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A cross-sectional study on socio-ecological and socio-anthropological determinants of COVID-19 in Lusaka Province of Zambia

Alyce Fri Fonchin[1,6,*] Chisoni Mumba[1,*] Linda Basikolo[1,2,6,*] Simegnew Adugna Kallu[1,3,6,*] Henson Kainga[1,4,6,*] Jezreel Mwiinde[1,6] Vistorina Benhard[1,5,6] John Muma[1,*] Musso Munyeme[1,6]

1. Department of Disease Control, School of Veterinary Medicine, University of Zambia, Lusaka 10101, Zambia;cmumba@unza.zm (C.M.); mussomunyeme@gmail.com
2. Department of Animal Health and Livestock Development, Ministry of Agriculture, Lilongwe 207203, Malawi; basikololinda@yahoo.com (L.B.)
3. College of Veterinary Medicine, Haramaya University, P.O. Box 138, Dire Dawa, Ethiopia; adusim12@gmail.com (S.A.K.)
4. Department of Veterinary Epidemiology and Public Health, Faculty of Veterinary Medicine, Lilongwe University of Agriculture and Natural Resources, Lilongwe 207203, Malawi; hkainga@bunda.luanar.mw (H.K.)
5. Department of Agriculture Development, Ministry of Agriculture, Water and Land Reform, Namibia.
6. Africa Center of Excellence for Infectious Diseases of Humans and Animals, University of Zambia, Lusaka, 10101, Zambia.

*** Corresponding authors: Alyce Fonchin, alycefri@gmail.com**

ABSTRACT

Background: The COVID-19 disease constitutes a pandemic that has created an international public health emergency. Besides the significant health challenges, the impact of the COVID-19 disease has been the restriction of movements that have heavily affected the global economy. The first case of COVID-19 in Zambia was identified on March 18th, 2020. By the end of November 2020, the number of districts reporting COVID-19 infections had increased from 68 to 96, with reports of the highest transmission in the capital city, Lusaka, the Copperbelt, and Ndola districts. As COVID-19 spread across the nation of Zambia, several factors are responsible for the spread of the virus. Despite the extensive collection of research done on determinants of COVID-19 disease, the spatial distribution of the disease along socio-demographical and socio-ecological domains remains speculative and infectious diseases have been less looked into in the areas of anthropological dynamics.

Methodology: This study used a cross-sectional design to investigate the ecological and anthropological determinants of COVID-19 disease in four compounds in the Lusaka district of Zambia. A guided questionnaire was used to collect data from 301 participants. A descriptive analysis of all independent variables was done. Analysis for associations of dependent and independent variables and multivariate analysis of the independent variables significant at the bi-variate level was

conducted to investigate the association between the dependent variable (Knowledge of anyone infected with COVID-19 virus) and the independent variables.

Results: The bi-variate analysis results showed that 14 independent variables with odds ratios greater than one were significantly associated with the spread of COVID-19. Two variables were found to be highly significant in the multivariable logistic regression analysis model. These included beliefs about COVID-19 (odds = 3.0; p = 0.003; CI 1.2-3.3), and participants area of residence (odds = 2.6; p = 0.003; CI = 1.2-5.5). Other significant multivariate variables were ecological variable; climate and anthropological variables; hand hygienic practices.

Conclusion: The current research provides further insight into the potential role ecology and anthropology contribute to the spread of communicable diseases. The study recommends awareness of the population to enhance preparedness and response to reduce the spread of COVID-19.

Keywords: Anthropological, COVID-19, Ecological, Lusaka

INTRODUCTION

In the realm of infectious diseases, a pandemic is a worst-case scenario [1]. The COVID-19 disease constitutes one of the pandemics which have created an international public health emergency resulting in more than 116.3 million cases and 2.5 million deaths globally as of March 5, 2021[2]. The significant impact of the COVID-19 disease has been the restriction of movements and travel, which has heavily affected the international economies, showing a predicted revenue loss of about 810.7 billion USD in 2020 [3]. By May 2020, all African countries were faced with the COVID-19 virus, with an estimated total of about 124.4 thousand confirmed cases, with 69.7 thousand active cases [4]

The first case of COVID-19 in Zambia was identified on March 18th, 2020[5]. Since then, the Ministry of Health (MoH) has confirmed over 17.9 thousand cases with 364 deaths, with a case fatality rate of 2% as of December 7, 2020 [6]. From September 2020, of the 116 districts countrywide, the number of COVID-19 infections reported increased from 68 to 96 by the end of November 2020, with reports of the highest transmission in the capital city, Lusaka, the Copperbelt and Ndola districts [7]. As COVID-19 spread globally and across the nation of Zambia, several factors are responsible for the spread of the virus, which led to a cumulative increase in the number of COVID-19 confirmed cases, recoveries as well as the deaths in the nation, as affirmed regularly by the MoH [8].

Researchers have proposed several predictors for the spread and scope of the COVID-19 pandemic, some of which include environmental factors [4, 9], context-specific factors of different countries [10], population density [11], socio-demographic factors [12], socio-economic and health factors [13] amongst others. Despite these extensive collections of research, the spatial distribution of COVID-19 disease along socio-demographical and socio-ecological domains remains speculative

[14]. The effect of environmental factors relating to the COVID-19 pandemic has not been sufficiently investigated [9], and infectious diseases have been less looked on in the areas of anthropological dynamics, with slow incorporation of the investigations of socio-cultural factors into this mix of factors influencing the spread of COVID-19 disease [15].

The COVID-19 pandemic is causing a significant global health crisis due to its accelerating transmission and multiple waves of occurrence in all world regions [16]. Due to the novelty of the disease, little has been known about the virus and the contributing factors to the fast spread of the virus [17]. Further, the absence of empirical proof of determinants of COVID-19 has prevented global efforts to stop the spread of the disease [18], as it applies to Zambia. Therefore, the universal recommendations by the World Health Organization (WHO) to control the spread of the virus need contextualization and further investigation of country-level predicting factors [19]. Of these extensive collections of information, this present study focuses on the socio-ecological and socio-anthropological factors that influenced the spread of COVID-19 in the Lusaka District of Zambia.

METHODS AND STUDY POPULATION

Study Setting

A cross-sectional survey was conducted among the inhabitants of four residential areas (compounds) in the Lusaka district of Zambia. The Lusaka district is one of the eight districts that make up the Lusaka province of Zambia (Figure 1). It is the capital city of Zambia and the most populated district in the province, with a population of 1.7 million people [20].

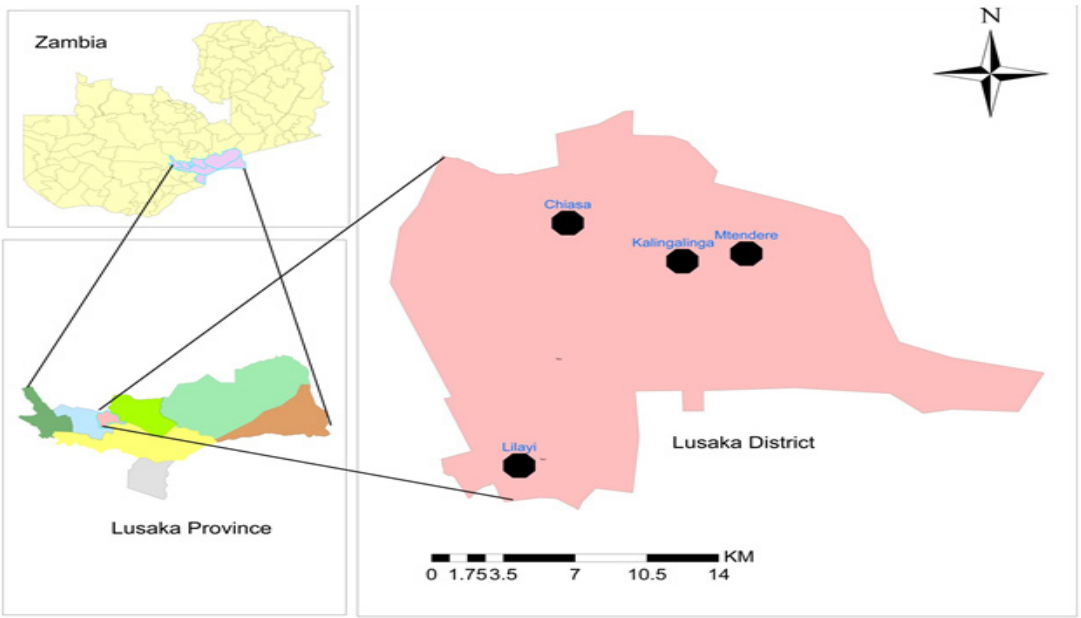

Figure 1: Lusaka district map with residential compounds

The four compounds were selected by a simple random sampling method from all the compounds that make up the Lusaka district. These were; Lilayi, Chaisa Kalingalinga,and Mtendere compounds.

Study Participants

Inhabitants of the Lusaka district of Zambia were considered as the study population. The study participants were randomly selected from the four compounds of interest based on these criteria: individuals ≥18 years of age who had lived in the compound of interest for at least six months (January to June 2021) prior to the study period and had consented to participate in the study.

Sample size calculation

The formula $\frac{x^2\ NP(1-P)}{d^2\ (N-1)+x^2\ P(1-P)'}$ [21], was used to calculate the sample size for this study at a 1.96 confidence level and 0.05 degree of accuracy, whilst the prevalence of possible infection was estimated at 0.5 (50%) of the total population of the Lusaka district (N=1,747,152). Then, the final sample size was 384, which was distributed between the compounds of interest proportionately depending on the percentages each compound contributed to the total district population using a formula (X/N * 384). Where X= population size of the compound in question, N=sum of the total population of the four compounds chosen for the study (178,527).

Calculated proportionately, 29, 43, 85, and 228 participants were the sample sizes for Lilayi, Chaisa, Kalingalinga, and Mutendere, respectively. Finally, the participants for this study were recruited by simple random sampling at the government health clinics located in each compound of interest.

Data Collection Instrument

The data collection tool used for this study was an interview-based questionnaire adopted and modified from previously published studies [18, 22 – 24]. The questionnaire was made of four sections; socio-demographic information, knowledge of COVID-19, ecological and anthropological variables which are likely to influence the spread of COVID-19 in the communities. This instrument was prepared in M.S. words in two languages (English and Nyanja).

Data Collection Procedure

Two qualified enumerators were recruited. The team received sufficient training about the purpose of the study and the data collection procedure. The enumerators were informed about all precautions to be followed during the data collection process, such as: handling ethical issues, social distancing, wearing face masks, and the use of hand sanitizers. Before the commencement of the interview, participants were well informed about the study, and participation was based on participants' consent. The principal investigator kept in touch with enumerators to regularly check on the data collection process till the end of the study. Data was collected from 14th June 2021-18th June 2021.

Data Processing, Analysis Quality Control

The liability analysis of the questionnaire was done on 20 participants of the University of Zambia community and

the Cronbach`s alpha coefficient of 0.81, indicating the internal consistency and reliability of the study instrument. Data cleaning was conducted in Microsoft Office Excel®, 2019, while data analysis was conducted using STATA® Version 15 Statistical software. Data analysis was done in three stages; first, univariate analysis for descriptive statistics such as percentages and frequencies of each independent variable. In the second stage, a bi-variate analysis was conducted to assess the association between the independent and dependent variables, "Knowledge of anyone infected with COVID-19". The third stage was a multivariate analysis to assess the association between significant independent variables at the bivariate level and the dependent variable. For the bivariate and multivariate analysis, independent variables with an odds ratio greater than 1 were considered significant variables. Data entry and analysis were consistently cross-checked by supervisors.

RESULTS

Descriptive statistics

Study participants' characteristics

A total of 301 individuals participated in the study giving a 78.4% response rate (Table 1). Female participants were slightly more (54.5%) than males (45.5%). Additionally, the majority (53.2%) of the participants were in the age range of 18-28 years. With regards to marital status, 53.5% of the participants were single, while with regards to educational status, 46.5% of the participants were either in or had left college. The majority of the participants (46.6%) were formerly employed, (18.6%) were self-employed, and 34.8% were unemployed. The participants with monthly income between 0-K1000 had a higher proportion (57.8%).

Demographic characteristics	***Category***	***Frequency (n=301)***	***Proportion (%)***	***95% C I***
Gender:	Male	137	45.5	39.8,51.3
	Female	164	54.5	48.7,60.2
Age (years):				
	18-28	160	53.2	47.4,58.9
	29-39	83	27.6	22.7,33.1
	≥ 40	56	18.6	14.5,23.6
	No information	2	0.6	0.0,2.6
Marital Status: Single				
	Single	161	53.5	47.7,59.2
	Married	120	39.9	34.3,45.7
	Divorced	18	6.0	3.7,9.4
	Others[α]	2	0.6	0.0,2.6
Level of Education:				
	None	6	2.0	0.8,4.5
	Primary	94	31.2	26.1,36.8
	Secondary	61	20.2	15.9,25.3
	Tertiary	140	46.5	40.8,52.3

Occupation:				
	Government employed	70	23.3	18.7,28.5
	Private employed	70	23.3	18.7,28.5
	Self-employed	56	18.6	14.4,23.5
	Unemployed	105	34.9	29.6,40.6
Monthly income levels				
	0-K1000	174	57.8	52.0,63.4
	K1001-K5000	90	29.9	24.8,35.5
	K5001-K10000	32	10.6	7.5,14.8
	Above 10000	5	1.7	0.6,4.5
	Above 10000	5	1.7	0.6,4.5

n = number of respondents; % = Percentage; α=Widow and widower; CI = Confidence interval

Participants' Knowledge about COVID-19 and Social Factors that Influence the Spread of COVID-19

The majority of the participants, at 92.7% (95% CI 89.7, 95.6), considered COVID-19 a serious disease with disruptive aspects of social life (Table 2). A further 58.1% (95% CI 52.5, 63.7) of participants alluded to getting COVID 19 information from social media. With regards to the socially disruptive effects of COVID-19, 54.5% (95% CI 49.2, 60.1) of the participants had knowledge of someone who was/had been sick or had died of the disease within 12 months of the survey. When it came to the knowledge of deterrent factors for COVID-19, only 44.5% (95% CI 38.8, 50.2) of participants affirmatively responded to opening their windows in a house as a way of allowing airflow as a measure of avoiding the spread of COVID-19. Despite the 73.4% (95% CI 68.4, 78.4) of participants acknowledging that crowded places could be a medium for the spread of COVID-19 disease, and the 72.4% (95% CI 67.2, 77.5) of participants also agreeing that COVID-19 is an airborne disease, a majority of participants, 61.8% (95% CI 56.3, 67.3) still found themselves in crowded places from day to day in the midst of the COVID-19 pandemic. A further 76.0% (95% CL 70.9, 80.6) of participants responded that the individual lifestyles displayed by communities were more likely to promote the spread of COVID-19 and 71.4 % (95% CI 66.3,76.6) of participants affirmed that the spread of COVID-19 reduced in a community where hand-washing, social distancing and masking were practiced.

Table 2: Participants' Knowledge of COVID-19 and Social Factors that Influence the Spread of COVID-19

Variables	*n=301*	*%*	*95% CI*
Common sources of COVID-19 information:			
Social media (internet, facebook)	175	58.1	52.5,63.7
Local health campaigns	66	22.0	17.2,26.6
Posters and billboards	51	17.0	12.7,21.2
Others	09	3.0	1.1,5.0
Is COVID-19 a serious problem?			
Yes	279	92.7	89.7,95.6
No	03	1.0	0,2.1
No information	19	6.0	4.0,9.0
Is COVID-19 airborne?			
Yes	218	72.4	67.2,77.5
No	83	27.6	22.5,32.6
Knowledge of anyone sick/died of OVID-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
Effect of windows on the spread of OVID-19			
Yes	134	44.5	38.8,50.2
No	149	49.5	43.8,55.2
No information	18	6.0	3.3,8.7
Habits of being in crowded places in the midst of COVID-19			
Yes	186		61.8
No	114		37.9
No information	01		0.3
Are there crowded places sources of COVID-19 disease?			
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
Effect of community lifestyle on the spread of COVID-19			
Yes	228	76.0	71.0,80.6
No	70	23.3	18.5,28.1
No information	03	1.3	0.1,2.1
Hand-washing, masking and social distancing effect on the spread of COVID-19:			
COVID-19 disease will still spread rapidly	69	23.0	18.1,27.7
The rate of spread will reduce	215	71.4	66.3,76.6
The will be no spread	16	5.3	2.8,7.9
No information	01	0.3	0.3,1.0

n = number of respondents; CI = Confidence interval; % = Percentage

Ecological factors that influence the spread of COVID-19

Distribution of the ecological factors that might influence the spread of COVID-19 disease varied across the study area (Table 3). Of the 301 participants enrolled in the study, 53.8% (95% CI 48.2, 59.5) affirmed that the COVID-19 virus spread more in colder climates, and 68.1% (95% CI 62.8, 73.4) of participants acknowledged that sunlight had a role in the spread of COVID-19 disease. The majority of the participants, 59.5% (95% CI 54.0, 65.0), were of the opinion that environmental/ air pollution did not affect the spread of COVID-19 disease, and 63.1% (95% CI 57.6,68.6) of participants acknowledged that COVID-19 disease spread faster in areas of high population density. In addition, a majority of the study participants, 71.4% (95% CI 66.3, 77.1), agreed that public transportation affected the spread of COVID-19 disease.

Table 3: Distribution of participants' perceptions of the possible ecological determinants of COVID-19

Variables	*n=301*	*%*	*95% CI*
The effect of climate on the spread of COVID-19;			
Climate has no effect	38	12.5	8.9,16.4
The hotter the climate, the lower the spread	83	27.6	22.5,32.7
The colder the climate, the more the spread	162	53.8	48.2,59.5
No information	18	6.0	3.3,8.7
Sunlight has a role on the spread of COVID-19			
Yes	205	68.1	62.8,73.4
No	82	27.2	22.2,32.3
No information	14	4.7	2.3,7.0
Effect of environmental/air pollution on the spread of COVID-19			
Yes	84	28.0	22.8,33.0
No	179	59.5	54.0,65.0
No information	38	12.6	9.0,16.4
Relationship btw pop. density and the spread of COVID-19			
No relationship	59	19.6	15.1,24.1
The denser the pop., the more the spread	190	63.1	57.6,68.6
The lesser the pop, the more the spread	04	1.3	0.03,2.0
The lesser the pop., the lesser the spread	39	13.0	9.1,16.8
No information	09	3.0	1.1,5.2
Does public transport affect the spread of COVID-19?			
Yes	215	71.4	66.3,77.1
No	26	9.4	5.4,12.3
No information	60	20.0	15.4,24.5

n = number of respondents; CI = Confidence interval; % = Percentage

Anthropological factors that influence the spread of COVID-19

The study found different perceptions of the possible anthropological factors which might influence the spread of COVID-19 across study participants (Table 4). With regards to hand hygienic practices, 63.5% (95% CI 58.0,69.0) of participants acknowledged that hand hygiene was not a common practice in the communities before the onset of COVID-19 disease and only 60.1% (95% CI 54.6,65.7) of participants attested that hand hygienic practices were more common in the midst of COVID-19 pandemic. Social activities such as markets, churches and family gatherings were still ongoing in these communities in the midst of the COVID-19 pandemic, with 30.1% (95 % CI 25.6,36.2) and 25.0% (95% 20.0,30.3) of participants acknowledging that market and family gathering being the most common activities in the communities respectively. Despite the 81.3% (95% CI 76.3,85.2) of participants who believed that COVID-19 disease was real and the 53.5% (95% CI 48.0,59.2) participants who believed that handshakes were still common greet practices in the communities was a means of COVID-19 disease transmission, only 49.4% (95% CI 43.2,55.1) of participants had a positive attitude towards the COVID-19 vaccine.

Table 4: Distribution of participants' perceptions of the possible anthropological factors that might influence the spread of COVID-19

Variables	*n=301*	*%*	*95% CI*
Beliefs about COVID-19			
It is real	243	81.3	76.3,85.2
It is not real	14	5.0	2.3,7.1
No information	44	13.7	9.5,17.2
Manner of greetings which enhance the spread of COVID-19			
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
Was hand-washing practice common before 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 hand-washing in the mist of COVID-19 pandemic;			
Very often	181	60.1	54.6,65.7
Only after an interaction with people	92	30.6	25.3,35.8
Not all	16	5.3	2.8,7.9
No information	12	4.0	1.8,6.2

Activities during the COVID-19 pandemic which are avenues for COVID-19 spread;			
Family gatherings	75	25.0	20.0,30.3
Market gatherings	93	30.1	25.6,36.2
Sport gatherings	51	17.0	12.7,21.2
Other(church)	82	27.2	22.2,32.3
Willingness 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

n = number of respondents; CI = Confidence interval; % = Percentage

Measure of association of potential determinants of COVID-19

This statistical analysis was carried out with the dependent variable "Knowledge of anyone infected with COVID-19" to measure the spread of COVID-19 against all the other independent variables. The results presented 14 significant variables associated with the spread of COVID-19, cutting across demographic, ecological and anthropological variables inclusive (Table 5). The significance of a variable was reported based on an odds ratio (OR) greater than 1.

Table 5: Factors significant to the spread of COVID-19 in both high and density areas at the bivariate level

Variables	*n=301*	*%*	*95% CI*
Strata	0.008	2.8	1.3,6.0
Gender	0.661	1.2	1.0,2.8
Beliefs about COVID-19	0.001	2.1	1.4,3.2
Willingness to be vaccinated	0.304	1.5	0.7,3.5
Climate effect on the spread of COVID-19	0.354	1.3	0.7,2.4
Habits of being in crowded places in the midst of COVID-19	0.119	2.0	0.8,4.6
Effect of windows on the spread of COVID-19	0.360	1.4	0.7,3.0
Environmental/air pollution effect on Covid-19 spread	0.626	1.2	0.6,2.4
Hand-washing practices before the onset of COVID-19	0.615	1.2	0.7,2.7
Frequency of hand-washing in the mist of COVID-19	0.345	1.2	0.8,2.1
Knowledge of anyone sick/died of COVID-19	0.716	1.2	0.5,2.7
Effect of Hand-washing, masking and social distances	0.755	1.1	0.5,2.7
Crowded places being a media of Covid-19 spread	0.014	2.5	1.2,5.2
Public transport effect on the spread of COVID-19	0.532	1.2	0.7,2.0

CI = Confidence interval; % = Percentage; OR = Odds ratio

Maximum likelihood estimates of potential determinants of COVID-19

After running a multivariate analysis with "is COVID-19 a serious problem" as a measure of the spread of COVID-19, against all independent variables which were significant at the bi-variate level; strata, climate, beliefs about COVID-19 and hand hygiene were positively associated with the spread of COVID-19 (Table 6). The results are reported based on the odds ratios (OR) greater than 1.

Table 6: Factors significant to the spread of COVID-19 disease at multivariate level

Variable	b	S.E. (b)	p-value	OR	95% CI (OR)
Constant	1.0	1.1	0.19	-	-
Strata	2.5	0.9	0.003	2.6	1.2,5.5
Higher spread in Colder climate	1.78	0.6	0.005	1.8	0.9,3.4
Beliefs about COVID 19	2.9	0.5	0.003	3.0	1.2,3.3
Frequency of washing hands	0.9	0.3	0.0001	1.5	0.7,2.3

b = Unstandardized regression weight; SE = Standard error; OR= Odds ratios; CI = Confidence interval

DISCUSSIONS

The findings from our present study have been able to elaborate on the factors that influence the spread of COVID-19 disease in Lusaka District of Zambia. Several studies have suggested the association of some ecological variables [25, 26] and anthropological variables [27, 28] with the spread of COVID-19 disease. Overall, the findings of this present study suggest four factors to be associated with the spread of COVID-19 disease in the Lusaka District of Zambia. Based on the multiple logistic regression analysis, these were; the demographic variable strata (origin of study participants), the ecological variable climate, and the anthropological variables; beliefs about COVID-19 and hand hygienic practices in the communities. The results of this study, to some extent, agree with some earlier research findings that supported the concepts of strata [29, 30], climate [31, 32], beliefs about COVID-19 [33, 34], and hand hygienic practices [35, 36] as significant determinants to the spread of COVID-19 disease.

Specifically, this current study identified the overall factors, predictors, and explanatory factors of COVID-19 disease occurrence. Within these, the following came out significant; climate, habits of being in crowded places, the effects of windows on the spread of COVID-19 and the effect of environmental/air pollution on the spread of COVID-19 disease as significant socio-ecological determinants of the spread of COVID-19. It has been postulated that crowded places are a media for spreading COVID-19 disease. These results agreed with the similar studies which shows climate [32], crowding [37] and air quality [38] as significant predictors of COVID-19 infections

Further in this study, we identified; individuals' beliefs about COVID-19 disease, individuals' attitudes towards COVID-19 vaccines, and hand hygienic practices as the socio-anthropological

determinants of COVID-19 in the Lusaka district in Zambia. Consistently, research has demonstrated greater compliance of both culture and individuals' beliefs about COVID-19 with adherence to social norms [27, 28]. Evaluating individuals' beliefs is challenging, particularly for a new disease like COVID-19 [34]. The results of this study, to some extent, agree with the study that found community's perception of COVID-19 disease severity significant to the spread of the disease [33]. Biddlestone and co-workers [27] showed that individualist and collectivist perceptions exhibited different intentions for individuals or groups to engage in activities that are likely to reduce the spread of COVID-19.

Evidently, the implication of vaccination can be recognized by the protection it provides to those vaccinated and the unvaccinated through herd immunity. Unfortunately, ensuring optimal vaccine uptake at the population level presents significant challenges [39]. In with others researchers [40], this study found participants' attitude towards COVID-19 vaccine a significant predictor to the spread of COVID-19. Hand hygienic practices have been recognized as one of the essential activities health professionals use to stop the spread of diseases and infections [35]. At the onset of the COVID-19 pandemic, the WHO reiterated regular hand-washing practices as a recommendation for preventing COVID-19 infection [41]. In this study, 60.1% of the respondents agreed to wash hands as a measure of COVID-19 prevention. The results of this study concur with the study that found moderate-frequency of hand-washing practice to be associated with a significant reduction in the risk of SARS-Co-V-2 infection compared to low hand-washing [36].

The study showed some strengths: firstly, the study incorporated the investigation of anthropological factors that influence the spread of COVID-19, which is an area of study where limited research has been done. Secondly, the study population was a mix of individuals from all social backgrounds, both literate and illiterate, educated and non-educated, high and low-density population areas, which was a representative of the constitution of the Lusaka district. However, this study had several limitations, including the following; firstly, the study failed to record the number of daily COVID-19 cases in the communities because this was beyond the scope of the study. Secondly, the data collection process took place over a period of one week in the context of a rapidly changing COVID-19 landscape, which may render the interpretation of the findings and comparisons across compounds difficult. Hence, for further research, the methodology of this study could be replicated, taking total daily counts of COVID-19 cases as a dependent variable.

CONCLUSIONS AND RECOMMENDATIONS

There are numerous factors responsible for the spread of COVID-19 disease, and these factors apply to a different extent in different contexts. Lessons learned from the determinants of COVID-19 can offer the entire population with the knowledge to enhance preparedness and response to reduce the spread of

other infectious diseases. Overall, the current research provides further insight into the potential role ecology and anthropology contribute to the spread of communicable diseases. The current research also emphasizes examining the interplay between different factors in communicable disease transmissions.

Overall, this study will recommend strategies to encourage population awareness on the advantages of vaccines to communicable disease prevention and encourage more channels to facilitate vaccination uptake.

ETHICAL CONSIDERATIONS

The ethical clearance for this study was obtained from the Excellence in Research Ethics and Science (ERES) board with an ethical clearance number of I.R.B./407/12 and the Lusaka District Health Administrative Bodies. The participants for this study were informed about the study before the beginning of the data collection proper; informed consent was obtained from the participants.

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AUTHOR CONTRIBUTIONS

1. MM, JM and CM provided supervision for the study from proposal writing to data collection and analysis, final discussion and the development of this manuscript.
2. AF, SAK, LB and HK developed the proposal for this study
3. AFF, SAK, and LB collected data for this study
4. HK, SAK did data entry, cleaning, analyzed and interpreted the data
5. VB and JM put together the first collect draft of the manuscript
6. All authors made substantial contributions in revising the manuscript critically for important intellectual content; agreed to submit it to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

ETHICS STATEMENT

The authors confirm that the ethical policies of the journal, as noted on the journal's author guidelines page, have been adhered to. Ethical approval for this study was sought from the Excellence in Research Ethics and Science (ERES) CONVERGE IRB (ref No. 2021-June-09). A further approval letter was obtained from the Lusaka Health District Authority. A verbal consent was obtained from respondents of the questionnaire.

CONFLICT OF INTEREST STATEMENT

The authors of this paper do not have any financial or personal relationship with other people or organizations that could inappropriately influence or bias the content of this paper. Therefore, the authors declare to have no competing interests.

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DATA AVAILABILITY

All data and material of the present study are available upon request from the corresponding author.

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