed materials and equipment, 21(32.8%) corona disease is a scam, 3(4.7%) said that the Covid-19 protocols are against their religion and cultural practices, while 1(1.6%) gave other reasons. This is as shown in table 7.

DISCUSSION

The current Covid-19 pandemic provides a unique opportunity for Nations of the World to ensure well-being of its citizens, not forgetting our security agents. During emergency situation like Covid-19, Security agents are integral part of the Covid-19 response, hence, they must have adequate knowledge of the current situation at hand in order to be able to assist in the protection of civil, public health right and safety of the population.[4–7] Also, there have been numerous cases of little or no adherence to Covid-19 protocols in most societies both in the local and urban settings in developed and non-developed regions of the World.[12] A deeper and closer look at literature like our study showed a high knowledge, attitude and practice among various population of the world towards Covid-19.[12-19] Security agencies were drafted to ensure compliant with the laid down protocols, which can only be carried out within the ambit of the law when our security agencies have good knowledge, attitude and practice towards Covid-19 pandemic. This was to prevent human and civil right violation.[20,21] There was an increase in the number of males respondents compared to the females in this study, which can be attributed to the job nature of the sampled population. The modal age of the sampled population was found to be within the age range 21-30yrs. People around this age bracket tend to be very active , hence, may be responsible for the high level of respondents within that particular age bracket.[11] This is similar to finding from a general population study from Katsina in Nigeria but run contrary to another similar population study from Malasia[22], United Kingdom[23] and Africa,[12] which indicated higher number of female respondents. Keeping in mind that majority of the studies are population-based studies.[12,13,24] More than 90% of sampled population in this study claimed to have heard about Covid-19 as at the time of data collection, which may be attributed to the increased level of awareness and the various information dissemination channel on Covid-19 during the period of the study, as evidenced by the claim by majority of the questionnaire respondents that they got their information from media such as television, radio, family and friends, community health workers and social media with television serving as the major source of information on Covid-19 to respondents in this study. A popuation study from Katsina state[25] in North-Western part of Nigeria showed that majority of the respondents to their questionnaires claimed they use social media platform as primary source of information on Covid-19. This was in tandem with an earlier study by Masek et al,[14] which brought to fore the role of social and new media alongside traditional television as a means of information dissemination during the pandemic, Majority of our sampled population in this study knew that coronal virus infection was caused by a virus. Virtually all our study participants knew at least one sign or symptoms of Covid-19, when we compared our study with another similar population study from

Malasia,[22]most of our respondents knew all the possible signs and symptoms of Covid-19. Most of the security personnel who took part in the study do not know what line of action to take when they see a known or suspected Covid-19 patient and just few of them know that they must take the victim to the hospital or contact the health authority despite the fact the study took place around the hospital setting. This is like findings from another study from Ghana.[12] Hence, more work was needed to be done to further enlighten the security personnel on the required protocol to follow when confronted with a suspected case of Covid-19. There were many ways or methods that have been documented for the assessment of knowledge of different population to Covid-19,[12,18,19,22–26] but there is no uniformity and standard method used in such assessment of knowledge of study respondents to Covid-19 in the literature in most of the population studies encountered.[25] Azlan *et al.*,[22] earlier attributed the high level of knowledge and attitude discovered during the period of Covid-19 in most studies to the high level of cautiousness within the population during emergency like Covid-19 pandemic.[27] The question now arise on what may be the attitude and the knowledge drive of the population or the society if there is no situation of emergency like the Covid-19 pandemic or there may be variability in way and manner of behavior. Although some studies have earlier documented effect of culture and believe system of the society on human behaviours.[25,28,29,30,31] Our study participants disclosed various actions they would take when confronted with Covid-19 patient such as praying over it, visiting the chemist, visit to the herbalist and just a small amount agreed to involved the health authority or advise the individual to visit the hospital. When our study participants were asked the major reason why they may not adhere to the Covid-19 protocols, the provided several reasons, such as coronal virus infection is a scam, God is their protector, economic reason, inadequate knowledge of the Covid-19 guidelines, not believing in the effectiveness of the protocols. Hence, the role of belief and cultural factors or norms of the people cannot be overemphasized, meaning any dissemination of information for effective infection control should as a matter of importance take into consideration both the cultural and believe system of the people. Olapegba *et al.*,[25] previously documented misconception among the populace in Nigeria that Covid-19 was due to biological warfare and our findings was also not free of various forms of misconceptions like Covid-19 is an avenue for corruption or scam and things like coronal virus is caused by China. Many of these misconceptions or grey areas must be clarified within the populace for effective Covid-19 response through our various agents of socialization or any future pandemic.

Another reason for this paper was to check for the level of adherence of the sampled population to the various Covid-19 prevention protocols as laid down by the health authority and the government at all level before a case of Covid-19 was declared in Borno state and after a case was declared in Maiduguri, this paper found about two third of the study population claiming adherence to all the protocols but just two fifth of the security personnel make adherence to the required protocol part of their daily routine, while there is a significant difference in the level of adherence to physical distancing and level of use of face mask among the sampled security personnel but there is no significant difference in the level of adherence among the security personnel in handwashing. The effect of the information and awareness on the pandemic on improvement in the duration of handwashing, showed a significant improvement in the duration of handwashing within the domain from 10seconds to 30seconds for number of study participants who washed their hand before the advent of Covid-19 and after the declaration of a case of Covid-19 in Maiduguri. Azlan AA and colleagues,[22] in a related study had earlier found a significant level of use of facemask and level of physical distancing among a general population in Malasia, based on age, gender, income and education status of the study participants but because most of the study participants are males with low level of education, this paper could not ascertain the level of significance of the use of face mask and physical distancing based on their gender, socio-economical and education status of the study participants. On use of face mask, the non-total adherence may be due the same explanation from some studied populations which fall within the South East Asia,[22,32] First, there was no mandatory law for the wearing facemask whenever a person feels sick before the advent of Covid-19 but at the height of Covid-19, the level of use of facemask skyrocketed due to demand and increased cost which in turn must have led to reduction in the level of adherence in that region of the World.[32] Also, at the beginning of the pandemic, WHO[33] recommended facemask for only health care personnel at the frontline of the pandemic, recommending usage only when a person feels sick or have Covid-19 related signs and symptoms, this must have affected the level of adherence. In addition, the scarcity and increased cost of the product must have contributed to the level of adherence to its use by the population under study.[32] We can therefore suffice to say, all the above reasons may be the cause of less adherence to the use of face mask in our study. Another study by Emdat *et al.*,[19] did not only

demonstrate excellent hand washing but also excellent use of face mask. Lastly, this paper tried to check if there is either an increase or decrease in Covid-19 related signs and symptoms among the sample security population before and after the first case of Covid-19 was declared in Maiduguri, From available data to us from this study, there was no obvious changes in the level of the values obtained in the number of participants with Covid-19 related signs and symptoms such as, cough, fever, difficulty in breathing, running nose, sore throat, diarrhoea, loss of smell, taste, body pain, headache etc before and after advent of Covid-19 in Borno State.

CONCLUSION

The study showed a significant improvement in the attitude and behaviour of the security personnel towards Covid-19. There was still a high level of misconception of the security personnel towards Covid-19 as most respondents would rather pray over Covid-19 or visit the herbalist than seek medical care. Overall, there was some level of improvement in their preventive measures towards Covid-19. There were no obvious changes in Covid-19 related signs and symptoms before and after advent of Covid-19 among sampled population.

Limitation

The study was faced with some limitations, first, only security hospital staff were recruited for this study, secondly, majority of the sample population are illiterate, making administration of the questionnaire difficult. Furthermore, the issue of language barrier between most study facilitators and the study participants made interpretation difficult. Lastly, majority of the sampled population are males compared to the females.

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Conflict Of Interest

We, the authors of this paper, declare no conflict of interest.

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APPENDIX I

AGE: …… SEX…… WARD……. RELIGIONS: ……... OCCUPATION……

BEHAVIOURAL PATTERN ON COVID-19 AND EFFECTS OF VARIOUS HYGIENE PRACTICES ON DISEASE PREVENTION AMONG SECURITY PERSONNEL WITHIN THE UNIVERSITY OF MAIDUGURI TEACHING HOSPITAL.

This questionare is on the Attitude, knowledge and behavioural pattern of security personnel within UMTH on preventive measures on COVID-19 and effect of hygiene practices on disease prevention. Kindly provide answers to the questions below as truthfully as possible. You can also thick multiple options where applicable.

1. Have you heard about COVID-19 a) yes b) no c) I don't know d) never
2. IF YES, when did you heard about COVID-19 a) 1month ago b) 2months ago c) 3monhs ago d) 4months ago e) 5months ago
3. How did you hear about COVID-19 a) Radio b) Television C) Newspaper d) community health workers e) religious gathering f) Families and friends g social media platforms. Others specify ( )
4. What do you think causes Corana disease a) Bacteria b) virus c) fungi d) parasite e) punishment from God f) China. Others, specify( )
5. Which type of disease is corona infection a) Lung b) Intestine c) Brain d) Heart e) Kidney. Others specify( )
6. Corona viruses cause a major damage to the following organ a) Lung b) heart c) kidney d) liver e) intestine f) muscle and bone. others specify ( )
7. How does corona disease spread? a) aerosol b) droplet spread c) contact with contaminated surface d) a to c e) I don't Know
8. The following are symptoms of corona disease a) cough b) fever c) difficulty in breathing d) headache e) body ache f) inability to taste g) loss of smell i) diarrhea j) Headache. Others specify( )
9. Have you had any of the above symptoms in the past 2months? a) yes b) no c) I don't know d) never
10. If yes, what did you do? a) pray over it b) visit herbalist or used herbal medication c) visit the hospital d) visit chemist for treatment e) do nothing f) never
11. Do you know anybody with any of the above symptoms? a) yes b) no c) I don't know d) never
12. If yes, what was your advice to you or him/her? a) pray over it b) visit herbalist or used herbal medication c) visit the hospital d) visit chemist for treatment e) do nothing f) never
13. Is there currently a specific committee set up by government to oversee COVID in Borno state? A) yes b) no c) I don't know d) never
14. Is there currently a specialized treatment centre for COVID in Borno state? a) yes b) no c) I don't know d) never
15. Is there currently any major treatment for the disease a) yes b) no c) I don't know d) never
16. Can corona disease be prevented a) yes b) no c) I don't know, d) never
17. Which of the following methods have been found to be effective in curbing the spread of corona disease? a) avoiding social gathering b) maintaining physical distance of 2meters apart c) mandatory use of facemask d) regular hand washing for minimum 30seconds e) alcohol-based hand rub f) avoiding close contact with a suspected g) isolation when there is a contact with a suspected case I) contacting health authorities when you feel sick with signs and symptoms. Others specify( )

The following next set of questions shows your level of hygiene practices 4months ago prior to COVID-19 PANDEMIC, kindly cast your mind back and answer the questions as truthful as you can, you can give multiple answers where you deem applicable.

Prior to COVID -19 pandemic,

18. Do you practice physical distancing? a) yes b) no c) I don't know d) never
19. If yes, how often a) Everyday b) sometimes c) I don't know d) never
20. When do you practice your physical distancing? a) religious gathering b) parties c) markets d) school environment e) interpersonal interaction f) at home g) never. Others specify( )
21. Do you wear face mask? a) yes b) no c) I don't know
22. How often? a) everyday b) sometimes c) I don't know d) never
23. Where do you wear your facemask? a) during interpersonal interaction b) religious gathering c) parties d) markets e) school environment f) at home g) never. Others, specify( )
24. Have you been carrying out hand washing? a) yes b) no c) I don't know d) never

25. If yes, how often a) every time I touched a contaminated surface b) sometimes c) I don't know d) never
26. How long do you wash your hands a) 10seconds b) 30seconds c) 60 seconds d)120seconds e) I don't know f) never
27. How often do you get sick in a month? a) not at all b) at least once c) most of the time d) I don't know e) never
28. How often do you have cough in a month a) not at all b) at least once c) most of the time d)I don't know e) never
29. How often do you have fever in a month a) not at all b) at least one time in a month c) most of the time d) I don't know e) never
30. How often do you have running nose? a) not at all b) at least one time in a month c) most of the time d) I don't know e) never
31. How often to do have oral problems? a) not at all b) at least one time in a month c) most of the time d) I don't know e) never
32. How often do you have sore throat? a) not at all b) at least one time in a month c) most of the time d) I don't know
33. How often do you have difficulty breathing? a) not at all b) at least one time in a month c) most of the time d) I don't know e) never
34. How often do you have diarrhea? a) not at all b) at least one time in a month c) most of the time d) I don't know e) never
35. How often do you have loss of sense of taste? a) not at all b) at least one time in a month c) most of the time d) I don't know e) never
36. How often do you have loss of sense of smell? a) not at all b) at least one time in a month c) most of the time d) I don't know e) never
37. How often do you have body pain? a) not at all b) at least one time in a month c) most of the time d) I don't know e) never
38. How often do you have headache? a) not at all b) at least one time in a month c) most of the time d) I don't know e) never

After the declaration of a case of COVID-19 in Maiduguri, the next set of questions indicate your level of adherence to the health authority's hygiene and disease preventive protocols. Kindly answer the questions as truthful as you can.

39. Have you been adherent to disease preventive protocols as prescribed by health authorities? a) yes b) no c) I don't know.
40. If yes, how often? a) everyday b) sometimes c) I don't know d) never
41. If no, why? a) I don't believe in them b) I don't understand how to carry out them out c) God is my protector d) I can nnot affordmost of the materials and equipments e) corona disease is a scam f) they are against my cultural believe and religious practices. Others, specify( )
42. Do you practice physical distancing? a) yes b) no c) I don't know d) never
43. If yes, how often a) Everyday b) sometimes c) I don't know d) never
44. When do you practice your physical distancing? a) religious gathering b) parties c) markets d) school environment e) interpersonal interaction f) at home g) never. Others specify( )
45. Do you wear face mask? a) yes b) no c) I don't know d) never
46. How often? a) everyday b) sometimes c) I don't know d) never
47. Where do you wear your facemask? a) during interpersonal interaction b) religious gathering c) parties d) markets e) school environment f) at home g) never. Others, specify ( )
48. Have you been carrying out hand washing? a) yes b) no c) I don't know d) never
49. If yes, how often a) every time I touched a contaminated surface b) sometimes c) I don't know d) never
50. How long do you wash your hands a) 10seconds b) 30seconds c) 60 seconds d)120seconds e) I don't know f) never
51. How often do you get sick in a month? a) not at all b) at least once c) most of the time d) I don't know e) never
52. How often do you have cough in a month a) not at all b) at least once c) most of the time d) I don't know e) never

53. How often do you have fever in a month a) not at all b) at least one time in a month c) most of the time d) I don't know e) never
54. How often do you have running nose? a) not at all b) at least one time in a month c) most of the time d) I don't know e) never
55. How often to do have oral problems? a) not at all b) at least one time in a month c) most of the time d) I don't know e) never
56. How often do you have sore throat? a) not at all b) at least one time in a month c) most of the time d) I don't know
57. How often do you have difficulty breathing? a) not at all b) at least one time in a month c) most of the time d) I don't know e) never
58. How often do you have diarrhea? a) not at all b) at least one time in a month c) most of the time d) I don't know e) never

APPENDIX II

INFORMED CONSENT

I am DR. OGBEZODE MATHEW from University of Maiduguri Teaching Hospital. I am carrying out research on **The Behavioural pattern on COVID-19 and Effects of various hygiene practices on disease prevention among inhabitants of Maiduguri metropolis.** I would appreciate it if you could help me out with the filing of this questionnaire. I can assure you that your information and response will be kept very confidential. Thank you for your kind response.

I hereby agree to participate in this study, the reason for the study was well stated and explained to me by the researcher.

Signature and Date: _____ Signature and Date: _____

Study participant Researcher