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Corona Virus-19 Crisis Management: Factors Essential to Africa's Success in Managing the Corona Virus

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Abstract

Africa has kept the COVID-19 impact lower than in the other world's continents despite its challenges of high population with a population density of 45 people per square kilometer, low economic development status, high population, informal settlements, lack of water and sanitation facilities which makes it more difficult to ensure practices that will assure safety such as hand washing and social distancing. These challenges make Africa more vulnerable to the disease, but the continent has remained the least affected. The study aims to unearth factors essential to Africa's success in managing the CORONA Virus by examining the Covid-19 impact in Africa and the commonly cited hypothetical factors thought to reduce same which include Good Public Support, Young Population, Fewer old age homes, Warm Climate and Good Community Health System. fifty-five countries in Africa were covered in this study. Secondary data was obtained from reputable databases such the world in data, World meter and weather spark. Regression analysis was used to analyze the data. Two dependent variables were identified which include Case infection, case fatality. It also identified five (5) independent variables including public support, old age homes, age, climate, and public health. The findings of the study were that the hypothetical factors have a significant influence on the low impact of COVID-19 in Africa. The study concluded that public support variable has the most positive impact on the reduction of COVID impact in Africa. The study recommends strengthening of data capturing and public support policy for COVID-19 worldwide.

Keywords: *Corona Virus, Crisis Management and Essential Factors.*

Introduction

Africa has fifty-five (55) sovereign member states unionized under the African Union [1]. The African Union is there to promote unity and solidarity of the African member states. It is to coordinate and intensify their cooperation and efforts to achieve a better life for the people of Africa [1]. The African Union is a product of the first and post-colonial era continental organization called Organization for African Unity (OAU) which laid the foundation of Unity and cooperation among member states [1].

The continent commands an area of 29,648,481 km^2, population of 1,384,312,600 and a population density of 45 per km^2 and the median age of 19.7 [2]. It is confirmed as the most tropical of all continents. Africa is reported to be the only continent that straddles the equator and the prime meridian, making it the only continent to be situated in all four cardinal hemispheres of the world. It is the only continent that stretches from the North temperate to the South temperate zones of the world [3]. As such it incorporates both the Tropic of Cancer and Capricorn. The equator divides the continent into almost two equal parts, the North, and the South. The North is warmer, and the South portion is cooler [4]. The continent is underdeveloped with its member countries at various stages of economic development spanning from low, middle, upper middle and high-income status (World Bank

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2021). African countries rank the lowest in per capita spending on healthcare and the availability of physicians [5].

The continent is characterized by a young age population and fewest old age population in the world (above 60 years), [6]. It is reported that 41% of Africa population is under the age of fifteen (15) [7].

Africa also has a housing crisis as of the one billion people of the world reported to be living in slums, two hundred million of them are found in Africa [8]. This poses a challenge on the fast spread of Covid-19, especially where there is crowding of small houses there is certainly lack of ventilation and social distancing.

The continent is also a host to numerous deadly pandemic diseases to human beings. These include malaria, dysentery, and hemorrhagic fevers to name a few [9]. Recently, the world saw the emergence of the COVID-19 pandemic and Africa is not spared, albeit being the least affected continent in the whole world [10]. Such diseases compete for the same limited resources required for dealing with the COVID -19 pandemic.

The study aimed to unearth factors essential to Africa's success in managing CORONA VIRUS DISEASE 19 (COVID -19) in comparison with the world. The study has two objectives, but this journal article is based on the second objective which is to establish which of these hypothetical factors (Good Public Support, Young Population, Fewer old age homes, Warm Climate and Good Community Health System) does indeed have an impact, how do they interact, and which one's matter most.

Research Problem

The COVID-19 Pandemic simply compounds the continent's pandemic disease problems. [11] reflects that at the beginning of the third wave, out of the population of the world, population vaccinated for COVID-19 has 2.4% coming from Africa in comparison with 25.31% of Asia, 27.1 in South America and 40% from Europe and North America. This reflects a meagre vaccination progress of the population of Africa totalling more than 1.2 billion people and hopefully the continent will catch up in the future. Therefore, it was a given from the onset of the pandemic that it will most severely affect Africa more than any other continent. In an unexpected turn of events, Africa, the continent with the second highest population of the world after Asia and thought to be most vulnerable to the COVID-19 pandemic, stood out the least affected in the world. Africa continues to trail behind other continents by recording lower infections and lead the world regarding recoveries. Africa's case fatality ratio and positive cases remains far lower than elsewhere in the world. Africa has so far, in the first and second wave combined, recorded Thirty-seven thousand (37000) deaths compared roughly with fifty-eight (58,0000) from the Americas, two hundred and thirty thousand (230,000) in Europe and two hundred and five thousand (205,000) from Asia and the fatality case ratio together with new infection rates were on the decline [12]. Africa continued to trail the world even in the wake of the recent fifth wave of July 2021 despite significantly lagging on the vaccination of her population [12].

Research Hypothesis

The study is premised on five hypothetical statements which are thought to be the scientific reasons for the resistance against COVID-19. These include Good Public Support, Young Population, Fewer old age homes, Warm Climate and Good Community Health System. It is hypothesized that there is no relation between the COVID-19 impact in Africa and Good Public Support, Young Population, Fewer old age homes, Warm Climate and Good Community Health System.

This chapter outlines the approach followed in conducting the study. It outlines the dependent and independent variable considered in the

study. It explains that the study followed structured approach as it is quantitative type using secondary data. It covers the research design, data collection, strata frame, data organization and data evaluation method. It provides information on the data basis from which data is drawn.

Methodology

This chapter outlines the approach followed in conducting the study. It outlines the dependent and independent variable considered in the study. It explains that the study followed structured approach as it is quantitative type using secondary data. It covers the research design, data collection, strata frame, data organization and data evaluation method. It provides information on the data basis from which data is drawn.

Research Design

The study focuses on studying the success factors behind the resilience of Africa towards. COVID 19 impact. The study assesses this over a period of three years and cover the first five (5) waives of COVID 19. The study assessed all the 55 countries of Africa. The study further stratifies the countries according to their climate zones as climate is understood to be a major factor in disease spread. The study frame is therefore all the countries of the continent which include: Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde (ISLAND NATION), The Central African Republic, Chad, Comoros (ISLAND NATION), The Democratic Republic of the Congo, Republic of the Congo, Djibouti, Egypt, Equatorial Guinea (ISLAND NATION), Eritrea, Ethiopia, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Kenya, Lesotho, Liberia, Libya, Madagascar (ISLAND NATION), Malawi, Mali, Mauritania, Mauritius (ISLAND NATION), Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe (ISLAND NATION), Senegal, Seychelles (ISLAND NATION), Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Swaziland, Tanzania, Togo, Tunisia, Western Sahara, Uganda, Zambia and Zimbabwe [1].

Study Variables

Independent Variables

1. Public Support: Defined by the number of COVID-19 composite measure based on thirteen policy indicators including school closures, workplace closures, testing policy, contact tracing, face covering, and vaccine policy rescaled to a value from 0 to 100 (100 = strictest). If policies vary at subnational level, the index is shown as the response level of the strictest sub-region.
2. Climate: Defined by the average temperature obtaining in the all the countries
3. Population Age: Defined by the average population age per country.
4. Old age homes: defined by the average number of old age homes.
5. Public Health System: defined by the number of hospitals available per 100,000 people per country.

Dependent Variables

1. Case infection: defined by the number of people infected by COVID 19 in specified dates within each waive period.
2. Case fatality: defined by the number of deaths due to COVID-19 in specified dates within each waive period.

Data Collection

The study drew secondary data from existing reputable data bases for both the dependent and independent variables. The continent is divided into three strata, which is the Northern Hemisphere, Equator and Southern Hemisphere. Each stratum has unique conditions regarding the chosen hypothetical factors' influence over the impact of the

COVD-19. The data under consideration comes from case surveillance conducted by the countries of the continent, recorded daily in their respective hospitals, health care providers and laboratories who transfer the data for case reporting to state, local and territorial public health departments as required under each country's disease reporting law. The State, local and territorial department, health departments move data notification to the Central Disease Coordination (CDC) through National Notifiable Disease Surveillance System (NNDSS). The CDC reports national COVID - 19 case surveillance data to the World Health Organization as required under international health regulations. CDC also publishes COVID-19 national case surveillance data for public use at data.cdc.gov.

The data is selected in line with the peak time of the pandemic waives. Specific dates against which data is chosen are selected and recoded in data tables. In the event the date chosen does not exist in the data base, the closest date before is used.

Strata Frame

Stratum 1: Northern Hemisphere Countries

Western Sahara, Mauritania, Senegal, Guinea, Liberia, Ivory Coast, Sierra Leone, Mali, Burkina Faso, Ghana, Togo, Benin, Eritrea, Niger, Chad, Djibouti, Guinea-Bissau, Equatorial Guinea, Cameroon, Nigeria, Sudan, Ethiopia and the northern parts of Somalia, and Gabon.

Stratum 2: Equator Countries

Republic of Congo, the Democratic Republic of the Congo (DRC), Kenya, Samoa TP, Somalia, Uganda.

Stratum 3: Southern Hemisphere Countries

Angola, Botswana, Burundi, Comoros, Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Papua New Guinea, Rwanda, Seychelles, Solomon Islands, South Africa, Tanzania, Zambia, and Zimbabwe and Gabon.

Data Organization

The specific steps for organization of the data are as follows:

The study variables consist of the independent and dependent variables as already outlined above. The data for the dependent variables comes from different data bases addressed under the topics on independent variables below. The data for the dependant variables is obtainable in one data base which is Our World in Data, and it has a number of data sets addressed.

The data for both independent and dependent variables were collected from the various data bases consistently against the same dates obtaining within the five pandemic waves taken into consideration in this study. The list of these dates is outlined below. The first date at the top denotes the start of the first wave in Africa and the last date at the bottom denotes the fifth wave. In the event of the inconsistency of data availability in line with the stipulated dates, the date before was chosen.

Selected Dates Against Which Data Was Collected

February 25, 2020
April 4, 2020
July 24, 2020
October 12, 2020
November 22, 2020
February 5, 2021
July 28, 2021
October 19, 2021
January 25,2022
March 30, 2022

As the analysis proceeded some dates together with the data would be removed as found not adding value to the analysis.

Data Bases for Independent Variables

Data for the independent variables is drawn from different data bases as follows:

1. Public Support: is drawn from Our World in Data: Covid-19 Containment and Health Index data base.
2. Climate: meteorological data from country data base or Weather Spark Data Base (Worldspark.com).
3. Age: Age is drawn from the demography database of each country and World Economics Data Base (World Economics.com).
4. old age homes data is drawn from African advice data base (Africanadvice.com/Old age homes/country).
5. Good Public Health System: is drawn from orldometer (COVID 19 Data base).

Data Evaluation

The data is analyzed using multiple regression analysis using Excel as the analytical tool. Multiple Regression is used due to the multiple independent variables involved.

Multiple Regression Equations

The study identifies two multiple regression equations which are as follows:

Case infection = Public Support + Young age + Fewer old age homes +Warm Climate + Good Community Health System.

Case Fatality = Public Support + Young age + Fewer old age homes +Warm Climate + Good Community Health System.

Findings, Discussion and Recommendations and Limitations

This chapter focusses on presenting findings, discussion of the findings, recommendations including future scope of research in this regard. It also presents the limitations of the study. The findings are presented in tables summarizing the results obtained when analyzing the data using regression analysis from excel across all the countries. The regression analysis results for each country are attached in the thesis. The results are first arranged by the strata and lastly by the continent to deduce the COVID-19 effects in each country and block. At strata level the study starts of by presenting the data gap tables demonstrating that it considered existing gaps in the analysis and follow by outcomes of the analysis.

Results

Stratum 1: Northern Hemisphere

The stratum has twenty-nine (29) countries. There are two countries which are Western Sahara and Somali North that did not have data in the World in Data COVID-19 dataset chosen for the study, hence it does not reflect on the tables presented in this stratum. All of them do not have daily data on serious/critical sick, save for Algeria, instead they have annual totals which were not helpful in this study. Further gaps are noticeable in other variables; four out of the twenty-nine (4/29) lack data on public support, one out of the twenty-nine (1/29) on old age, one out of the twenty-nine (1/29) on climate, one out of the twenty-nine (1/29) health system, two out of the twenty-nine (2/29) on case infections, and three of the twenty-nine (3/29) on case fatality. See table 1 below:

Table 1. Availability of Data for Stratum 1

Data Type	Public Support	Age	Old Age	Climate	Health System	Case Infection	Case Fatality	Recoveries	Serious/ Critical
Country									
Gabon	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Ethiopia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No

Sudan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Nigeria	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Cameroon	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Equatorial Guinea	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Guinea Bissau	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Djibouti	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Chad	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Eritrea	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Central Africa Republic	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Benin	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Togo	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
St Helen	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Cape Verde	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Senegal	yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Sierra Leon	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Mali	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Coidevoire Voire	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Gambia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Tunisia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Liberia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Mauritania	No	Yes	No	No	No	No	No	No	No
Algeria	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Libya	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Egypt	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Morocco	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No

Key: Yes – Data is available; No – no data.

The Stratum has fifteen out of twenty-nine (15/29) countries with a poor data fit and ten out of twenty-nine (10/29) good data fit on the case infection dependent variable.

The Stratum has twenty out of twenty-nine (20/29) countries that reflect a poor data fit for the Case fatality dependent variable and four out of twenty-nine (4/29) countries indicate a good data fit on the same variable. None of the countries reflect a significant F.

The stratum has five out of twenty-nine (5/29) countries with independent variables reflecting significant influence on case infection and twenty out of twenty-nine (20/29) countries reflect insignificant influence of the independent variables across all dependent variables.

The stratum has two out of twenty-nine (2/29) countries indicating significant influence of public support over case fatality in two countries that is Guinea Bissau and Algeria.

The Stratum has two out of twenty-nine (2/29) countries indicating significant influence of age over case infections in two countries that is Equatorial Guinea and Cote d'Ivoire. The stratum also has one out of twenty-nine (1/29) countries reflecting significant influence of old age, climate, and health System over case fatality. See table 2.

Table 2. Data Availability for Stratum 2

Independent Variable	**Public Health**		**Age**		**Old Age Homes**		**Climate**		**Health System**		**Significant F**		**Data Fit**	
Dependant Variable	Case Infection	Case Fatality	Case Infection	Case Fatality	Case Infection	Case Fatality	Case Infection	Case Fatality	Case Infection	Case fatality	Case Infection	Case Fatality	Case Infection	Case Fatality
Country														
Gabon	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Ethiopia	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Sudan	I	I	I	I	I	S	I	S	I	S	I	S	P	N
Nigeria	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Cameroon	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Equatorial Guinea	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Guinea Bissau	S	I	I	I	I	I	I	I	I	I	I	I	P	N
Djibouti	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Chad	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Eritrea	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Central Republic	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Benin	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Togo	I	I	I	I	I	I	I	I	I	I	I	I	P	N
St Helen	I	N	I	I	I	N	I	N	I	N	I	I	P	N
Cape Verde	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Senegal	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Siera Leon	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Mali	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Cotivore Voire	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Tunisia	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Liberia	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Liberia	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Mauritania	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Algers	S	I	S	I	I	I	I	I	I	I	I	I	P	N
Libya	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Egypt	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Morocco	I	I	I	I	I	I	I	I	I	I	I	I	P	N
Gambia	I	I	I	I	I	I	I	I	I	I	I	I	P	N

Key.: S – Significant; I – Insignificant; N – No Data

Stratum 2: Equator Countries

The stratum consists of six (6) countries. All the countries lack data on old age homes, recoveries, and serious/critical sick independent variables. One of the six countries lacks the Health System independent variable data. See table 3.

Table 3. Data Availability for stratum 2

Data Type	Public Support	Age	Old Age	Climate	Case Infection	Health System	Serious/ Critical	Case Fatality
Country								
Congo	Yes	No	No	Yes	Yes	No	No	Yes
DRC	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Kenya	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Samoa T.P	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Somalia	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Uganda	Yes	Yes	No	Yes	Yes	No	No	Yes

Key: Yes - Data is available; No - Data is not available Key

All six countries bear a poor data fit for the case fatality dependent variable and one out of the six (1/6) countries show a good data fit on case infection dependent variable while one country bear a significant influence of Public Support over the low case infection. See table below:

Table 4. Data Analysis Outcome for Stratum 2

Data Type	Public Support		Age		Old Age		Climate		Health System		Significant F	
	Case Fatality	Case Infection	Case Infection	Case Fatality	Case Infection	Case Fatality	Case Infection	Case Fatality	Case infection	Case Fatality	Case Infection	Case Fatality
Country												
Congo	S	I	I	I	I	I	I	I	I	I	S	I
DRC	I	I	I	I	I	I	I		I	I	I	I
Kenya	I	I	I	I	I	I	I	I	I	I	I	I
Samoa T.P	I	I	I	I	I	I	I	I	I	I	I	I
Somalia	I	I	I	I	I	I	I	I	I	I	I	I
Uganda	I	I	I	I	I	I	I	I	I	I	I	I

Key: S – Significant; I – Insignificant; N – No Data

Stratum 3: Southern Hemisphere Countries

All countries do not have recoveries and seriously/critically sick data, seven out of twenty (7/20) do not have old-age data, one out of twenty (1/20) do not have climate data and three out of twenty (3/20) lack data on health systems. See table 5.

Table 5. Data Availability for Stratum 3

Data Type	Public Support	Old Age	Climate	Health System	Case Infection	Recoveries	Serious/ Critical	Case Fatality
Country	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Angola Botswana	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Burundi	Yes	Yes	Yes	No	Yes	No	No	Yes
Comoros	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Eswatini	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Lesotho	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Madagascar	Yes	No	Yes	Yes	Yes	No	No	Yes
Malawi	Yes	No	Yes	Yes	Yes	No	No	Yes
Mauritius	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Mozambique	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Papua New Guinea	Yes	No	Yes	Yes	Yes	No	No	Yes
Seychelles	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Solomon Island	Yes	No	Yes	No	Yes	No	No	Yes
Rwanda	Yes	No	No	No	Yes	No	No	Yes
South Africa	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Tanzania	Yes	No	Yes	Yes	Yes	No	No	Yes
Zimbabwe	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Zambia	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Sudan	Yes	No	Yes	Yes	Yes	No	No	Yes
Namibia	Yes	Yes	Yes	Yes	Yes	No	No	Yes

Key: Yes - Data is available; No - Data is not available

The stratum has five out of twenty (5/20) countries reflecting good data fit on the case fatality dependent variable, eight out of twenty (8/20) countries bear good data fit on case infection, two out of twenty (2/20) countries bear significant F on case fatality.

Seven out of the twenty (7/20) countries show a significant influence of the public support independent variable on case infection dependent variable.

Two out of the twenty (2/20) countries showed significant influence of Public Support independent variable over Case Fatality dependent Variable. See table 5.

Table 6. Data Analysis Outcome for Stratum 3

Independent Variables	Public Support		Old Age		Climate		Health System		Significant F		Data fit	
Dependent Variables	Case Infection	Case Fatality	Case Infection	Case Fatality	Case Infect	Case fatality	Case Infection	Case Fatality	Case Infection	Case Fatality		
Country												
Angola	I	I	I	I	I	I	I	I	I	I	G	G
Botswana	I	I	I	I	I	I	I	I	I	I	P	P
Burundi	I	I	I	I	I	I	I	I	I	I	P	P
Comoros	I	I	I	I	I	I	I	I	I	I	P	P
Eswatini	I	S	I	I	I	I	I	I	I	I	G	G
Lesotho	S	S	I	I	I	I	I	S	I	S	G	G
Madagascar	S	I	I	I	I	I	I	I	I	I	P	P

Malawi	I	I	I	I	I	I	I	I	I	I	P	P
Mauritius	S	I	I	I	I	I	I	I	I	I	G	P
Mozambique	I	I	I	I	I	I	I	I	I	I	P	P
Papau new Ginnea	I	I	I	I	I	I	I	I	I	I	P	G
Seychelles	S	I	I	I	I	I	I	I	I	I	P	P
Solomon Island	S	I	I	I	I	I	I	I	I	I	G	P
Rwanda	I	I	I	I	I	I	I	I	I	I	P	P
South Africa	I	I	I	I	I	I	I	I	I	S	G	G
Tanzania	S	I	I	I	I	I	I	I	I	I	G	P
Zambia	S	I	I	I	I	I	I	I	I	I	G	P
Zimbabwe	I	I	I	I	I	I	I	I	I	I	P	P
South Sudan	I	I	I	I	I	I	I	I	I	I	P	P
Namibia	I	I	I	I	I	I	I	I	I	I	P	P

Key: S- significant; I- insignificant

Overall Africa Results

The study summarizes the impact of the independent variable on dependent variables across Africa as follows.

Case Infection

The study identifies an equation for the case infection dependent variable as follows:

Case infection = Public Support + Young age + Fewer old age homes +Warm Climate + Good Community Health System.

Upon running the regression analysis on excel, the study found that the public support independent variable has significant influence on the low case infection in thirteen out of the fifty-five (13/55) countries of Africa. It also found that the age independent variable has significant influence on the low case infection in two out of the fifty-five (2/55) countries of Africa. The old age homes, climate, and health system independent variables bear insignificant influence on the low case infections in all the countries of Africa.

Case Fatality

The study identified the equation for this dependent variable as follows:

Case Fatality = Public Support + Young age + Fewer old age homes +Warm Climate + Good Community Health System.

Upon running the regression analysis on excel, the study found that the public support independent variable has significant influence on the low case fatality in four out of the fifty-five (4/55) countries of Africa. It also found that the age, old age homes, climate, and health system independent variables, each, have significant influence on the low case fatality in one out of fifty-five (1/55) countries of Africa. See table 7.

Table 7. Summary of the Results for Overall Africa

	Significant Independent Variables				
Dependant Variables	Public Support	Age	Old age Homes	Climate	Health System
Case Infection	13	2	O	0	0
Case Fatality	4	1	1	1	1
Recoveries					

Critically Ill					

Objective 2 In Relation to The Results

The study achieved objective 2. The objective is in three folds as follows:

1. Proving if the hypothetical factors do indeed have an impact.
2. How do they interact and
3. Which ones matter most.

The study found that, indeed, these hypothetical factors have an impact on COVID-19, as it discovered that public support bears a significant influence in both reduced case infection in Ten (10) countries and reduced fatality rate in two (2) countries, followed by young age and good community health system.

The interaction of these hypothetical factors is explained through literature review. The literature review reveals that the public health support slows down the case infection by delaying the spread of the disease to many people, thus allowing the community health system to cope with treatment of the few affected people and conducting vaccination. [13] postulates that Africa's resilience against COVID 19 is because of such factors as good public support. The literature also asserts that Africa's Community Health System is weak. Unfortunately, the continent health care system is underdeveloped with health infrastructure unevenly distributed and often of poor quality and half of them do not have access to clean water and adequate sanitation [14]. However, the continent was able to cope with the case infections prevalent during the five waves of the pandemic disease between 2020 and 2023. Such statements can be accepted as true as the study could not establish literature or news media reports that ever reported a case where the disease overwhelmed any of the African states community health systems. The literature reported lack of data but acknowledge that there is no evidence of overwhelming fatality incidents because of the COVID-19 Pandemic.

The young age independent variable showed a significant influence over low case fatality because young people are not vulnerable to death, because of the COVID-19 disease. Africa has the advantage of a young population. [15] report says 91% of the affected population in Africa comes from the young people below 60 years and the study show that young age has influence over the low case fatality. [16] on their data update on Age, Sex, Existing Conditions of COVID-19 Cases and Deaths reflects insignificant influence on deaths from young age to very significant influence on deaths on old age people due to the COVID-19.

The warm climate independent variable shows significant influence on the low case fatality in African countries. It is confirmed by the literature as a condition not favorable for COVID-19 survival. The literature asserts that the condition results in reduced case fatality and case infection [18]. The few old age homes independent variable has a significant influence on the low case fatality in Africa. The literature review indicates that old age homes correlate with high case fatality. [17] asserts that the old age homes independent variable is associated with both high case fatality and case infection.

With regards to which one of the factors matters most, this study points to the public health support as it is the single hypothetical factor reflecting impact on both case infection and case fatality in multiple countries compared to the rest of the hypothetical factors.

Despite the excessive lack of data in some countries the study is still able to conclude that Africa is resilient against the COVID-19 pandemic disease, and this is because of the continent's very effective environment system and leadership against pandemic diseases. The continent managed to strengthen public support in good time to ensure survival.

Summary, Conclusion and Recommendations

Summary

This study focusses on the essential management factors that have helped Africa keep the COVID-19 impact lower than in the other world's continents. Despite the challenges namely high population with a population density of 45 people per square kilometer, low economic development status, high population, informal settlements, lack of

water and sanitation facilities which makes it more difficult to ensure practices that will assure safety such as hand washing and social distancing. This makes Africa more vulnerable to the disease, but the continent has remained the least affected. This study set out to establish the relationship between Covid-19 impact in Africa and the commonly cited hypothetical factors thought to reduce same which include Good Public Support, Young Population, Fewer old age homes, Warm Climate and Good Community Health System. It is also to establish which of these hypothetical factors does indeed have an impact, how do they interact and which one's matter most. The study frame covers the fifty-five countries of Africa which are further categorized into three strata namely Northern Hemisphere, Equator and Southern Hemisphere. The study relies on secondary data drawn from different reputable data bases. The study identifies two dependent variables and five independent variables which forms two multiple regression equations analyzed using excel as a tool. The study found that there is lack of data in most of the countries being studied. Despite the lack of data, the study concludes that Africa is resilient against the COVID-19 pandemic disease mainly due to public support. The study recommends strengthening of data capturing and public support in case of COVID-19 out brake for the world.

Conclusion

The study's contribution to new knowledge is that the hypothetical factors interact positively with each other with the public support having more significant influence over the reduction in COVID-19 infection and fatality compared to the rest. Effectively public support is key to warding off the COVID-19 pandemic negative impact on people.

Research Recommendations

1. In cases of pandemics such as COVID-19, emphasis should be more on strengthening public health support.
2. African countries should strengthen systematic data collection with the aim of doing research leading to improved public health support.
3. More studies should be done on the public health support variable to better understand its impact on pandemic diseases such as the COVID-19.

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Conflict of Interest

I Silwayiphi Samson Sithole declare that this thesis entitled Corona Virus-19 Crisis Management: Factors Essential to Africa's Success in Managing the Corona Virus submitted in partial fulfilment of the degree of Doctor of Philosophy is a record of original work carried out by me under the supervision of Dr Daniel Vusanani Dlamini and has not formed basis for the award of any other degree or Diploma, in this or any other institution or University. In keeping with the ethical practice in reporting scientific information due acknowledgements have been made wherever the findings of others have been cited

Dedication

This Thesis is dedicated to my beloved wife Phetsile, my son Nkamboyethu and my daughter Senezelwe.

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