MULUNGUSHI UNIVERSITY MULTIDISCIPLINARY JOURNAL (MUMJ)

Mulungushi University Multidisciplinary Journal
ISSN: 2958-3926
Vol. 6 No. 1

https://research.mu.ac.zm/research/index.php/mu

Association between knowledge and perceptions of COVID-19 among Kabwe residents in Central Province, Zambia

Jeane.B. Ngala[1], Harriet.M. Simaubi[1], Concepta.N. Kwaleyela[1], Jamia Milanzi[1], Isabel. N. Luambia[1], Harrison Namoomba[1], Melody H. Kuswe[1]

[1] Mulungushi University, School of nursing and Midwifery, Kabwe, Zambia; Email: jane.ngala@yahoo.com
[1] Mulungushi University, School of nursing and Midwifery, Kabwe, Zambia; Email: hmlonda@yahoo.com
[1] Mulungushi University, School of nursing and Midwifery, Kabwe, Zambia; Email: ckwaleyela@gmail.com
[1] Mulungushi University, School of nursing and Midwifery, Kabwe, Zambia; Email: aminakabungo@gmail.com
[1] Mulungushi University, School of nursing and Midwifery, Kabwe, Zambia; Email: isabelluambia@gmail.com
[1] Mulungushi University, School of nursing and Midwifery, Kabwe, Zambia; Email: harrisonamoomba@gmail.com
[1] Mulungushi University, School of nursing and Midwifery, Kabwe, Zambia; Email: melodyhaz@yahoo.co.uk

*Correspondence Jeane B. Ngala, Email: jane.ngala@yahoo.com

ARTICLE HISTORY: Received 22 April 2025; Accepted 24 June 2025

ABSTRACT

The COVID-19 pandemic, caused by SARS-CoV-2, posed major global health challenges, including in Zambia. Transmission primarily occurred through respiratory droplets, with additional risks from contaminated surfaces and possible fecal-oral routes. With an incubation period of 2–14 days, diverse containment strategies were implemented. In Zambia, the Ministry of Health launched extensive public health campaigns promoting hand hygiene, mask use, physical distancing, and vaccination. Despite these efforts, variations in public response and adherence to preventive measures were observed across different regions, Kabwe District inclusive. This study examined the association between knowledge and perceptions of COVID-19 among Kabwe residents. A quantitative cross-sectional study was conducted in Kabwe's Central Business District, purposefully selected due to its population density and public activity which was advantageous for accessing a diverse range of participants in a short period. Convenience sampling was employed to recruit participants who were readily available and willing to participate at the time of data collection, this approach was used to maximize participation in a busy urban setting while acknowledging limitations of non-probability sampling. The sample size was 384. Participants aged 18 years and above were recruited through convenience sampling. Data were collected via semi-structured questionnaires following informed consent. Statistical Package for Social Sciences (SPSS) version 23 was used for analysis. Chi-square tests assessed associations, and multivariate logistic regression identified predictors of knowledge and perception. The study found that 87% of respondents had substantial knowledge of COVID-19, though 13% held misconceptions. Education level significantly predicted knowledge, with 91% of higher educated individuals demonstrating correct understanding compared to 61% of those with lower education (p = 0.044). Place of residence also influenced knowledge (p = 0.003). However, 89% of respondents exhibited poor perception of COVID-19, indicating limited recognition of the serious of COVID-19. Significant associations were found between perception and age (p = 0.0009), education (p=0.001), and employment (p = 0.001), Knowledge level was significantly associated with perception (p = 0.001). Despite high awareness, persistent misconceptions necessitate targeted health education and demographic specific strategies such as youth focused peer education and elderly centered counseling to promote accurate perceptions and improve compliance with COVID-19 preventive measures.

Keywords: COVID-19, knowledge, perception, demographic factors, community sensitization, COVID-19 containment measures

INTRODUCTION

The COVID-19 pandemic, caused by the novel 2019 coronavirus, devastated the globe, and Zambia, situated in the southern region of sub-Saharan Africa, was not exempted. With high morbidity and mortality rates, COVID-19 affected millions worldwide (WHO,2020a). This new coronavirus strain, responsible for illnesses ranging from the common cold to severe acute respiratory syndrome (SARS), had not previously been identified in humans (WHO,2020b). Transmission occurred through human-to-human contact via respiratory droplets, the fecal-oral route, and direct contact with contaminated surfaces, with an incubation period of 2–14 days. At the time, no antiviral treatment specifically targeted COVID-19 (Bhagavathula et al., 2020). However, since December 2019, countries worldwide had implemented various control measures to curb the pandemic. Recommended strategies included personal protective measures such as voluntary home isolation, respiratory etiquette, hand hygiene, physical distancing, and staying at home; environmental interventions such as regular surface disinfection; and community-based measures such as social distancing and the postponement or cancellation of gatherings (Seale et al., 2020). Additionally, health-seeking behaviors for early diagnosis and treatment were encouraged.

In alignment with WHO guidelines, the Government of the Republic of Zambia (GRZ), through the Ministry of Health (MoH), implemented individual health protection measures to combat COVID-19. These measures were incorporated into public health laws, including Statutory Instruments (SIs) No. 21 and 22 of 2020 under the Public Health Act, Cap 295 which served as critical legal frameworks guiding Zambia's response to COVID 19 pandemic. These regulations mandated hygiene and sanitary measures in public premises and required quarantine for confirmed cases. They also imposed restrictions on public gatherings, and enforced personal protection measures, such as the mandatory wearing of face masks in public (Government of the Republic of Zambia, (GRZ) 2020). However, in Kabwe District, Central Province, additional interventions were introduced to mitigate the spread of COVID-19. These included active surveillance, routine screening in health facilities and schools, mortuary surveillance of all Brought-in-Dead (BID) cases, establishment of isolation facilities for suspected cases, community engagement through radio programs, and traveler screening at selected checkpoints. Despite these efforts and a declining trend in cases, many individuals disregarded the control measures, increasing the risk of a resurgence. Therefore, implementing evidence-based interventions was crucial to mitigate the impending threat, underscoring the relevance of this study.

Statement of the Problem

As of April 16, 2021, the Ministry of Health (MoH), through its daily COVID-19 update bulletin, reported a cumulative total of 6,445 COVID-19 cases, 51 deaths, and 6,354 recoveries in Central Province since the onset of the pandemic (GRZ, 2021). This data indicated a promising recovery rate of 97.5%. However, despite these encouraging figures, community members continued to frequent crowded public spaces without adhering to recommended preventive measures, such as maintaining social distancing or correctly wearing face masks. Observations revealed that many individuals wore masks improperly, often positioning them below their chins rather than securely covering both the nose and mouth. This non-compliance with public health guidelines posed a significant threat to the progress achieved in controlling the spread of COVID-19 and raised concerns about the public's awareness and perception of the disease's severity and transmission risks.

Understanding the underlying factors contributing to such behaviors necessitated an investigation into the community's knowledge, perceptions, and attitudes toward COVID-19. Specifically, it was crucial to examine the determinants influencing

individuals' willingness, motivation, and ability to adhere to the preventive measures implemented by health authorities. Addressing these concerns was essential for developing a comprehensive, evidence-based public health response tailored to the community's needs. The findings of this research aimed to inform strategic interventions that would enhance compliance with preventive measures, thereby mitigating the continued spread of COVID-19 within the region.

Justification of the Study

Health-related behaviors were often influenced by individuals' perceptions of potential benefits and barriers, which were closely linked to their level of knowledge about a specific health issue (LaMorte, 2019). Understanding these perceptions was particularly important during the COVID-19 pandemic, as public adherence to preventive measures played a critical role in mitigating disease transmission. This study was significant for several reasons;

First, by examining the knowledge and perceptions of Kabwe residents regarding COVID-19, the study provided valuable insights into both the community's accurate understanding of the disease and the prevalent misconceptions. These included correct beliefs about modes of transmission and prevention alongside persistent misunderstandings related to the severity of the disease and the effectiveness of public health measures. The study also identified existing knowledge gaps concerning disease transmission and prevention, which were essential for informing targeted public health education initiatives. Addressing these gaps was considered crucial for enhancing public awareness and promoting adherence to recommended preventive measures.

Second, the study explored the key factors that influenced compliance or non-compliance with COVID-19 preventive measures. Understanding these behavioral determinants was critical for tailoring public health communication strategies to resonate more effectively with the community and to improve adherence to health guidelines. Additionally, the study assessed residents perceived threats and anticipated adverse outcomes of COVID-19. Such insights were instrumental in developing targeted interventions to encourage compliance with infection prevention measures. For instance, if fear of severe illness or mortality was identified as a primary motivator, reinforcing the severity of COVID-19 in public health messaging could have served as an effective strategy to enhance compliance.

Finally, the study findings served as a valuable resource for the Central Province COVID-19 Multi-Sectoral Preparedness and Response Committee. The insights gained provided the committee with evidence-based guidance on priority areas for intervention and strategies to improve adherence to preventive measures within the community. Beyond the immediate context of COVID-19, the findings contributed to the broader goal of strengthening pandemic preparedness and response efforts in Kabwe.

Overall, this study had significant public health implications, providing critical evidence to support COVID-19 containment efforts through data driven community messaging and improved policy targeting. These insights can inform future epidemic response strategies in Zambia.

Purpose of the Research

The primary aim of this study was to assess the knowledge and perceptions of Kabwe residents regarding the COVID-19 pandemic. By identifying gaps in understanding and awareness, the study aimed to inform targeted interventions designed to enhance adherence to preventive measures that mitigate the spread and acquisition of COVID-19.

Research Hypothesis

This study hypothesized that there was a significant association between the level of knowledge and perceptions of COVID-19 among residents of Kabwe District, located in Zambia's Central Province.

The study hypothesized a significant association between residents' knowledge and their perceptions of COVID-19 in Kabwe district, Central Province, Zambia.

General Objective

The overarching objective of this research was to evaluate the knowledge levels and perceptions of COVID-19 among residents of Kabwe.

Specific Objectives

The study was guided by the following specific objectives:

- To assess the knowledge levels of COVID-19 among residents' of Kabwe District.
- To determine the perceptions of COVID-19 among Kabwe District residents.

Theoretical Framework

This study was grounded in the Health Belief Model (HBM), a widely recognized psychological framework for understanding health-related behaviors, particularly in relation to disease prevention. The HBM postulates that an individual's decision to adopt preventive health behaviors is influenced by their perceived susceptibility to the disease, perceived severity of the disease, perceived benefits of taking preventive actions, perceived barriers to such actions, cues to action, and self-efficacy (Rosenstock, 1974).

The six key components of the HBM applied in this study included:

1. ***Perceived Susceptibility:*** This referred to an individual's assessment of their risk of contracting COVID-19. In this study, it examined how Kabwe residents perceived their likelihood of infection.
2. ***Perceived Severity:*** This component considered an individual's belief in the seriousness of contracting COVID-19 or the consequences of not adhering to preventive measures.
3. ***Perceived Benefits***: This aspect pertained to the belief in the effectiveness of recommended preventive actions, such as mask-wearing, social distancing, and hand hygiene, in reducing the risk of infection.
4. ***Perceived Barriers:*** These included the perceived obstacles or challenges associated with adherence to COVID-19 preventive measures, such as accessibility, inconvenience, or misinformation.
5. ***Cues to Action:*** These were external triggers that prompted individuals to adopt preventive behaviors. In this study, cues included media reports, guidance from health professionals, advice from peers and family, or direct experiences with COVID-19 cases.
6. ***Self-Efficacy:*** This referred to an individual's confidence in their ability to effectively adopt and maintain behaviors necessary for preventing COVID-19 transmission.

By applying the HBM, this study sought to provide a structured understanding of how knowledge and perceptions influenced adherence to COVID-19 preventive measures among Kabwe residents. The findings contributed to the development of targeted Public Health interventions aimed at improving community compliance with recommended health guidelines.

METHODOLOGY

Study design

A cross-sectional quantitative design was adopted for this research. This design was appropriate as it allowed for the collection of data at a single point in time to assess the association between residents' knowledge and perception of COVID-19.

Research setting

The study was conducted in Kabwe District Business Centre, the capital of Central province, Zambia. Kabwe serves as transit district linking Lusaka and Copperbelt provinces. This district was purposefully selected due to its high prevalence of confirmed COVID-19 cases, the highest in the

province, as reported by the Zambia National Public Health Institute (ZNPHI, 2020).

Study Population

The study population comprised of men and women aged 18 years and above who resided in Kabwe District. Specifically, the focus was on individuals frequenting the Central Business District (CBD) of Kabwe.

Sampling

A convenience sampling method was employed to recruit participants due to its practicality and feasibility, particularly considering limitations in time and available resources. This non-probability sampling approach allowed for the inclusion of individuals who were easily accessible and willing to participate; however, it may introduce potential biases and limit the generalizability of the findings

Data collection

A semi-structured questionnaire (see Appendix 1) served as the primary data collection tool. The questionnaire was carefully designed based on relevant literature and existing validated instruments, and was adapted to suit the local context and study objectives. Prior to the main data collection, the tool was pretested with a small sample from the target population to assess clarity, appropriateness, and comprehension. Feedback from the pilot informed necessary modifications. To ensure validity and reliability, the questionnaire underwent expert review.

Sample Size

The sample size for this study was determined using the OpenEpi software.

n = [DEFF * Np(1-p)] / [(d2/Z21-α/2 * (N-1) + p * (1-p)]

Here, 'n' stands for the sample size, 'DEFF' is the design effect, 'N' represents the finite population size, 'p' denotes the estimated prevalence, and 'd' is the acceptable error margin.

A sample size of 384 was determined using Open Epi, based on a finite population of 1,000,000, a 5% margin of error, and a 95% confidence level (Dean et al., 2013). This sample size was fully achieved during data collection and was deemed sufficient to ensure statistical precision and representativeness within the defined population parameters.

Data Analysis

The data were analyzed using SPSS (version 23). The Chi-square test was utilized to evaluate associations between categorical variables, encompassing both dependent and independent factors. Additionally, bivariate logistic regression model was applied to identify determinants of COVID-19 knowledge and perceptions. The multivariate analysis adjusted for confounding variables to establish independent predictors. A statistical significance threshold of $p < 0.05$ was used, and findings were presented with 95% confidence intervals.

Ethical Considerations

Ethical approval was obtained from the Mulungushi University School of Medicine and Health Sciences Research Ethics Committee (MUSoMS-REC). Permission to conduct the study was also granted by the Kabwe Municipal Council and the Zambia National Research Authority. Informed consent was secured from all participants prior to their enrollment in the study. Literate participants provided written consent, while illiterate participants provided consent using thumbprints.

RESULTS

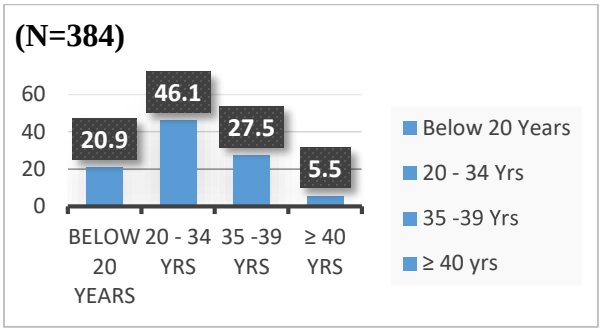
Introduction

This section presents the findings of the study, which examined the demographic characteristics, knowledge, and perceptions of COVID-19 among the study participants. The results are organized to directly address the research questions, providing key insights that contribute to a comprehensive understanding of factors influencing knowledge and perception within the study population.

Demographic Characteristics of Study Participants

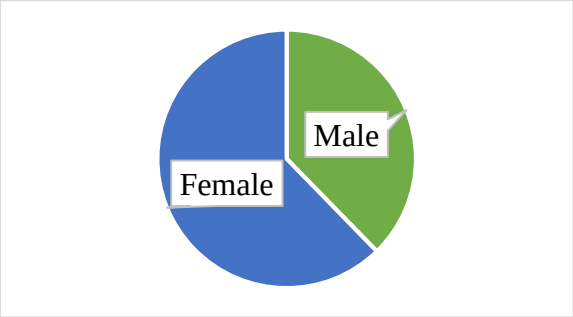
A detailed analysis of the demographic characteristics of the study participants was conducted to establish a comprehensive profile. The analysis encompassed various factors, including age, gender, education level, employment status, and place of residence.

Fig 4.1 Age Distribution of Participants



The findings in figure 4.1 indicated that nearly half (46.1%) of the participants were aged between 20 and 34 years. This was followed by those in the 35 to 39-year age group, who comprised 27.5% of the total sample. This age distribution reflects a predominantly young adult population, which has important implications for public health messaging.

Fig 4.2 Gender Distribution of Participants



The study included both male and female participants, with a greater proportion of females (62.3%) compared to males (37.7%) as indicated in Figure 4.2. This gender distribution offers a strategic entry point for health education initiatives. Given their potential role as key influencers within households, women can be effective conduits for disseminating accurate COVID-19 information

Fig. 4.1 Educational status of study participants

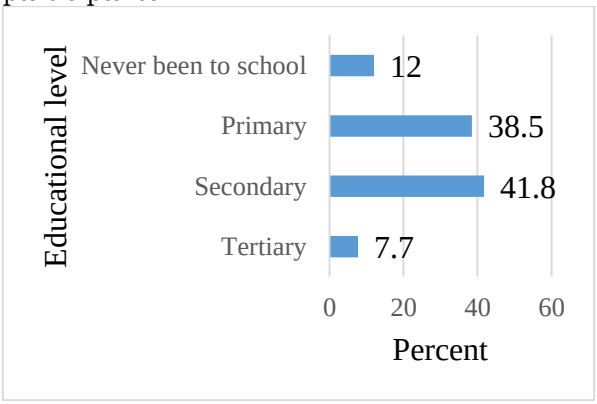
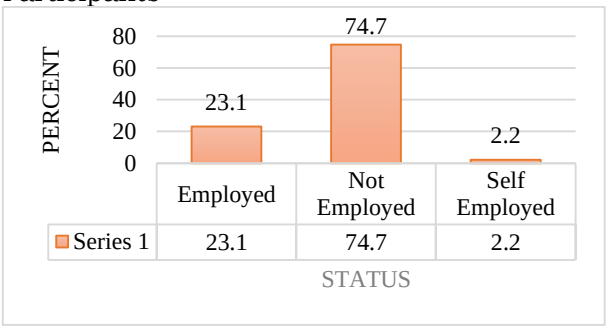


Figure 4.3 revealed that the largest proportion (41.8%) had completed secondary education, while a slightly lower percentage (38.5%) had attained only primary education. A smaller subset (12%) reported having no formal education, whereas the least represented group comprised individuals with tertiary education (7.7%). From a public health perspective, the findings underscore the critical need for tailored health communication strategies that match the literacy levels of the target population

Fig 4.4 Employment Status Distribution of Participants



The findings in figure 4.4 indicated that a substantial proportion of the sample, nearly three-quarters (74.7%), were not engaged in any form of employment. In contrast, only

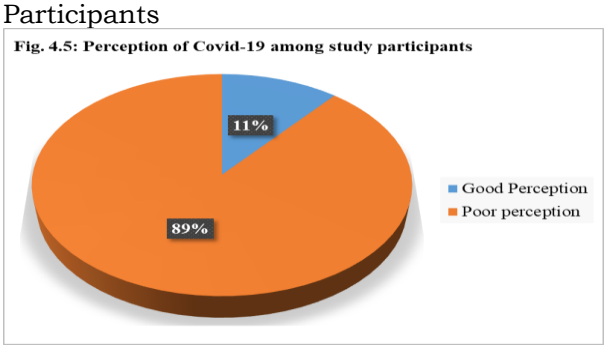
23.1% of the participants reported being employed, while a notably smaller fraction (2.2%) identified as self-employed. Therefore, from a public health perspective, these findings highlight the need for community-based outreach strategies that deliberately include economically inactive population.

Table 4.1: Religion and Place of Residence of Participants (n = 384)

Variable	Category	Frequency (n)	Percentage (%)
Religion	Christianity	376	97.8
	No Religion	8	2.2
Place of			
Residence	High-density		
	Area	215	56.0
	Low-density		
	Area	169	44.0

The results in table 4.1 showed that the vast majority (97.8%) were affiliated with Christianity. Also, about half (47.2%) lived or were located in densely populated areas. The high level of Christian affiliation reflects the religious composition of the population in the study area and highlights the potential role of faith-based institutions in public health communication.

4.3 Perceptions of COVID-19 among Participants



The findings in figure 4.5 indicated that the majority of participants (89%) demonstrated a poor perception of the disease, while only a small proportion (11%) exhibited a good perception. The overwhelming prevalence of poor perception raises serious public health concerns, as it suggests a low level of risk awareness and potential non-adherence to preventive measures.

Table 4.2 Common misconceptions about COVID-19 transmission and prevention

Question	**Responses, n (%)**
Covid-19 can only be transmitted in cold and cool climates	
Yes	25 (6.6)
No	156 (40.7)
Don't know	203 (52.8)
Mosquito bites can transmit covid-19	

Yes	135 (35.2)
No	202 (52.7)
Don't know	42 (11)
Eating garlic and ginger can help prevent Covid-19	
Yes	245 (63.7)
No	118 (30.8)
Don't know	17 (4.4)

The data in table 4.2 revealed varied public perceptions surrounding specific myths and preventive beliefs about COVID-19. A majority of respondents (52.8%) were uncertain about whether COVID-19 can only be transmitted in cold climates, indicating a considerable knowledge gap. While over half (52.7%) correctly dismissed the notion that mosquito bites can transmit the virus, a significant portion (35.2%) still held this misconception. Notably, a large proportion (63.7%) believed that consuming garlic and ginger could prevent infection, reflecting a strong influence of traditional beliefs on health practices.

Table 4.3: Participants' perception about covid-19 in relation to demographic characteristics

		Perceptions n (%)		χ^2	P
Characteristic	**Unit**	**Good**	**Poor**		
Age (years)	Below 20	40 (10.5)	344 (89.5)	16.43	0.0009
	20 – 34	55 (14.3)	329 (85.7)		
	35 – 39	31 (8.0)	353 (92.0)		
	≥40	0	67(100)		
Gender	Male	55 (14.3)	329 (85.7)	2.01	0.156
	Female	41 (10.7)	343 (89.3)		
Education	Never been to school	35 (9.1)	349 (90.9)	51.37	$4.07x10^{-11}$
	Primary	11 (2.9)	373 (97.1)		
	Secondary	71 (18.4)	313 (81.6)		
	Tertiary	42 (11)	342 (89.0)		
Employment status	Employed	77(20)	307 36.	92 (80)	$9.62 x^{10-9}$

	Unemployed	22 (5.7)	362 (94.3)		
	Self-employed	69 (17.9)	315 (82.1)		
Place of residence	High Density Area	38 (9.8)	346 (90.2)	1.06	0.303
	Low density area	48 (12.5)	336 (87.5)		

The data presented in Table 4.3 explored the association between participants' perceptions of COVID-19 and selected demographic characteristics namely, age, gender, education level, employment status, and place of residence using chi-square (x^2) tests to determine statistical significance. A significant relationship was identified between age and perception of COVID-19 (x^2 = 16.43, p = 0.009). Participants aged 20–34 years exhibited the highest proportion of good perception (14.3%), whereas no individual aged 40 years or above demonstrated a good perception. This finding is significant, as it highlights that older adults despite being more vulnerable to severe outcomes of COVID-19 may engage less in preventive behaviors due to lower perceived risk.

Gender, by contrast, was not significantly associated with perception (x^2 = 2.01, p = 0.156). Although males reported a marginally higher rate of good perception (14.3%) than females (10.7%). Although not statistically significant, the gender-based differences suggest a need for further qualitative research to explore underlying behavioral or sociocultural factors. Education level emerged as a strong determinant of perception, with a statistically significant association (x^2 = 51.37, p <0.001). Participants with secondary education reported the highest levels of good perception (18.4%), followed by those with tertiary education (11.0%). Conversely, those with no formal education or only primary education reported markedly lower levels of good perception (9.1% and 2.9%, respectively). The findings revealed that participants with higher levels of formal education demonstrated more accurate perceptions of COVID-19, reinforcing that health literacy linked to formal education influences perception accuracy; thus, public health efforts should use simplified, culturally appropriate messaging to effectively reach less-educated populations.

Employment status was also significantly associated with perception of COVID-19 (x^2 = 36.92, p < 0.001). Employed individuals and the self-employed exhibited higher levels of good perception (20.0% and 17.9%, respectively), whereas only 5.7% of unemployed respondents demonstrated good perception. This result suggests that economic engagement may facilitate greater access to health information, either through workplace education or social networks.

Finally, place of residence was not significantly associated with perception (x^2 = 1.06, p = 0.303). Although individuals residing in low-density areas reported slightly higher levels of good perception (12.5%) compared to those in high-density areas (9.8%), this difference did not reach statistical significance. The lack of significant variation suggests a uniform deficiency in perception that must be addressed across residential zones.

Fig 4.6 Knowledge of COVID-19 among Participants

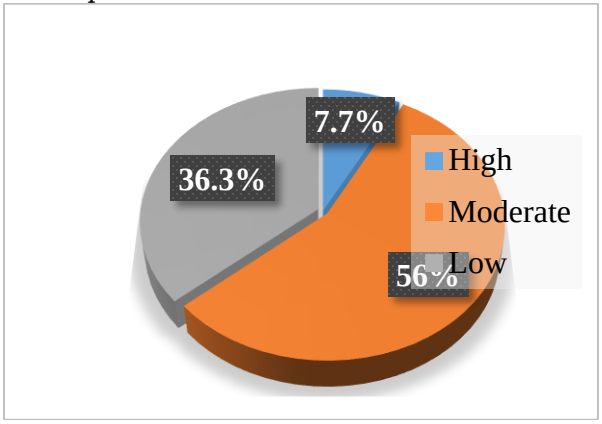


Figure 4.6 illustrates participants' levels of knowledge regarding COVID-19. More than half of the respondents, 215 (56%), demonstrated a moderate level of knowledge. Approximately one-third of the respondents, 139 (36.3%), exhibited low knowledge, highlighting significant gaps in their understanding of COVID-19. A smaller proportion of participants, 30 (7.7%), showed a high level of knowledge. The high prevalence of moderate and low knowledge levels poses a serious public health concern, as limited understanding of COVID-19 can undermine adherence to guidelines and weaken disease control efforts.

Table 4 1: Knowledge about covid-19

Question	Responses: n (%)
Have you tested for covid-19	
Yes	215 (56)
No	169 (44)
Covid-19 is an infection caused by novel corona virus	
Yes	51 (13.2)
No	236 (61.1)
I don't know	97 (25.2)
What is your source of information of covid-19 infection	
TV	343 (89.3)
Social media	8 (2.2)
Friends/relatives	20 (5.2)
WHO website	13 (3.3)
What are the most common signs and symptoms of covid-19	
Fever	246 (64)
Fatigue	87 (23.1)
Dry cough	30 (7.7)
Sneezing	21 (5.5)
How can you protect yourself against covid-19	
Hand washing	55 (14.3)
Hand sanitizing	291 (75.8)
Avoiding crowded places	17 (4.4)
Wearing masks	21 (5.5)

The findings in Table 4.4 reveal significant gaps in participants' knowledge about COVID-19. Although over half (56%) had been tested, only 13.2% correctly identified the cause of COVID-19 as the novel coronavirus, with a majority demonstrating incorrect or uncertain understanding. This low level of knowledge reflects substantial misinformation or lack of access to accurate information, which poses a serious barrier to effective disease prevention and control efforts in the community. Television was the dominant source of information (89.3%), while reliance on authoritative sources like the WHO website was minimal. From a public health perspective, this finding underlines the need to strengthen the quality and consistency of COVID-19 messaging through popular channels while promoting trust in official health sources.

Knowledge of symptoms was limited, with most participants identifying fever (64%) and fatigue (23.1%), but very few recognized dry coughs (7.7%), a key symptom. This gap in symptom awareness is concerning, as it may delay recognition of infection and discourage timely health-seeking behavior, thereby increasing the risk of community transmission.

While hand sanitizing was widely acknowledged as a preventive measure (75.8%), awareness of other critical strategies such as mask wearing and avoiding crowded places was notably low. This finding highlights an incomplete understanding of the

full spectrum of preventive behaviors recommended by global and national health authorities

Table 4 2: Participants' knowledge in relation to demographic characteristics

Characteristic	Unit	Knowledge, n (%) **High**	**Moderate**	**Low**	χ2	P
Age (years)	Below 20	0	202 (52.6)	182 (47.4)	5.287	0.508
	20 – 34	46 (11.9)	228 (59.5)	110 (28.6)		
	35 – 39	31 (8)	215 (56)	138 (36)		
	≥40	0	154 (40)	230 (60)		
Gender	Male	55 (14.3)	165 (42.9)	164 (42.7)	0.755	0.686
	Female	27 (7.1)	220 (57.2)	137 (35.8)		
Education	Never been to school	0	209 (54.5)	175 (45.5)	12.944	**0.044**
	Primary	0	210 (54.6)	174 (45.3)		
	Secondary	51 (13.2)	232 (60.5)	101 (26.3)		
	Tertiary	110 (28.6)	219 (57.1)	55 (14.3)		
Employment status	Employed	77 (20)	230 (60)	77 (20)	4.808	0.308
	Unemployed	21 (5.7)	196 (51)	167 (43.4)		
	Self-employed	27 (7.1)	247 (64.3)	110 (28.6)		
Place of residence	High density area	53 (13.7)	241 (62.7)	90 (23.5)	11.608	**0.003**
	Low density area	0	183 (47.6)	201 (52.5)		

The chi-square analysis in Table 4.5 examined the association between participants' levels of COVID-19 knowledge and their demographic characteristics. No statistically significant relationships were found between knowledge and age ($x^2(df = 4) = 5.287$, $p = 0.508$), gender ($x^2(df = 2) = 0.755$, $p = 0.686$), or employment status ($x^2(df = 4) = 4.808$, $p = 0.308$). These findings suggest knowledge levels did not vary meaningfully across different age groups, between males and females, or between employment categories, which may reflect broader systemic issues such as uniform exposure to health information or limited targeted outreach.

In contrast, education level showed a statistically significant association with knowledge ($x^2(df = 4) = 12.944$, $p = 0.044$), with participants possessing secondary and tertiary education demonstrating higher levels of COVID-19 knowledge. This finding aligns with the study's objective of examining the influence of socio-demographic factors on health knowledge and emphasizes the role of formal education in promoting health literacy.

Additionally, place of residence was significantly associated with knowledge (x^2(df = 2) = 11.608, p = 0.003), with participants residing in high-density areas exhibiting higher knowledge levels than those in low-density areas. This may reflect focused awareness campaigns in urban, high-risk areas.

Fig 4.7 Bivariate Analysis: Relationship between Knowledge and Perceptions about COVID-19

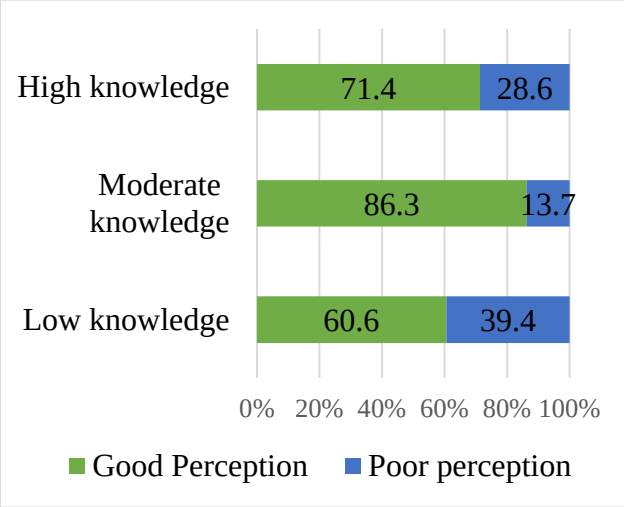


Figure 4.7 presents a bivariate analysis exploring the relationship between participants' knowledge levels (classified as high, moderate, or low) and their perceptions of COVID-19 (categorized as good or poor). The findings reveal a positive association between increased knowledge and more favorable perceptions of the disease. Participants with high or moderate knowledge levels were significantly more likely to demonstrate good perceptions. Conversely, those with lower knowledge levels were more frequently associated with poor perceptions. This association was found to be statistically significant based on the results of a Chi-square test of independence ($x^2 = 61.11$, $df = 2$, $p < 0.0001$). The findings suggest that improving health literacy, especially among populations with lower baseline knowledge, could be a strategic entry point for shifting public attitudes and strengthening community-level resilience

DISCUSSION

Introduction

This chapter presents a comprehensive discussion of the key findings from the study, which investigated the levels of knowledge and perceptions of COVID-19 among residents of Kabwe, Zambia. The discussion integrates the quantitative results with existing literature to contextualize and interpret the patterns observed in the data. By examining the associations between knowledge and perception, this chapter seeks to deepen understanding of how public awareness and comprehension of COVID-19 influence individual and community-level attitudes and behaviors toward the pandemic.

Demographic Factors and their Effect on Perception and Knowledge

The demographic analysis of the study highlighted distinct patterns in age distribution, gender distribution, educational attainment, employment status, religious affiliation, and residential location among the participants.

The age distribution revealed that nearly half of the participants (46.1%) were between the ages of 20 and 34 years, making this the predominant age group. This was followed by participants aged 35 to 39 years, comprising 27.5% of the total sample. Similar findings were observed in other research, which indicated that individuals in their 20s and 30s are more accessible and responsive to surveys, particularly those utilizing online platforms or community-based recruitment strategies (Seale et al., 2020; Al-Hanawi et al., 2020). However, contrasting results by Zhong et al., (2020) found greater survey responsiveness among slightly older adults (35-50 years), attributed to their higher levels of professional engagement and awareness of public health issues.

The gender distribution indicated a higher representation of females (62.3%) compared to males (37.7%). This aligns with previous studies suggesting females are more inclined

to participate in surveys due to their increased availability in household and community settings (Smith, 2008; Galea & Tracy, 2007). Conversely, O'Neil et al. (2014) documented equal participation rates among genders, attributing this to targeted recruitment approaches focusing specifically on male populations.

Regarding educational attainment, the largest proportion of participants had completed secondary education (41.8%), closely followed by primary education (38.5%). A smaller group had no formal education (12%), and the smallest proportion had tertiary education (7.7%). This educational pattern reflects typical trends observed in low and middle-income countries, where economic barriers significantly limit access to higher education levels (United Nations Educational, Scientific and Cultural Organization (UNESCO),2019; Psacharopoulos & Patrinos, 2018). Conversely, studies conducted in urbanized areas report higher tertiary education attainment, highlighting the role of geographic and economic contexts in shaping educational outcomes (Adeyemi & Adeyinka, 2020).

Employment status findings indicated significant unemployment (74.7%) among participants, with only 23.1% employed and 2.2% self-employed. This high unemployment rate aligns with global observations of economic instability and limited job opportunities prevalent in many developing regions (World Bank, 2020). However, studies focusing on urban populations suggest a higher employment rate, underscoring regional disparities in labor market dynamics (International Labour Organization (ILO), 2021; Okoye & Aderibigbe, 2021).

The study's findings on religious affiliation revealed that the overwhelming majority (97.8%) identified as Christians, consistent with census data from Sub-Saharan African nations, where Christianity predominates culturally and socially (Pew Research Center, 2018). Nevertheless, other research has highlighted significant religious diversity within similar populations, demonstrating variability based on specific community contexts (Lugo & Cooperman, 2010).

Lastly, nearly half of the participants (56%) resided in densely populated areas. High-density residential areas typically facilitate greater research participation due to proximity and community involvement (Chen et al., 2019). However, contrasting studies suggest urban residents may have lower participation due to increased mobility and competition for attention, in contrast to more cohesive rural communities (Lu & Wang, 2018).

Perception of Covid - 19 among Participants

The current study revealed that a substantial proportion (89%) of participants exhibited poor perceptions regarding COVID-19, whereas only a small segment (11%) showed good perceptions (Figure 4.5). These results are consistent with earlier studies highlighting substantial public misconceptions about COVID-19, particularly in settings characterized by limited resources and prevalent misinformation (Nwagbara et al., 2021; Alzoubi et al., 2020). Comparable findings emerged from research in Nigeria, where over 70% of respondent's demonstrated inadequate understanding and perceptions of COVID-19 preventive measures, emphasizing extensive misinformation within communities (Reuben et al., 2021).

Conversely, findings from studies conducted in different regions indicate higher levels of public understanding and favorable perceptions. For example, studies from Saudi Arabia and China reported notably better perceptions, attributed largely to rigorous public health education campaigns and widespread dissemination of accurate information (Al-Hanawi et al., 2020; Zhong et al., 2020). Specifically, about 81% of respondents in Saudi Arabia had positive perceptions and sufficient knowledge of preventive strategies, highlighting the success of intensive public health education initiatives (Al-Hanawi et al., 2020).

The differences between these findings and the current study may stem from diverse socioeconomic factors, educational

opportunities, information accessibility, and cultural attitudes towards health crises. The high proportion of poor perceptions observed highlights an urgent requirement for localized educational interventions and strong public health messaging tailored specifically to community needs (Nwagbara et al., 2021). Addressing misinformation effectively through targeted, community-specific strategies could significantly enhance public perceptions and compliance with preventive measures (Seale et al., 2020).

Participants' responses regarding common misconceptions about COVID-19 transmission and prevention

The study identified diverse public perceptions and beliefs about COVID-19, highlighting significant knowledge gaps among participants. Over half of the respondents (52.8%) expressed uncertainty regarding the transmission of COVID-19 solely in cold climates, illustrating a notable misunderstanding. Similarly, while a majority (52.7%) accurately recognized that COVID-19 is not spread through mosquito bites, a considerable minority (35.2%) continued to hold this incorrect belief. Additionally, a large segment of participants (63.7%) maintained that consuming garlic and ginger could prevent COVID-19 infection, indicating a strong influence of traditional beliefs on health-related behavior.

These findings align with prior research illustrating widespread misinformation and misconceptions regarding COVID-19, especially within communities with limited access to accurate health information. For example, a study conducted in Ethiopia reported similar misconceptions, including beliefs in traditional remedies and misunderstandings about virus transmission (Gebretsadik et al., 2021). Conversely, contrasting evidence from other regions, such as China and Australia, demonstrates significantly better public understanding and fewer misconceptions, attributed to comprehensive public health education and clear, consistent messaging from health authorities (Thomas et al., 2021; Zhong et al., 2020).

The observed variations in findings could be attributed to differences in socioeconomic status, education levels, and accessibility to credible information, and cultural health beliefs. The persistent presence of misinformation and traditional beliefs within this study's population emphasized the urgent necessity for culturally appropriate educational interventions and robust public health communication strategies (Gebretsadik et al., 2021). Effective and targeted education campaigns are crucial in addressing these knowledge gaps, correcting misconceptions, and improving compliance with recommended preventive measures (Thomas et al., 2021).

Participants' perception about Covid-19 in relation to demographic characteristics

A statistically significant association was found between age and perception of COVID-19 ($x^2 = 16.43$, $p = 0.0009$). Participants within the 20–34 age range exhibited the highest proportion of good perception (14.3%). Conversely, none of the participants aged 40 years or above demonstrated a good perception, which indicated potential gaps in health communication effectiveness among older adults. This aligns with recent findings by Wolf et al., (2020) and Riiser et al., (2020), who noted that younger adults often possess greater access and receptivity to public health messaging, possibly facilitated by their frequent use of digital platforms and social media. However, contrary findings by Barber and Kim (2021) suggested that older adults could also exhibit good perception due to higher perceived vulnerability and consequent vigilance in accessing health information.

Gender differences did not significantly influence perception regarding COVID-19 ($x^2 = 2.01$, $p = 0.156$). Although males showed slightly higher rates of good perception compared to females (14.3% versus 10.7%), this variation was statistically insignificant. This observation was consistent with findings by Zhong et al., (2020), who identified minimal gender disparities in COVID-19 perceptions.

Conversely, literature from Galasso et al., (2020) indicated significant gender-related differences in compliance and perception, with women generally more receptive to health guidelines.

Educational attainment emerged as a critical determinant, with a robust statistical significance (x2 = 51.37, p < 0.001). Participants with secondary education had the highest good perception (18.4%), followed by tertiary education holders (11.0%). Those with no formal education or primary education exhibited substantially lower good perception (9.1% and 2.9%, respectively). These findings underscored education's role in facilitating better health literacy and perception, corroborating findings by Nguyen et al., (2020), who found a direct correlation between higher education levels and better COVID-19 knowledge and perception. Contrarily, a study by Ferdous et al., (2020) found that even individuals with lower formal education could attain high COVID-19 perception through targeted community-based information programs.

Employment status significantly influenced perceptions of COVID-19 (x2 = 36.92, p 0.001), with employed and self-employed participants showing greater proportions of good perception (20.0% and 17.9%, respectively) compared to the unemployed (5.7%). This result suggested socioeconomic factors potentially mediate the acquisition of health-related information. Similar findings by Huang et al., (2020) reported employment status as pivotal in influencing individuals' exposure and responsiveness to public health advisories. Nevertheless, Okello et al., (2020) presented contradictory results, suggesting employment type rather than status per se could be a stronger predictor of COVID-19 perceptions.

Lastly, residence type (high-density vs. low-density areas) did not significantly impact perceptions (x2 = 1.06, p = 0.303), despite marginally higher good perception among residents of low-density areas (12.5%) compared to those in high-density areas (9.8%). This result contrasts with the work of Ouyang et al. (2020), who identified significant differences attributed to residence density, citing disparities in health infrastructure and communication efficacy in varied residential contexts.

Knowledge Levels Regarding COVID-19

Figure 4.6 presents the distribution of participants' knowledge about COVID-19. The data revealed that a majority of respondents, 215 (56%), exhibited a moderate understanding of the disease. Meanwhile, 139 participants (36.3%) were found to have a low level of knowledge, highlighting substantial gaps in awareness regarding transmission routes, preventive measures, and symptoms. Only 30 individuals (7.7%) demonstrated a high level of knowledge, suggesting that comprehensive awareness of COVID-19 was relatively uncommon within the study population. These results point to potential inadequacies in public health communication and education efforts during the study period. The pattern observed aligns with findings reported in similar contexts across low and middle-income countries. In a study conducted in Ethiopia, Bekele et al., (2021) found that only 10.3% of respondents possessed adequate knowledge of COVID-19, with the majority exhibiting either insufficient or moderate understanding. Similarly, Adesegun et al., (2020) in a multi-country survey within sub-Saharan Africa noted that although awareness of the virus existed, a significant proportion of the population lacked detailed knowledge, largely due to persistent misinformation and limited access to accurate health information.

Several contextual factors may explain the low prevalence of high-level knowledge in this study. These included inequalities in access to reliable information sources, limited reach of structured health promotion programs, and the widespread dissemination of myths and misinformation. Olum et al. (2020) highlighted that populations in rural or under-resourced environments often depended on informal communication channels such as social media or community

word-of-mouth, which may not always provide scientifically accurate content.

In contrast, higher knowledge scores have been documented in more developed settings or among better-educated populations. For example, a national survey by Zhong et al., (2020) in China found that over 90% of participants had a high level of knowledge about COVID-19. The authors attributed this to the implementation of comprehensive and coordinated public health strategies, coupled with a higher general literacy rate and broad access to accurate information.

COVID-19 Knowledge Gaps among Participants

The data presented in Table 4.4 illustrated significant deficits in the knowledge of COVID-19 among the study population, despite a relatively high rate of testing (56%). Only a small proportion (13.2%) accurately identified the etiological agent of COVID-19 as the novel coronavirus (SARS-CoV-2), with the majority either selecting incorrect causes or expressing uncertainty. This finding suggested a fundamental gap in the understanding of disease causation, which may compromise adherence to evidence-based preventive behaviors.

Television emerged as the predominant source of information for 89.3% of participants, whereas more reliable and authoritative platforms such as the World Health Organization (WHO) website were underutilized. This reliance on mass media rather than institutional sources might have contributed to the observed knowledge inaccuracies, especially in rapidly evolving public health crises (Islam et al., 2020). The limited use of digital or official health sources also indicated potential barriers such as digital literacy, access to the internet, or trust in institutional messaging.

Symptom recognition was similarly limited. While a majority could identify fever (64%) and fatigue (23.1%) as symptoms, only 7.7% correctly recognized dry cough a primary symptom noted in the clinical presentation of COVID-19 (Huang et al., 2020). This suggested that public messaging may have emphasized general signs of illness while failing to communicate hallmark features specific to the disease.

Regarding preventive measures, hand sanitization was widely acknowledged (75.8%). However, critical strategies such as wearing masks and avoiding crowded places were poorly recognized. This gap in preventive knowledge is particularly concerning, as these behaviors are central to interrupting transmission chains, especially in low-resource settings where vaccine access may be limited (Chu et al., 2020).

The observed findings align with studies conducted in similar low and middle-income countries (LMICs). For instance, Bekele et al., (2021) in Ethiopia reported that a substantial proportion of their participants lacked correct knowledge on COVID-19 causation and symptomatology. Similarly, Olum et al., (2020) in Uganda found that while some preventive measures were commonly known, knowledge of disease symptoms and transmission pathways was inconsistent. These trends suggested that gaps in knowledge are not isolated to a single region but represent a broader issue in public health communication across LMICs.

Conversely, studies in higher income countries have shown greater awareness and understanding of COVID-19. A survey in Italy by Ricco et al. (2020) revealed that over 80% of respondents were aware of the key symptoms and preventive measures, attributed to stronger health communication strategies and higher access to credible online resources.

The current study's findings underscore the urgent need for targeted and contextually appropriate health education campaigns. Messaging should be tailored to local information channels, such as television and radio, but must be grounded in scientific accuracy and endorsed by public health authorities. Furthermore, increasing digital

health literacy and promoting engagement with trusted online platforms (e.g., WHO, CDC) could enhance the public's capacity to access and interpret accurate health information.

Association between COVID-19 Knowledge and Demographic Characteristics

The chi-square analysis in Table 4.5 examined the association between COVID-19 knowledge and demographic variables. The results showed no statistically significant relationship between knowledge and age (x^2 = 5.287, p = 0.508), gender (x^2 = 0.755, p = 0.686), or employment status (x^2 = 4.808, p = 0.308), suggesting these factors did not significantly influence knowledge levels within the study population.

Conversely, education level (x^2 = 12.944, p = 0.044) and place of residence (x^2 = 11.608, p = 0.003) were significantly associated with COVID-19 knowledge. Participants with secondary and tertiary education demonstrated higher knowledge levels than those with no or only primary education. These findings are supported by Ferdous et al., (2020) and Bekele et al., (2021), who reported that higher educational attainment enhances health literacy and promotes preventive behavior.

Similarly, individuals residing in high-density or urban areas exhibited better knowledge than those in low-density settings. This trend is was consistent with previous studies indicating that urban dwellers benefit from greater access to health services, mass media, and health promotion campaigns (Olapegba et al., 2020; Alhassan et al., 2021).

However, some studies suggested differing results. For example, Al-Hanawi et al., (2020) found a significant gender-based difference in COVID-19 knowledge, with males scoring higher, while Zhong et al., (2020) associated employment, particularly in health and information sectors with greater awareness. These discrepancies may reflect contextual variations related to population characteristics, information dissemination, or sampling methods.

Relationship between Knowledge and Perceptions about COVID-19

The bivariate analysis (x^2 = 61.11, df = 2, p < 0.0001) revealed a statistically significant association between participants' knowledge levels about COVID-19 and their perceptions of the disease. Participants with higher levels of knowledge were more likely to demonstrate good perceptions, while those with low knowledge exhibited poor perceptions. These findings suggested that increased knowledge may facilitate a more informed, rational understanding of the pandemic, thereby fostering positive health attitudes and behaviours. The strength of the association further emphasized the role of public health education in influencing risk perception and compliance with preventive measures.

This result is consistent with previous studies that have highlighted the positive relationship between knowledge and perception during health crises. For example, Zhong et al., (2020) in a study conducted in China, found that higher COVID-19 knowledge scores were significantly associated with optimistic attitudes and appropriate preventive behaviours. Similarly, Olum et al., (2020) reported that Ugandan healthcare workers with better knowledge about COVID-19 also demonstrated more appropriate perceptions and practices. These findings affirm that individuals who understand the disease's etiology, transmission, and prevention are more likely to adopt a constructive outlook and engage with evidence-based interventions.

Moreover, in Zambia and other low and middle-income settings, health communication often shapes perceptions, especially in contexts where misinformation is prevalent. A study by Banda et al., (2021) found that inadequate access to credible information contributed to negative perceptions of COVID-19, especially in populations with lower education levels. This underlines the importance of sustained and context-specific health education strategies in

shaping public understanding and perception.

Conversely, some literature provides a more nuanced view. For instance, Abdelhafiz et al., (2020) observed that while knowledge was generally high among Egyptian adults, this did not always translate into positive perceptions or behaviors, suggesting that factors such as fear, distrust in government, or cultural beliefs may mediate the relationship between knowledge and perception. Likewise, a study by Erfani et al., (2020) in Iran reported discrepancies between knowledge and perception, particularly in older populations, indicating that knowledge alone may not suffice in shaping attitudes unless accompanied by trust and tailored messaging.

Therefore, while this study affirms the hypothesis that knowledge positively influences perception, it also aligns with the argument that multi-dimensional approaches combining education with behavioral communication, community engagement, and culturally sensitive health messaging are essential to foster positive public attitudes towards pandemics such as COVID-19.

Theoretical Implications

The findings of this study provided theoretical implications that enhance the understanding of the Health Belief Model (HBM) in the context of the COVID-19 pandemic.

Health Belief model

The study employed the health belief model as its theoretical framework, which emphasizes that individual health actions are shaped by personal beliefs regarding health threats and the perceived effectiveness of interventions. In assessing public responses to Covid-19, the model's key constructs – namely perceived susceptibility, severity, benefits, barriers, cues to action, and overall perception-played a vital role in interpreting behavior. The results supported the model's relevance indication that individuals who perceived a higher risk and severity of Covid-19, alongside recognizing the advantages of preventive measures, were more likely to engage in protective actions. Nonetheless, the findings also revealed that certain demographic groups, despite possessing considerable knowledge of the disease, demonstrated low adherence to preventive practices. This suggested that compliance may be limited by existing barriers or a lack of motivating cues. These findings highlighted the need for well-targeted public health interventions that not only disseminate knowledge but also address the cognitive and contextual factors that influence behavioral outcomes.

Practical Implications

The results of this study provided insightful practical implications that could be utilized by health authorities and policymakers involved in managing the COVID-19 pandemic.

Implications for Health Authorities and Policymakers

This study emphasized the crucial influence that knowledge and perceptions of COVID-19 have on adherence to preventive practices. Health authorities must ensure clear, accurate, and consistent communication about the virus, its symptoms, transmission methods, and effective preventive measures. Effective communication is vital for dispelling misinformation, fostering public trust, and improving overall understanding of the disease. Furthermore, observed differences in knowledge, perceptions, and preventive behaviors among various demographic groups indicated the necessity of targeted health education programs. These programs should account for the specific informational requirements, linguistic diversity, and cultural practices of different communities. Special focus should be placed on elderly populations, individuals with lower levels of education, and socio-economically disadvantaged groups who may face challenges accessing health information or implementing recommended preventive actions.

RECOMMENDATION

Health authorities and policymakers in Kabwe district should ensure continuous, clear dissemination of accurate COVID-19 information through local media and community leaders to address misinformation. Tailored educational interventions, considering local languages and cultural contexts, must target elderly, less educated, and economically disadvantaged groups to effectively improve community knowledge and perceptions.

Limitations of the study

This study faced some limitations that must be considered when interpreting its findings. The sample size, although considerable, may not fully represent the entire Kabwe district population, as logistical and financial constraints prevented the inclusion of all demographic subgroups, potentially affecting the generalizability of the results. Despite these constraints, the research provides important insights into COVID-19-related knowledge and perceptions in Kabwe district.

Dissemination Plans

The study's dissemination strategy involved academic publications, presentations at conferences and seminars, and community engagement initiatives, aiming to enhance understanding and inform effective COVID-19 management strategies in Kabwe district and beyond.

CONCLUSION

The analysis has highlighted key insights into the knowledge and perceptions regarding COVID-19 among Kabwe residents, clarifying the varying adherence levels to preventive measures. The research linked these behavioral differences to demographic and socio-economic factors, offering a multifaceted explanation of community responses. Additionally, the findings were contextualized within the study's theoretical framework, providing validation and deeper theoretical insights. Ultimately, this research can guide health policy and intervention strategies, contributing significantly to ongoing global efforts against the COVID-19 pandemic.

Privacy Statement

Jeane. B. Ngala (jane.ngala@yahoo.com), Harriet.M. Simaubi(hmlonda@yahoo.com), Concepta.N. Kwaleyela (ckwaleyela@gmail.com),Jamia Milanzi.(aminakabungo@gmail.com),Isabel.N. Luambia.(isabelluambia@gmail.com), Harrison Namoomba(harrisonamoomba@gmail.com), Melody. H. Kuswenji (melodyhaz@yahoo.co.uk)

Acknowledgements

We want to convey our sincere gratitude towards the participants of Kabwe Central Business District who participated. Great appreciation to Kabwe District Council for granting us authority to conduct the research.

Funding

No funding or financial grant was received to conduct the present study

REFERENCES

1. Abdelhafiz, A. S., Mohammed, Z., Ibrahim, M. E., Ziady, H. H., Alorabi, M., Ayyad, M. & Sultan, E. A**.** (2020) '**Knowledge, perceptions, and attitude of Egyptians towards the novel coronavirus disease (COVID-19)**', *Journal of Community Health*, 45(5), pp. 881–890. https://doi.org/10.1007/s10900-020-00827-7. Accessed on 10.04.2025
2. Adesegun, O. A., Binuyo, T., Adeyemi, O., Ehioghae, O., Rabor, D. F., Amusan, O. et al**.,** (2020) **'The COVID-19 crisis in sub-Saharan Africa: Knowledge, attitudes, and practices of the Nigerian public',** ***Health Promotion Perspectives*****,** 10(2), pp. 142–147. https://doi.org/10.34172/hpp.2020.20

3. Adeyemi, T. O. & Adeyinka, A. A. (2020) **'Educational attainment in urban Africa: Trends and implications',** ***African Education Review***, 17(1), pp. 45-60.
4. Al-Hanawi, M. K., Angawi, K., Alshareef, N., Qattan, A. M. N., Helmy, H. Z., Abudawood, Y. & Alsharqi, O**.** (2020) '**Knowledge, attitude, and practice toward COVID-19 among the public in the Kingdom of Saudi Arabia: a cross-sectional study**', *Frontiers in Public Health*, 8, 217.
5. Alhassan, R. K., Owusu-Addo, E. & Ayanore, M. A. (2021) '**Urban–rural differences in COVID-19 preventive behavior: Evidence from Ghana',** ***International Journal of Environmental Research and Public Health*****,** 18(11), 5996. https://doi.org/10.3390/ijerph18115996
6. Alzoubi, H., Alnawaiseh, N., Al-Mnayyis, A., Abu-Lubada, M., Aqel, A. & Al-Shagahin, H. (2020) **'COVID-19-knowledge, attitude and practice among medical and non-medical university students in Jordan',** ***Journal of Pure and Applied Microbiology*****,** 14(1), pp. 17-24.
7. Banda, J., Daka, V., Chanda-Kapata, P. & Kapata, N. (2021) **'COVID-19-related knowledge, attitudes, and practices among Zambians: A cross-sectional study',** *Pan African Medical Journal*, 38, 12. https://doi.org/10.11604/pamj.2021.38.12.27936. Accessed 04.04.2025
8. Barber, S. J. & Kim, H. (2021) **'COVID-19 worries and behavior changes in older and younger men and women',** ***The Journals of Gerontology: Series B*****,** 76(2), e17–e23.
9. Bekele, D., Tolossa, T., Tsegaye, R. & Teshome, W. (2021) '**The knowledge and practice towards COVID-19 pandemic prevention among residents of Ethiopia: An online cross-sectional study'**, *PLOS ONE*, 16(1), e0234585. https://doi.org/10.1371/journal.pone.0234585. Accessed on 11.04.25
10. Bhagavathula, A. S., Wafa, A., Jamal, R., Mohammad, J., Ashrafin, M. & Deepak, K. B. (2020**) 'Knowledge and perceptions: A survey on health workers'.** https://reports.unocha.org/en/country/zambia. Accessed on 16.07.2020
11. Chen, X., Gao, Y. & Liu, Y**.** (2019) **'Population density and community engagement: Insights from urban sociology'**, *Journal of Urban Studies*, 56(3), pp. 512–528.
12. Chu, D. K., Akl, E. A., Duda, S., Solo, K., Yaacoub, S. & Schünemann, H. J**.** (2020) **'Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: A systematic review and meta-analysis',** *The Lancet*, 395(10242), pp. 1973–1987. https://doi.org/10.1016/S0140-6736(20)31142-9
Erfani, A., Shahriarirad, R., Ranjbar, K., Mirahmadizadeh, A. & Moghadami, M. (2020) '**Knowledge, attitude and practice toward the novel coronavirus (COVID-19) outbreak: A population-based survey in Iran',** *Bulletin of the World Health Organization*. https://doi.org/10.2471/BLT.20.256651. Accessed 12.04.2023
13. Ferdous, M. Z., Islam, M. S., Sikder, M. T., Mosaddek, A. S. M., Zegarra-Valdivia, J. A. & Gozal, D. (2020) '**Knowledge, attitude, and practice regarding COVID-19 outbreak in Bangladesh: An online-based cross-sectional study',** *PLOS ONE*, 15(10), e0239254. https://doi.org/10.1371/journal.pone.0239254
14. Galasso, V., Pons, V., Profeta, P., Becher, M., Brouard, S. & Foucault, M**.** (2020**) 'Gender differences in COVID-19 attitudes and behavior: Panel evidence from eight countries',** ***Proceedings of the***

***National Academy of Sciences*,** 117(44), pp. 27285–27291.
15. Galea, S. & Tracy, M. (2007) **'Participation rates in epidemiologic studies',** ***Annals of Epidemiology*,** 17(9), pp. 643–653.
16. Gebretsadik, D., Ahmed, N., Kebede, E., Gebremichael, M., Belete, M. A. & Adane, M. (2021) **'Assessment of knowledge, attitude, and practices toward COVID-19 pandemic among residents of Ethiopia'**, *Frontiers in Public Health*, 9, 720445.
17. Government of the Republic of Zambia (GRZ) (2021). **Ministry of Health daily COVID-19 update bulletin**-16 April 2021.Lusaka:Ministry of Health.
18. Government of the Republic of Zambia (GRZ) (2020) ***Statutory Instrument No. 21 and 22. Public Health Act*, Volume 17, Cap 295**. https://www.zambia.org.uk. Accessed on 26.07.2020.
19. Huang, L., Lei, W., Xu, F., Liu, H. & Yu, L. (2020) **'Emotional responses and coping strategies in nurses and nursing students during COVID-19 outbreak:** A comparative study', *PLOS ONE*, 15(8), e0237303.
20. International Labour Organization (ILO) (2021) ***Global employment trends for youth 2020: Technology and the future of jobs*.** https://www.ilo.org/global/research/global-reports/youth/2020/lang--en/index.htm
21. Islam, M. S., Sarkar, T., Khan, S. H. et al.; (2020) **'COVID-19–related infodemic and its impact on public health: A global social media analysis'**, *The American Journal of Tropical Medicine and Hygiene*, 103(4), pp. 1621–1629. https://doi.org/10.4269/ajtmh.20-0812
22. LaMorte, W. (2019) ***Health Belief Model*. Boston University School of Public Health.** https://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories2.html. Accessed on 19.07.2020
23. Lu, Y. & Wang, F. (2018) **'Urban versus rural participation in health research: A review of literature',** *Public Health Reviews*, 39(1), pp. 12–24. https://doi.org/10.1186/s40985-018-0096-3. Accessed on 10.02.2021.
24. Lugo, L. & Cooperman, A. (2010) ***Global religious diversity*. Pew Forum on Religion & Public Life.** https://www.pewresearch.org/religion/2014/04/04/global-religious-diversity/
25. Ministry of Health [MOH]. (2021). **Coronavirus disease (COVID-19) situation report. Zambia**: MOH. ttps://www.moh.gov.zm/?wpfb_dl=57 . Accessed on 04.02.22
26. Nguyen, H. T., Do, B. N., Pham, K. M., Kim, G. B., Dam, H. T. B., Nguyen, T. T. et al**.** (2020) '**Fear of COVID-19 scale—associations of its scores with health literacy and health-related behaviors among medical students',** *International Journal of Environmental Research and Public Health*, 17(11), 4164. https://doi.org/10.3390/ijerph17114164
27. Nwagbara, U. I., Osual, E. C., Chireshe, R., Bolarinwa, O. A., Saeed, B. Q. & Khuzwayo, N. (2021) **'Knowledge, attitude, perception, and preventative practices towards COVID-19 in sub-Saharan Africa: A scoping review',** *PLOS ONE*, 16(4), e0249853. https://doi.org/10.1371/journal.pone.0249853
28. Olapegba, P. O., Ayandele, O., Kolawole, S. O., Oguntayo, R., Gandi, J. C., Dangiwa, A. L. & Iorfa, S. K. (2020) **'A preliminary assessment of novel coronavirus (COVID-19) knowledge and perceptions in Nigeria',** *medRxiv*. https://doi.org/10.1101/2020.04.11.20061408
29. Okello, G., Izudi, J., Teguzirigwa, S., Kakinda, A. & Van Hal, G. (2020)

'Findings of a cross-sectional survey on knowledge, attitudes, and practices about COVID-19 in Uganda: Implications for public health prevention and control measures', *BioMed Research International*, 2020. https://doi.org/10.1155/2020/5917378

30. Okoye, V. O. & Aderibigbe, O**.** (2021) **'Employment patterns in Sub-Saharan Africa',** ***Economic and Labour Relations Review***, 32(2), pp. 273–293. https://doi.org/10.1177/1035304620927107
31. O'Neil, A., Scovelle, A. J. & Milner, A. J. (2014) **'Gender disparities in community-based research participation',** *Social Science & Medicine*, 117, pp. 63–69. https://doi.org/10.1016/j.socscimed.2014.07.006
32. Ouyang, P., Zhang, W. & Lyu, S**.** (2020) **'Social networks and residents' willingness to participate in community governance during the COVID-19 pandemic',** ***Journal of Environmental Planning and Management*,** 64(6), pp. 1093–1114. https://doi.org/10.1080/09640568.2020.1824472
33. Pew Research Center. (2018) ***Christianity in Sub-Saharan Africa.*** https://www.pewresearch.org/religion/2010/04/15/executive-summary-islam-and-christianity-in-sub-saharan-africa/
34. Psacharopoulos, G. & Patrinos, H. A**.** (2018) **'Returns to investment in education: A decennial review of the global literature',** ***Education Economics*,** 26(5), pp. 445–458. https://doi.org/10.1080/09645292.2018.1484426
35. Reuben, R. C., Danladi, M. M. A., Saleh, D. A. & Ejembi, P. E. (2021) **'Knowledge, attitudes and practices towards COVID-19: An epidemiological survey in North-Central Nigeria',** *Journal of Community Health*, 46(3), pp. 457–470. https://doi.org/10.1007/s10900-020-00881-1
36. Ricco, M., Ferraro, P., Gualerzi, G. & Ranzieri, S. (2020) **'Knowledge, Attitudes, and Practices (KAP) towards COVID-19 among medical students:** A cross-sectional study in Italy', *Acta Bio Medica: Atenei Parmensis*, 91(2), e2020008. https://doi.org/10.23750/abm.v91i2.9402
37. Riiser, K., Helseth, S., Haraldstad, K., Torbjørnsen, A. & Richardsen, K. R**.** (2020) **'Adolescents' health literacy, health protective measures, and health-related quality of life during the Covid-19 pandemic',** *PLOS ONE*, 15(8), e0238161. https://doi.org/10.1371/journal.pone.0238161
38. Rosenstock, I. M. (1974). **Historical origins of the Health Belief Model.** ***Health Education Monographs*,** *2*(4), 328–335. https://doi.org/10.1177/109019817400200403. Accessed 02.02.2020
39. Seale, H., Heywood, A. E., Leask, J., Sheel, M., Thomas, S., Durrheim, D. N. & Bolsewicz, K. (2020) **'COVID-19 is rapidly changing: examining public perceptions and behaviors in response to this evolving pandemic',** *PLOS ONE*, 15(6), e0235112. https://doi.org/10.1371/journal.pone.0235112. Accessed on 22.07.2020.
40. Smith, W. G**.** (2008) **'Does gender influence online survey participation?'** ***ERIC Document*** ED501717. https://eric.ed.gov/?id=ED501717.
41. Thomas, R., Greenwood, H., Michie, S., Yardley, L., West, R. & Amlôt, R. (2021) **'Public knowledge, beliefs and behaviour regarding COVID-19 in Australia: Results from a nationally representative survey',** ***Frontiers in Public Health***, 9, 638059.

https://doi.org/10.3389/fpubh.2021.638059

42. UNESCO. (2019) ***Education for all global monitoring report*** *2019*. https://unesdoc.unesco.org/ark:/48223/pf0000265558
43. Wolf, M. S., Serper, M., Opsasnick, L., O'Conor, R. M., Curtis, L. M., Benavente, J. Y. et al**.,** (2020) '**Awareness, attitudes, and actions related to COVID-19 among adults with chronic conditions at the onset of the US outbreak:** a cross-sectional survey', *Annals of Internal Medicine*, 173(2), pp. 100–109. https://doi.org/10.7326/M20-1239
    World Bank. (2020) ***World Development Report 2020*. World Bank Group**. https://www.worldbank.org/en/publication/wdr2020 . Accessed 12.02.2022
    World Health Organization. (2020a) *Novel coronavirus (COVID-19) situation.* https://experience.arcgis.com/experience/685d0ace521648f8a5beeeee1b9125c. Accessed 12.02.2022
44. World Health Organization. (2020b) *COVID-19* ***Situation update for the WHO African Region, External Situation Report 18***. https://reliefweb.int/report/south-africa/covid-19-situation-update-who-african-region-external-situation-report-18-01. Accessed on 10.02.22
45. Zhong, B. L., Luo, W., Li, H. M., Zhang, Q. Q., Liu, X. G., Li, W. T. & Li, Y. (2020) '**Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey',** *International Journal of Biological Sciences*, 16(10), pp. 1745–1752. https://doi.org/10.7150/ijbs.45221. 10.03.2023