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Original Research Article

Determinants of Covid-19 in the Lusaka District, Zambia; An Anthropological Study

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Abstract

The unprecedented scale and potential to completely devastate the public health systems internationally has drawn attention to the COVID-19 pandemic. In recent years', the interdisciplinary approach to health and infectious diseases has been less looked upon, especially the areas of anthropological dynamics and its effect on infectious disease pathogens. To this effect, this study aims at investigating the anthropological factors that influence the spread of the SARS-Co-V-2 virus in the Lusaka District of Zambia. From the cross-sectional data collected in two Lusaka compounds, we carried out an anthropological study through univariate and multivariate linear regression analysis. To do this, we conducted an analysis using a dependent variable "is COVID-19 a serious problem" as a measure for the spread of SARS-Co-V-2 virus. The study had five anthropological variables and other variables to evaluate participants' knowledge on COVID-19. But the study reported only the significant variables after the full analysis. Applying a stepwise analysis, the study found four anthropological variables (Belief about COVID-19, attitude towards COVID-19 vaccine, Handwashing practice before COVID-19 and in the mist of COVID-19 pandemics) significant at univariate level and one anthropological variable (Beliefs about COVID-19) significant at multivariate level. Demographic and anthropological determinants have a significant effect on the spread of SARS-Co-V-2 virus

Keywords: Determinants, Lusaka, COVID-19, anthropological study

INTRODUCTION

Globally, the COVID-19 pandemic has been a challenge to the healthcare systems, social, economic, and psychological wellbeing of humanity (Bante et al., 2021). As at January 10, 2021, COVID-19 had affected over 218 nations worldwide with over 90.2 million confirmed cases and 1.9 million deceases.In the African continent, over 3 million confirmed cases and +72,387 deaths were reported (WHO, 2021).

Low- and middle-income countries (LMIC) are intensely influenced due to the deficient medical equipment and essential supplies for victims, which has resulted in a catastrophic loss of lives (Bante et al., 2021). After the first COVID-19 case testified on March 15th, 2020 in Zambia, the number of cases and deaths rose exponentially (Simulundu et al., 2020). As COVID-19 began to spread globally and across the nation of Zambia, several factors are responsible for its transmission which has led to the cumulative increase in the number of COVID-19 confirmed cases, recoveries as well as the deaths in the nation as affirmed on regular basis by the Ministry of Health (Mulenga et al., 2021). As at March 2021, Zambia had a total of 80,687 positive cases and 1,109 deaths, which at present, represents one of the highest in Africa (WHO, 2021).

In preparation to the response for the SARS-CoV-2 viral outbreak, Zambia applied a multi-sectoral national epidemic disease surveillance and response system resulting in the identification of the first case of COVID-19

within 48hrs of the individual entering the country (Simulundu et al., 2020). The spread of COVID-19 varies from country to country and it's dependent on various factors (Allel, Tapia-Muñoz and Morris, 2020).

COVID-19 has continuously spread due to the absence of personal protective equipment (PPE), public resistance to the recommended prevention measures, and poor socioeconomic status amongst others (Bante et al.,2021).At the onset of COVID-19, the government of Zambia initiated basic preventive measures such as obligatory quarantine periods for passengers, gathering restrictions, closures of school and religious places, and mandatory wearing of face masks in public places amongst others (Zambia National Public Health Institute, 2020). Despite these measures, Zambia has faced repeated waves of COVID-19 registering high morbidity and mortality rates in each wave of occurrence (Zambia MoH, 2021). Thus, identifying the factors that influence the spread of COVID-19 is vital for its prevention.Several authors have studied the effect of other factors on the spread of the SARS-CoV-2 virus in the environment, such as; effect of environmental factors (Xu et al.,2020) and effects of demographic factors (Huang et al, 2021) amongst others, but they have been a slow incorporation of the investigations of the sociocultural factors into this mix of factors influencing the spread of COVID-19 disease (Friedler, 2020), despite the essential role anthropological factors played in the spread of infectious diseases around the world (Hoke and Schell, 2020). In addition, despite the increasing focus on infectious diseases and other social dimensions, there has been less focus on the area of cultural dynamics and its effect on infectious disease pathogens behavior (Friedler, 2021). To this effect, this study seeks to identify the anthropological factors that influence the spread of COVID-19 the Lusaka District of Zambia.

MATERIALS AND METHODS

Study Design, Period, Setting, and Population

A community-based cross-sectional survey was done in two compounds of the Lusaka District of Zambia (Kalingalinga and Mutendre). The Lusaka district is one of the eight districts of the Lusaka province. It is the most populated district of the province, with a population size of 1,747,152 inhabitants as of the 2010 population census. The choice of the compounds was randomly selected from a pool of all compounds that made up the Lusaka district of Zambia.

Study Participants

All households in the Kalingalinga and Mutendre compounds were considered as the source of the study population separately. The participants selected for this study were sampled randomly.

Inclusion criteria and exclusion criteria

The study included individuals ≥18years who have lived in the community of interest for the last 6 months (January-June 2021) prior to the study and were willing to participate in the study. The study excluded individuals ≥18 who were not willing to participate in the study and those who had not stayed for up to six months in the compounds of interest prior to the study.

Sample size determination

The sample size determination formula by (Krejcie and Morgan, 1970)was used to determine the minimum sample required for this study with the accompanying suppositions: 95% level of confidence, 5% precision, 50% proportion was assumed.

Sample size = $S = \frac{x^2 NP(1-P)}{d^2(N-1)+x^2 P(1-P)}$

N here was total population for Kalingalinga and Mutendre (145267)

P is the estimated Prevalence/proportion of contamination (0.5)

d^2 is the degree of accuracy (0.05)

X^2 is 1.96 Confidence level

The final sample size was 384 participants. This sample size was proportionally divided between the two compounds using the formula (x/n) *384. Where x = population size for each compound, n= the total population size for all the found compounds and 384 which is the sample size for the study.

Data Collection

Data were collected by using a self-administered questionnaire which was prepared with knowledge adopted and modified from the WHO's cultural determinants of health (WHO, 2016) and previous research with some adjustment (Biddlestone, Green and Douglas, 2020). The tool was composed of 3 parts, i.e., Sociodemographic characteristics, Knowledge on COVID-19, and anthropological factors.

Variables

Dependent Variable: The spread of COVID-19; this variable was measured by the measure to the response variable "is COVID-19 a serious problem".

Independent: Anthropological factors that might

influence the spread of the SARS-CoV-2 virus in the community.

Data Quality Control

A one-day training was given for data collector assistants on how to administer the questionnaires, handle ethical issues and maintain privacy. The instrument was prepared in two languages (English and Nyenja). Before the actual data collection, the tool was pretested among 20 dwellers of ~~in~~ the University of Zambia community to verify the appropriateness, feasibility, and reliability of the tool.

Data Collection Procedure

One qualified data collector was recruited along with the principal supervisor. The data agent received sufficient training about the purpose of the study and the data collection procedure. The data collector was informed about all precautions to be followed during data assortment such as during the interview they must keep physical distance, wear a face mask, and use a sanitizer. Prior to the beginning of the data collection process, participants were educated about the study and participation was based on their willingness. The principal investigator kept in touch with the data collector to regularly check the process of the data collection till the end of the study.

Statistical Analysis

The data was established in excel and was analyzed using STATA version 15.0. Descriptive statistics for continuous variables and frequency and percentage for categorical variables were computed and presented in texts and tables. The association between the independent and outcome variables was assessed by univariate and multivariate analysis. Independent Variables with odd ratios greater than 1 were considered as significant to the spread of COVID-19 disease.

Ethical Considerations

Before the initiation of the study, ethical clearance was obtained from the Excellence in Research Ethics and Science (ERES) board with an ethical clearance number of IRB/407/12 and the Lusaka District Health Administrative Bodies. The participants for this study were informed about this study and before the beginning of the data collection proper, informed consent was obtained from the participants. For confidentiality reasons, code numbers were used throughout the data collection process.

RESULTS

A sample size of 384 participants was required for this study, but the study succeeded in recruiting 301 participants into the study giving a 78.4% response rate.

Socio-Demographic Characteristics

Out of 301 respondents, 45.5 % (n = 137) were male and 54.5 %(n = 169) were female with the most frequent age group 18-28 years, with 53.5 % (n=160) were single.46.5% (n =140) of the respondents had either completed college or university or were still in college or university. 34.8 % (105) of the respondent were unemployed with 58.0 % (n= 174) respondents ending K1000 and below as monthly income (Table 1)

Knowledge and attitude towards COVID-19

The respondents reported that 54.5% (n=164) had friends, family members, or colleagues diagnosed and died with COVID-19. 58.1%(n=175) of respondents said social media was the common source of information for COVID-19 and 92.7% (n=279) acknowledge that COVID-19 was a serious problem. Despite the 72.4% (n=218) of respondent who knew that COVID-19 is an airborne disease and the 73 % (n=221) who knew that crowded places could be a source of contamination for COVID-19, 61.8% of the respondent still found themselves in crowded places in the mist of the COVID-19 pandemic (Table 2)

Anthropological determinants

In this study, 81% (n=243) of respondents believed COVID-19 is real, 53.5% (n=161) of the respondents' acknowledged handshakes are common greeting practices in the community that enhance the spread of COVID-19. Even though 63.5% (n=191) of respondent said handwashing was not a common practice in this communities before the onset of COVID-19, 60.1% (n=181) of respondents said the frequency of hand washing in the mist of COVID-19 pandemic has increase in the communities and only 49.4 % (n=147) were willing to be vaccinated against COVID-19 disease. (Table 3)

Univariate Analysis

A univariate analysis was done with the dependent

Table 1. Socio-demographic characteristics of study participants

Demographic characteristics	Total (301	%(T)
Gender		
Male	137	45.5
Female	164	54.5
Age		
18-28	160	53.2
29-39	83	27.6
>39	56	18.6
No opinion	02	0.6
Marital Status		
Single	161	53.5
Married	120	40.0
Divorced	18	6.0
Others	02	0.5
Level of education		
No formal education	06	2.0
Basic education	77	25.6
Primary level	17	5.6
Secondary level	61	20.3
College and above	140	46.5
Occupation		
Government employment	70	23.3
Private employment	70	23.3
Self-employment	56	18.6
Unemployed	105	34.8
Monthly income levels		
0-K1000	174	58.0
K1000-K5000	90	30.0
K5001-K10000	32	10.6
Above K10000	5	1.4

Table 2. Distribution of Knowledge on COVID-19 And Social Factors that Influence the Spread of COVID-19 across the study participants

Variables	*n=301*	%	95 %CI
Knowledge of anyone sick/died of COVID-19			
Yes	164	54.5	49.2,60.1
No	135	44.9	36.2,50.5
No information	02	0.7	0.2,1.6
Common sources of information COVID-19			
Social media (TV, radio, internet)	175	58.1	52.5,63.7
Local health campaign	66	22.0	17.2,26.6
Poster and campaigns	51	17.0	12.7,21.2
Others	09	3.0	1.1,5.0
Is COVID-19 serious problem?			
Yes	279	92.7	89.7,95.6
No	03	1.0	0, 2.1
No information	19	6.3	4.0,9.0
Is COVID-19 air-borne?			
Yes	218	72.4	67.2,77.5
No	83	27.6	22.5,32.6
Habits of being in crowded places			
Yes	186	61.8	56.3,67.3
No	114	37.9	32.7,43.4
No information	01	0.3	0.3,0.9
Are these crowded places sources of COVID-19?			
Yes	221	73.4	68.4,78.4
No	74	24.6	19.7,29.5
No information	06	2.0	0.4,3.6

Table 3. A distribution of the anthropological factors that influence the spread of COVID-19 across the study participants

Variables	n=301	%(n)	95%CI
Beliefs about COVID-19 disease			
It is real	243	81.3	76.3,85.2
It's not real	14	5.0	2.3,7.1
No information	44	13.7	9.5,17.2
Manner of greetings which enhance COVID-19 spread			
Handshakes	161	53.5	48.0,69.2
Hugs	95	31.6	26.3,37.4
Pegs and kisses	39	13.0	9.1,17.7
No Information	06	2.0	0.4,3.6
Hand washing a common practice before the onset of COVID-19			
Yes	91	30.3	25.1,35.5
No	191	63.5	58.0,69.0
No Information	19	6.3	3.5,9.1
Frequency of handwashing in the mist of COVID-19			
Very often	181	60.1	54.6,65.7
Only after an interaction with people	92	30.6	25.3,35.8
Not at all	16	5.3	2.8,7.9
No information	12	4.0	1.8,6.2
Willing to be vaccinated against COVID-19			
Yes	147	49.4	43.2,55.1
No	150	50.3	44.2,56.1
No information	04	1.3	0.03,3.0

Table 4. Factors significant to the spread of COVID-19 at univariate level

Variables	p-value	OR	95%CI(OR)
Strata (compound)	0.008	2.8	1.3,6.0
Gender	0.661	1.2	1.0,2.8
Belief about COVID-19	0.001	2.1	1.4, 3.2
Willingness to be vaccinated	0.304	1.5	0.7, 3.5
Habit of Being in crowded places	0.119	2.0	0.8,4.6
Handwashing practice before the COVID-19 pandemic	0.615	1.2	0.7,2.7
Knowledge of anyone sick/died of COVID-19	0.716	1.2	0.5,2.7
Crowded places being a media of Covid-19 spread	0.014	2.5	1.2,5.2
Frequency of hand washing in the mist of COVID-19	0.345	1.2	0.8,2.1

Table 5. Factors significant to the spread of COVID-19 disease at multivariate level

Variables	p-value	OR	95%CI(OR)
Beliefs about COVID-19	0.005	2.8	1.3, 6.0
Strata (compound)	0.05	1.9	0.8, 4.6

variable "is COVID-19 a serious problem" as a measure for spread against all other independent variables. Only the results of the significant variables were reported with respect to the OR and the p-values at the 95% CI. Table 4

Multivariate Analysis

A multivariate analysis was done with the dependent variable "is COVID-19 a serious problem" as a measure of the spread of COVID-19, against all other independent variables that were significant at univariate level. The results of which variables were significant at multi-variate levels were reported based on the odd ratios (OR). Table 5

DISCUSSIONS

In a means to contain the spread of the COVID-19 pandemic, it is important to identify the key predictors to

the spread of COVID-19 (Xu et al, 2020). (Nepomucenoet al, 2020), demonstrated the importance of demographic factors in the spread of SARS-Co-V-2 virus. They argue that the prevalence of infectious diseases at any point in time may differ substantially with respect to age and settings. (Galasso et al., 2020; Thelwall and Thelwall, 2021), found gender differences with attitude towards COVID-19 disease and COVID related beliefs. In the same regards, our study found some demographic factors significant predictors to the spread of COVID-19. The demographic variable strata which represents setting (p-value=0.008, OR= 2.8, 95% CI 1.3, 6.0) and gender (p-value=0.661, OR=1.2, 95% CI 1.0, 2.8) were significant predictors to the spread of COVID-19.

Friedler, 2021 showed a relationship between cultural factors and the spread of COVID-19 by examining the socially constructed dynamics of human behaviors that basically shapes and guides the development of infectious pathogen behavior. In a similar like, our study was able provide empirical evidence of the relationship between anthropological factors such as; Belief about COVID-19 (p-value= 0.001, OR= 2.1, 95% CI 1.4, 3.2), attitude towards COVID-19 vaccine (p-value=0.304, OR=1.5, 95% CI 0.7, 3.5), handwashing practices before the onset of COVID-19 (p-value= 0.615, OR=1.2, 95% CI 0.7, 2.7) and the habits of being in crowded places (p-value=0.119, OR=2.0, 95%CI 0.8, 4.6) and the spread of COVID-19 disease.

Limitations to the study

The study did not measure the daily cumulative numbers of COVID-19 cases which would have been a better measure for the spread of the SARS-Co-V-2 virus.

CONCLUSION

The anthropological analysis carried out in this study indicates that the effect of the estimated cumulative incidence of COVID-19 disease in the different compounds in the Lusaka District of Zambia is notably influenced by demographic, knowledge and some belief characteristics of the participants in each compound. In particular, after the analysis of the independent variables, with respect to the odd ratio, we found a total of nine (9) variables with statistical significance at univariate level and two (2) at multivariate level, which leads us to greater strength of the results obtained in the study. This analysis can help policymakers to make decisions to moderate the effects of future hypothetic pandemic situations

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