



**Disaster Risk Management Strategies and Covid-19: A Case of Health Centers Under the City County Government, Nairobi, Kenya**

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***Abstract***

Since the first case of COVID-19 infection was reported in Kenya, the government and its public health care service delivery system operationalised various strategies to prevent its spread including knowledge dissemination, imparting skills, promoting various practices and encouraging the public to evolve new health perceptions under the pretext of disaster risk management perspectives. Public hospitals and their management team, especially health centres being the point of service delivery at the grassroots level were key players in this process amidst various challenges as they combined to combat ordinary health care with pandemic service deliveries. In this background, this research aimed to explore disaster risk management strategies adopted to combat COVID-19 in health centres under the city-county government, Nairobi, Kenya. Further, this study was guided by the specific objectives: examine knowledge dissemination efforts to combat the COVID-19 pandemic in health centers as part of DRM strategies under the city-county government, Nairobi, Kenya; determine skills provided to combat COVID-19 pandemic in health centres as part of DRM strategies under the city-county government, Nairobi, Kenya; analyse the practices promoted to combat COVID-19 pandemic in health centers as part of DRM strategies under the city-county government, Nairobi, Kenya; determine pandemic perceptions promoted to combat COVID-19 pandemic in health centers as part of DRM strategies under the city-county government, Nairobi, Kenya. The study adopted mixed method approach using an explanatory sequential research design. The study was conducted in 78 health centers under the city-county government, Nairobi, Kenya and the target population was 234 health managers in hospitals under the city-county government. To collect quantitative data, the researcher adopted probability sampling method, and for qualitative data, the researcher used non-probability sampling. The study sample size was 148 health managers of health centers. Quantitative data was collected using the questionnaire. Qualitative data was collected by using in-depth interviews. The study findings establishes that COVID-19 knowledge, skills, practices and perceptions had a positive and significant association with combating COVID-19 in hospitals. The study recommends that health organisations may focus more on disseminating COVID-19 knowledge. Special attention needs to shift to training health workers on how to deal with the COVID-19 pandemic. The health organisations shall ensure that COVID-19 practices are implemented systematically among the public to have a better understanding of the perceptions of people regarding COVID-19.

**Key words:** *Disaster Risk Management Strategies, Covid-19*

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## **Introduction**

Globally, nations have been exposed to numerous disasters such as fires, earthquakes, floods, landslides, terrorism, storms and pandemics (Hoang, 2019). Countries have experienced an increase in the diversity, intensity and frequency of occurrence of disasters over the past two decades. In many cases, these have resulted in an increase in the number of people affected, and property damaged leading to rising economic losses (Cvetkovic, 2019). Additionally, disasters have resulted in significant impacts on people's health, including the loss of lives, and serious disruptions to the functioning of communities. Every new threat reveals the challenges of managing risks. Deaths, injuries, diseases, disabilities, psychosocial problems and disruptions of normal ways of living can be avoided or reduced by disaster response management strategies (Shahin & Hussien, 2020).

COVID-19 is threatening cities and communities across the globe in an unprecedented way, impacting not only public health but also the economy and social fabric. Since the outbreak began in Wuhan, China in December 2019, global confirmed cases of COVID-19 have exceeded ten million with an approximate mortality rate of 10% of reported cases. While COVID-19 might not be as fatal as some other previous epidemics such as SARS, Ebola, and MERS, its transmission rate is much higher, which poses a greater challenge to dense urban areas in the world, especially those with poor infrastructure and service delivery systems (Pearson, 2020). Besides its impact on public health, the COVID-19 epidemic is generating multifaceted, and likely prolonged economic impacts, ranging from disrupted global supply chains to bankrupted small businesses, with significant job losses and impacts on the livelihoods of people everywhere (World Bank Group, 2020).

Hospital risk management is integral in maintaining health services and controlling the spread of COVID-19. It involves the prevention, containment, management, monitoring, and identification of persons with COVID-19 or those exposed to them by implementing facility protocol (Griffin, Karas, Ivascu & Lief, 2020). These measures include the training of healthcare personnel (HCP) on infection prevention and control policies, rapid identification, and isolation of patients confirmed or suspected to have COVID-19; placement of patients in appropriate isolation rooms; transmission-based precaution with the use of the appropriate personal protective equipments (PPE); moving a patient with confirmed or suspected COVID-19 within the facility; hand hygiene; environment cleaning; and limiting visitor access (Griffin, Karas, Ivascu & Lief, 2020).

## **Understanding the problem**

Health managers are responsible for collaboration and coordination with health sector actors; planning and regulation of health systems and resource generation through the capacity as they perform the personnel roles but beyond direct service provision which is poorly described in Kenyan policy and little discussed in the literature though often found rhetoric of the terms like New Public Management, empowered managers continued devolution. This overarching role as the decisionmaker, problem-solver, information manager and communicator challenges health managers at level 3 hospitals as they are close to day-to-day operations, they know better than anyone where the problems are; use the information to communicate with diverse groups and effectively bring about change, especially during COVID-19. The Kenyan public hospitals have revealed leadership gaps and poor communication between senior administration and lower cadres. The poor information transmission from higher levels in the system to lower levels as an impediment to achieving better-improved service (Nzinga, Mbindyo, Mbaabu, Warira, & English, 2009).

Going beyond all odds and lacunas, the government took different risk management strategies to prevent COVID-19 infection since the first case was reported in Kenya. Under

Disaster Risk Management strategies, the Government formed the National COVID-19 task force, which supported the country's response through multi-sectoral technical working groups on testing, case management, risk communication and community engagement. An earlier version of the COVID case management guideline was released in April 2020 and capacity building of health care workers on diagnosis and treatment of COVID-19 was quickly carried out, even as counties prepared themselves by setting up isolation centres and supplies. Along with these, efforts were made to disseminate complete knowledge of the pandemic, impart new skills, promote preventive practices and generate perceptions of COVID-19 such as remaining vigilant, maintaining hygiene, keeping social distance, and wearing masks to prevent the furtherance of the pandemic.

However, there were challenges in the management of COVID-19, especially at health centres or level 3 health service delivery such as; shortage of PPE kits, shortage of diagnostic reagents, change of socio-cultural behaviours (handshake, traditional burials rites), interruption of essential health and specialised healthcare programs (Cancer care, Immunization, HIV, Maternal care), difficulties in contact tracing and implementation of quarantine measures and myths and misconceptions in the community. Another challenge in the war against the pandemic is the rate at which mutations occur, resulting in several variants of concern such as the Delta Variant, Omicron that have been noted to be more transmissible and evade the immune system, resulting in more infections and increased severity of the disease which pose threat and significance of strengthening COVID-19 risk management strategies.

Efforts were made to identify the management of disasters amid the COVID-19 pandemic. (Ishiwatari 2020), disaster management of the psychological impact of the COVID-19 pandemic (Sheek-Hussein, Abu-Zidan & Stip, 2020) and coronavirus Disease 2019 (COVID-19) in Kenya: Preparedness, response and transmissibility (Aluga, 2020). The reviewed studies show that there has been limited focus on disaster risk management strategies adopted by public sector hospitals to combat COVID-19 in Kenya. It is, therefore, due to delve deep into the disaster risk management strategies adopted and implemented to combat COVID-19 in hospitals under the city-county government, Nairobi, Kenya.

### **Research Objectives**

The aim of the study was to explore disaster risk management strategies adopted to combat COVID-19 in hospitals under the city-county government, Nairobi, Kenya.

The study was guided by the following specific objectives:

1. To examine knowledge dissemination efforts to combat the COVID-19 pandemic in hospitals as part of DRM strategies under the city county government, Nairobi, Kenya.
2. To determine skills provided to combat the COVID-19 pandemic in hospitals as part of DRM strategies under the city county government, Nairobi, Kenya.
3. To analyse the practices promoted to combat COVID-19 pandemic in hospitals as part of DRM strategies under the city county government, Nairobi, Kenya.
4. To determine pandemic perceptions promoted to combat COVID-19 pandemic in hospitals as part of DRM strategies under the city county government, Nairobi, Kenya.

### **Theoretical Framework of the Study**

The study was guided by Petak's Four-Phase Model on Disaster Management. In 1985, Petak proposed a four-phase model to identify the role of governments and stakeholders in each disaster management phase. He divided pre-disaster management and post-disaster management according to the progress of disasters and countermeasures and explained disaster management procedures in a time-sequential manner: Disaster mitigation, preparedness, response and

recovery. Petak emphasised that delineating the roles and responsibilities of all levels of government and stakeholders is essential for effective disaster management (Petak, 1985).

Mitigation involves minimising the effects of a disaster by building codes and zoning, vulnerability analyses and public education. Preparedness entails planning how to respond. Examples: preparedness plans, emergency exercises/training and warning systems. The response is the effort to minimise the effects created by a disaster for example emergency relief. Recovery is returning the community to normal (Petak, 1985).

This model can be applied in the case of the COVID-19 pandemic. Mitigation to minimise the effects of COVID-19 comprised encouraging individuals to maintain social distance, wear masks and avoid crowded places. Preparedness for responding to COVID-19 comprised involved carrying out COVID-19 tests, isolating and quarantining. Response during the pandemic involved closure of borders, targeted testing, lowering taxation of basic commodities and allowing employees remote working. Recovery involves mitigating socio-economic impacts as the pandemic is controlled, while also preventing another wave.

### **Material and Method of the Study**

The researcher followed a pragmatic research paradigm that facilitates the researcher to combine both positivist and constructivist principles in a single project. At the same time, applying so, the researcher used qualitative and quantitative methods to study the research problem. This assisted in arriving at the best possible answer to research questions. The study adopted a mixed-method approach using an explanatory sequential research design. The study population were health managers in 78 health centres under the county government of Nairobi. Therefore, the respondents were health managers in the hospitals under the county government of Nairobi. The study adopted a probability and non-probability sampling frame. To collect quantitative data, the researcher adopted the probability sampling method (simple random) and for qualitative data, the researcher used non-probability sampling (purposive sampling). The Yamane formula was used to arrive at a sample size of 148 health managers of health centres. Qualitative data were collected from health managers of level 4 -6 hospitals and from health facilities and dispensaries.

Quantitative data was collected using the questionnaire. Qualitative data was collected by using in-depth interviews and semi-structured interview guide. The collected data were transcribed and coded for thematic analysis. Data from the field was checked for completeness and edited. The researcher presented the quantitative data analyzed both in descriptive and inferential statistics using SPSS version 25.0. The correlational analysis was conducted to determine the strength of the relationship between the independent and dependent variables. The multiple regression analysis determined the relationship between the study variables. The information was presented in form of tables. The qualitative data collected were transcribed and coded for thematic analysis. The thematic analysis of the qualitative data was presented concurrently with quantitative data.

### **Results and Discussion**

The study targeted 148 health managers of health centers who were issued questionnaires and 15 health managers of health facilities who responded to the interviews. From the issued questionnaires, 126 were returned forming a response rate of 85.1%. The study was then furthered by undertaking a correlational analysis of the variables; knowledge, skills, practice and perspectives in relation to COVID-19.

Table 1

*Correlational analysis of knowledge, skills, practice and perspectives in relation to COVID-19*

Variables under study.	Tests and Sig and N	Combat COVID-19 pandemic	COVID-19 knowledge	COVID-19 skills	COVID-19 practices	COVID-19 perception
Combat COVID-19 pandemic	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	126				
COVID-19 knowledge	Pearson Correlation	0.741	1			
	Sig. (2-tailed)	0.002				
	N	126	126			
COVID-19 skills	Pearson Correlation	0.718	.544	1		
	Sig. (2-tailed)	0.002	.027			
	N	126	126	126		
COVID-19 practices	Pearson Correlation	0.748	.478	.562	1	
	Sig. (2-tailed)	0.002	.037	.052		
	N	126	126	126	126	
COVID-19 perceptions	Pearson Correlation	0.725	.368	.327	.358	1
	Sig. (2-tailed)	0.002	.046	.055	.049	
	N	126	126	126	126	126

Table 1 shows that COVID-19 knowledge had a positive significant correlation with combatting the COVID-19 pandemic in hospitals under the city county government ( $r=0.741$ ,  $p=0.002$ ) at a 5% significance level. Further, COVID-19 skills had a positive significant correlation with combatting the COVID-19 pandemic in hospitals under the city county government as shown by ( $r=0.718$ ,  $p=0.002$ ). The results also show that COVID-19 practices had a positive significant correlation with combatting the COVID-19 pandemic in hospitals under the city county government as shown by ( $r=0.748$ ,  $p=0.002$ ). Finally, COVID-19 perceptions had a positive significant correlation with combatting the COVID-19 pandemic in hospitals under the city county government as shown by ( $r=0.725$ ,  $p=0.002$ ). This implies that COVID-19 knowledge, skills, practices, and perceptions are significantly associated with combatting the COVID-19 pandemic.

**Regression analysis of COVID-19 knowledge, skills, practices and perceptions**

A multiple regression analysis was conducted to determine the disaster risk management strategies adopted to combat COVID- 19 in hospitals under the city county government, Nairobi, Kenya. The findings were presented in the subsections that follow.

The model summary was used to determine the variations in combatting COVID-19 pandemic due to changes in COVID-19 knowledge, skills, practices and perceptions. The results were summarized in Table 1.

Table 2

*Model Summary of COVID-19 Knowledge, Skills, Practices and Perceptions*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.829 <sup>a</sup>	.687	.682	.05128

Table 2 shows that the adjusted R square was 0.682. This implies that there was 68.2% variation in combatting the COVID-19 pandemic due to changes in COVID-19 knowledge,

skills, practices and perceptions. The remaining 31.8% implies that there are other factors affecting combatting the COVID-19 pandemic that was not discussed in this study.

The analysis of variance of COVID-19 knowledge, skills, practices and perceptions was used to determine whether the data is a good fit for the model using 0.05 has the selected significance level. The results are shown in Table 3.

Table 3

*Analysis of Variance of COVID-19 Knowledge, Skills, Practices and Perceptions*

<b>Model</b>		<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
1	Regression	13.176	4	3.294	10.626	.001 <sup>b</sup>
	Residual	37.453	121	.310		
	Total	50.629	125			

From the findings in Table 3, the significance value is 0.01 which is less than the selected significance level of 0.05. This implies that the data is a good fit for the model. Further, the f-calculated (10.626) is greater than f-critical (2.675) from the f-critical tables. This implies that the model can be used to predict disaster risk management strategies adopted to combat COVID-19 in hospitals under the city county government.

Table 4

*Beta Coefficients of COVID-19 Knowledge, Skills, Practices and Perceptions*

<b>Model</b>		<b>Unstandardized Coefficients</b>		<b>Standardized Coefficients</b>		<b>Sig.</b>
		<b>B</b>	<b>Std. Error</b>	<b>Beta</b>	<b>t</b>	
1	(Constant)	1.573	.267		5.891	.000
	COVID-19 knowledge	.392	.099	.291	3.960	.002
	COVID-19 skills	.326	.095	.237	3.432	.003
	COVID-19 practices	.378	.085	.225	4.447	.001
	COVID-19 perceptions	.329	.098	.228	3.357	.003

From the findings in Table 4, The regression model was fitted as follows;

$$Y = 1.573 + 0.392 X_1 + 0.326 X_2 + 0.378 X_3 + 0.329 X_4 + \epsilon$$

From the equation, it shows that holding COVID-19 knowledge, skills, practices and perceptions at a constant, combatting COVID-19 pandemic in hospitals will be at a constant of 1.573.

The findings also show that COVID-19 knowledge had a statistically significant impact on combatting the COVID-19 pandemic in hospitals under the city county government (B=0.392, P=0.002). Further, the relationship was positive. Hence, increasing COVID-19 knowledge by a unit would result in an increase in combatting the COVID-19 pandemic by 0.392 units.

COVID-19 skills had a statistically significant impact on combatting the COVID-19 pandemic in hospitals under the city county government (B=0.326, P=0.003). Further, the relationship was positive. Hence, a unit increase in COVID-19 skills would result in an increase in combatting the COVID-19 pandemic by 0.326 units.

COVID-19 practices had a statistically significant impact on combatting the COVID-19 pandemic in hospitals under the city county government (B=0.378, P=0.001). Further, the relationship was positive. Hence, a unit increase in COVID-19 practices would result in an increase in combatting the COVID-19 pandemic by 0.378 units.

COVID-19 perceptions had a statistically significant impact on combatting the COVID-19 pandemic in hospitals under the city county government ( $B=0.329$ ,  $P=0.003$ ). Further, the relationship was positive. Hence, a unit increase in COVID-19 perceptions would result to an increase in combatting the COVID-19 pandemic by 0.329 units.

### **Discussion of the results**

The statistical data analysis discloses that COVID-19 knowledge, skills, practices, and perceptions are significantly associated with combatting COVID-19. The Regression analysis also reveals that 68.2% of COVID-19 pandemic prevention strategies could change COVID-19 knowledge, skills, practices and perceptions. There are other factors affecting combatting the COVID-19 pandemic that was not discussed in this study and still need to be explored and opens the doors for further areas of the research. This implies that the Regression model on COVID-19 Knowledge, Skills, Practices and Perceptions can be used to predict disaster risk management strategies adopted to combat COVID-19 in hospitals under the city county government.

The study examined the effectiveness of the knowledge disseminated to combat COVID-19 and found that media was used to provide information about the spread of COVID-19 and that through effective knowledge dissemination the public was able to practice the COVID-19 preventive measures. Also, the public was provided with information about the level of COVID-19 transmission through press conferences and educated about COVID-19 through media houses. The findings corroborate with Ikenwe (2020) who indicated that Facebook and WhatsApp were the social media networks mostly used to provide COVID-19 information. Zhou (2021) found that people in remote regions obtained accurate information on COVID-19. Further, they were able to take appropriate measures to protect themselves.

The study assessed the skills provided about COVID-19 and established that health workers were trained on COVID-19 testing, the use of PPEs and how to protect themselves from contracting COVID-19. It was also noted that new skills were provided for handling new COVID-19 variants. The public was provided with information on how to protect themselves from contracting COVID-19 like skills on handwashing. The findings concur with Peason (2020) who found a statistically significant increase in COVID-19 knowledge and skills. The most significant improvement was found in the assessment of pediatric hemodynamic status and the management of fluid and electrolytes. The most interesting benefit to the participants was acquiring knowledge about the proper use of technology after the faculty development course.

The study examined the practices implemented to combat COVID-19 and revealed that curfews were imposed to combat the spread of COVID-19, contact tracing was adopted to combat the spread of COVID-19, individuals are required to practice social distancing and wear face masks, there was a closure of learning institutions and entertainment places and isolation and quarantine methods were implemented to combat the spread of COVID-19. The findings relate to Githinji G, de Laurent Z.R, Mohammed K (2020) who found that coughing and sneezing were identified as transmission routes by respondents, while indirect hand contact was the least commonly identified transmission route. Handwashing was identified as a preventive measure against the virus, but social distancing and avoiding crowds. Handwashing was the most common preventive practice in response to COVID-19.

The study assessed perceptions of the COVID-19 pandemic and found that there has been low adherence to face mask wearing by the public, personal beliefs of the public prevent their adherence to strategies to combat the COVID-19 pandemic, and the majority of the public is hesitant to get the COVID-19 vaccine. It was also established that the public had a low perception of the efficacy of prevention measures, had low intention to carry out measures and was low adherence to social distancing by the public. The findings corroborate with those of Zhou (2021) who found that 42.1% of participants had a low perception of the efficacy of

prevention measures and 28.3% had a low intention to carry out measures. Young adults, male gender, low literacy and face mask non-users were significantly associated with low perceived efficacy of COVID-19 prevention methods.

## **Conclusions**

The study concluded that knowledge dissemination had a positive and significant effect on combating the COVID-19 pandemic in hospitals. Knowledge dissemination in relation to COVID-19 contributes significantly to DRM in hospitals. COVID-19 knowledge can be disseminated through social media and press conferences. The skills provided in relation to COVID-19 have a positive and significant effect on combating the COVID-19 pandemic in hospitals. skills provided in relation to COVID-19 contribute significantly to combating COVID-19. Such skills comprise COVID-19 testing, skills on the use of PPEs, skills to handle new COVID-19 variants and skills on handwashing. Efforts to implement practices to prevent COVID-19 have a positive and significant effect on combating the COVID-19 pandemic in hospitals. This implies that an increase in practices implemented in relation to COVID-19 would increase the management of COVID-19. Practices such as curfews, contact tracing, social distancing and wearing face masks, isolation and quarantine are significant in combating the COVID-19 pandemic in hospitals. The practices to generate knowledge about COVID-19, imparting skills to prevent the pandemic and promoting innovative and globally accepted practices to prevent the pandemic created positive perceptions among the health managers and the public as they claim. This facilitated a positive and significant effect on combating the COVID-19 pandemic in hospitals. Positive perceptions in relation to COVID-19 significantly contribute to combating COVID-19. The perceptions include willingness to wear face masks and to get vaccinated.

## **Recommendations of the Study**

The study makes the following recommendation based on the finding.

1. The study recommends that the ministry of health and health Centre may focus on disseminating COVID-19 knowledge. This will enhance people understanding of the pandemic which helps combat the COVID-19 pandemic.
2. The study suggests that the ministry of health shall shift focus to training health workers on dealing with the COVID-19 pandemic. This will enhance their knowledge and skills in the management of COVID-19.
3. The study recommends that public health institutions ensure that COVID-19 practices are implemented systematically. This will help combat the COVID-19 pandemic.
4. The study suggests that public health institutions shall ensure that they have an understanding of the perceptions of people regarding COVID-19. This will help in strategising to change any negative perceptions about COVID-19.

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