OUTCOME OF COVID-19- INFECTION IN PATIENTS AGED 0-12 YEARS AT KENYATTA NATIONAL HOSPITAL

By

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NAIROBI, KENYA NOVEMBER, 23

DECLARATION

DECLARATION

This research dissertation is my personal work and has not been submitted for examination purposes or award of credit in any other institution of higher learning. And that it doesn't content any material previously published or written by another person except where due reference have been made in the text

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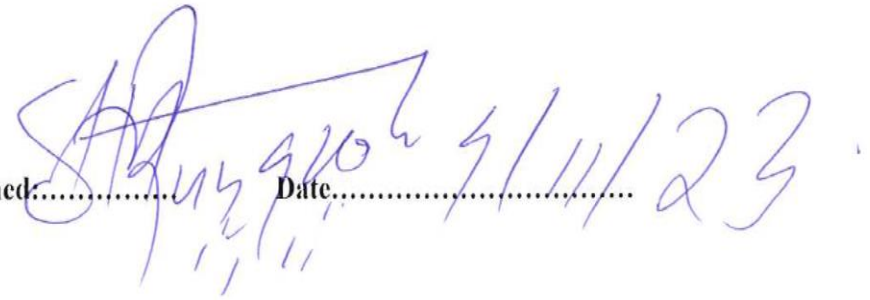
Signed:.....  **Date**.....

DEDICATION

This work is dedicated to my dear wife Harriet Malo, my mum Kwekwe James, my daughters Frida Florence and Hilda Malo. Thank you for your prayers, encouragement love and understanding.

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ABBREVIATIONS AND ACRONYMS

CCC	Comprehensive care centre
CT	Computerized Tomography
ETC	Extra
G/E	Gastroenteritis
NICU	Neonatal Intensive care Unit
PICU	Paediatric Intensive care Unit
KNH	Kenyatta National Hospital
LMICs	Low- & Middle-Income Countries
OCED	Organization for economic Co-operation and development
RAA	Renin angiotensin aldosterone.
SARS-2	Severe acute Respiratory Syndrome Type -2-
SDGs	Sustainable Developmental Goals
SCH	School

OPERATIONAL DEFINITIONS

Corona virus Disease: COVID-19- Is an infectious disease caused by the SARS-CoV-2Virus

Corona virus 19: - A type of a virus that was discovered in China at Wuhan in 2019 that Causes severe acute respiratory syndrome also known as SARS-CoV-2

Outcome : Disease complications following COVID-19 Infection

Pattern : A type of a respiratory disease among the study population

Paediatric Units : All Units where children are attended to e.g. CCC, At the Clinics Wards like 4A etc

STD Deviation : A measure of the amount of variation or dispersion of a set of values

Potential Confounder: An Unmeasured variable that influences both the supposed cause and Effect

Variable : Is any entity that can take on a different value e.g. Age, Country etc

Independent Variable: Is the type of variable in an analytical research study or experiment That the researcher changes in the study or experiment, the variable That is being manipulated

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STD Standard

USA United States of America

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ABSTRACT

Introduction: -COVID-19 has caused mortality among the 3,154 children and became the 3rd leading cause of death globally. It's caused by different strains of SARs-Cov-2-viruses that include omicron which is the novel type. The prevalence of Covid-19 Infection in pediatric population is 17.5% -19% in the US as was reported by CDC in 2022. There is inadequate information on the outcome of covid-19 in children especially in the developing countries. This observation impedes the development of appropriate measures of intervention to promote recovery in children from the disease.

Objective: -This study sought to determine Outcome of COVID-19 Infection in pediatric patients.

Methods: -This was a retrospective analytic study. Samples of **100** children who attended Kenyatta National Hospital from **Sept,** 2019 to **December**, 2022 and screened for COVID-19- and tested Positive were recruited to participate in the study. Sample size determination was in one weeks period. With help of Dr. Taros formula i calculated sample size. Data was analyzed descriptively utilizing percentages and frequencies as well as multivariate and inferential statistics using SPSS Version 25. Findings were presented in form of tables, graphs and charts. Ethical approval was sought from the University of Nairobi and Kenyatta National Hospital research committee.

Results: - The children who took three days and three days later after falling sick represented by 37.9% and 41.1%. Respectively. The children who came later after day three had a higher death rate of 2.6% among the admitted cases. About 90.5% of the cases were admitted in the

general wards and the remaining were in HDU and CCU. One key factor that influenced recovery was the early hospital attendance.

CONCLUSION: The **s**tudy reported that most of the children who were critically sick that required ICU and even those who died was as a result of late hospital attendance.

CHAPTER ONE: - INTRODUCTION

1.1 Background

Coronavirus is a communicable diseases that is caused by a virus and has killed 3,154 out of the 1.4 Million children diagnosed with COVID-19 in 2020,according to the academy of American Pediatrics association (Koh et al., 2021).In Kenya COVID-19 has affected children like other many people and has created stigma among the people with COVID-19 in the Country (Bhanot et al., 2021).Covid-19 Infection is affecting children's' quality of care, yet in the country there is no adequate documentation on the management and recovery and outcome. Learning has been affected and is conducted mostly .Children are wondering why people are putting on masks as a new normal of life with uncertainty. Some children have been affected by lose of their lovechildren is propagated by the act. (Woolf et al., 2021, Schmied and Walsh, 2010). In USA the 17% infection rate among children was derived from the 22% of the population of the Country. (Mantovani et al., 2021). Heart Disease is the leading cause of death as per the National center of statistics followed by cancer then COVID 19. The mortality was 350,831 in the United States by July, 2021(Woolf et al., 2021**.**The National center for health statistics by CDC places COVID -19-As a 3rd leading cause of death in the world. (Woolf et al., 2021). There is little data in the literature on COVID19 especially in children. It's important therefore to address this gap for evidence in information creation to support care by even doing this study. Covid 19 has rendered many people jobless. Employment especially to parents is important in the fight against poverty which reflects to healthy living among children. Here is limited data and literature on

COVID-19 mortality rates locally and especially in children. It's important therefore to address this gap for evidence in information creation to support care.

1.2 Problem statement

Children are infected of COVID-19, they are dying and admitted in ICU others in HDU and general wards.There is limited data on the outcome of pediatric patients with COVID-19 infection in the local setting. Since the infection rate has reduced. The MOH Protocol has not been evaluated. Corona virus disease being a pandemic condition is prudent to review and advice care in case of resurge of corona virus. Children get the infection through droplets via inhalation. This problem caused tension and anxiety among parents and in many other people in the world in general **(Salari et al., 2020)**. Data on COVID 19 Infection rates in children in Kenya is not available. However, at KNH there are about five children who tested positive for Covid-19 each week even though 90% of the infected recovered. Because of their underdeveloped immunity and exposure children remained vulnerable to the infection and equally susceptible as adults as a result they get some COVID-19 Infection and even die.

1.3 Research Questions

i). What is the recovery rate of children infected with COVID-19 infection?

ii). What is the severity of children admitted with COVID-19?

iii). Is there an Association between children socio-demographic characteristic and severity of Infection.

1. 4 Study Objectives

1.4.1 Broad objective. To establish the outcome of children with Covid-19-Infection at KNH

1.4.2 Specific Objectives: -

i). To establish the recovery rate of COVID-19 Infected Children.

ii). To Assess severity of Covid-19 Infection among children and admitted of the same.

iii). Establish association between children sociodemographic characteristic and severity of Infection.

1.5. Study Significance

Understanding the outcome and associated factors will inform the design of specific treatment interventions to promote recovery for children with Covid-19 infection. Understanding the outcome of the condition among children at KNH will constitute a critical first step for developing a clear-road map for optimal resource allocation and development of cost-effective strategies for clinical care at the facility. This in turn would facilitate increased access to high-quality COVID-19-Care for all children in need at the hospital. This Study will serve as a basis to further research work.

1.6. Justification

There is no reason to wait looking for a solution when children are dying now , i Can for an answer and revert the trend. The knowledge gap is scarce data in the African countries on outcome on Covid-19 Infection among children. In other parts of the world, there have been

some accumulative hospitalization rates of children especially below five years with reports of up to 26.5% of children admitted in the ICU for COVID-19 in the US.(Kroll et al., 2019)

Hypothesis:-Null- There is no association between children sociodemographic characteristic and severity of Infection.

Alternative **Hypothesis**: - Is there an Association between children sociodemographic characteristic and severity of Infection.

Variables of the study

Independent: Age, co morbidities, infrastructure, gender, treatment timing.

Dependent: -These are the outcomes following infection such as recovery rate, Complications and even mortality to the child.

Potential Confounders: -An intervention stage at which children requires health care services to manage this infection

The conceptual frame below works to relate these variables in figure-2-

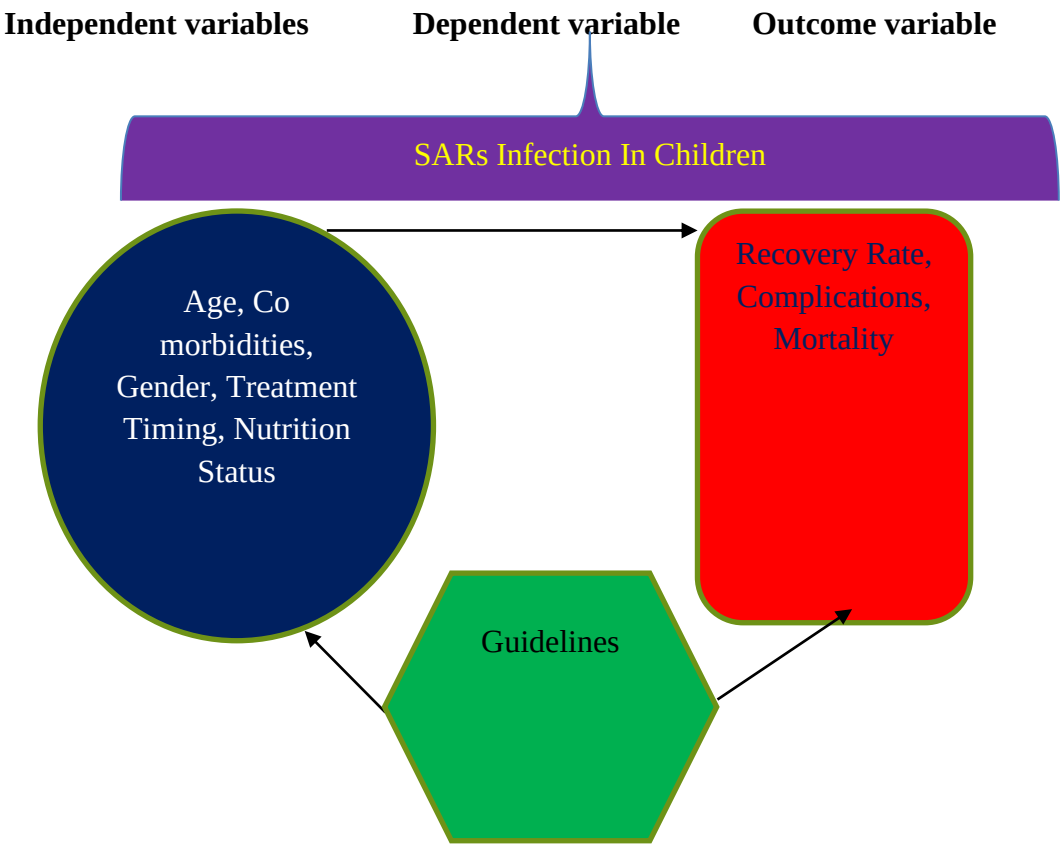


Figure-3-Conceptual Frame-Work showing the relationship between study variables.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

The chapter will give an overview of Covid-19 infection guided by the objectives. The chapter contains the review of the empirical literature on the emergence of the disease; how the disease affects children and its mode of spread along with the organism transmitting the disease. The chapter closes with a summary of the literature.

2.2 Overview of COVID-19.

COVID-19 Infection Spectrum ranges from mild to severe and to critical where the patient will be taken care of in the wards or intensive set-up. Most children remain asymptomatic but a few children presented with symptoms. There is limited information of the severity of the infection in children along with other outcomes. During the peak of Covid-19 infection, an average of 20 cases of COVID-19 infection in a month was recorded at KNH. The country then had an infection positivity rate of over 28% which has so far dropped with death rate of about 6000 People by early February, 2022. This study seeks to consolidate the death rate further by stimulating it in a knowledge data collection. Also to look into how severe the disease was in children in terms of the child's morbidity following the infection and how about the recovery ways and treatment. The infection positivity rate in the country is however, reducing by day. The pandemic has impacted every aspect of life that included closure of businesses, control in movement from one country to another and within the same country commonly known as lockdown. Closure of learning institutions and forceful change to new ways of doing things such as online learning as time went by to see how people could move on with life which in short had

come to a standstill. Being new, the infection and its spread caused lots of anxiety with stress (Al Dhaheri et al., 2021)· Of cause children will be and are affected negatively causing even some mental related conditions due to the pandemic directly or indirectly. Caused by a zoonotic virus of about 60-90nm diameter. Corona virus has caused highest deaths in America followed by Europe, Asia, Africa and Oceania. In Africa, South Africa has the highest death rate, followed by Tunisia with Egypt having 21,360 deaths, which is equivalent to 14 Cases/100000 population **(Radwan, 2020)**.

Epidemiology

Covid-19 has killed 4.55million people world over according to the National center for Health statistics by CDC, 2020. America recorded 375,235 deaths while 565,505 deaths were recorded in England in the same year. Italy had 756,450, whereas Greece had 132,514. In Spain there were 77,222 deaths .In Africa especially Kenya Covid-19 infection claimed 5,045 lives by 21st September 2022. (Bulut and Kato, 2020). It is very divesting conditions that have made 5Million people lose their jobs in Kenya and many more jobs are lost worldwide daily. A deadly disease whose prevention is by simple basic measures of hand washing and keeping of physical social distancing in between the main vector of the disease spread the human being Screen of the virus is underway to help in the management of the condition. Total lock down of human beings is been practiced. People are working from home a part from just a few organizations offering essential services. However, the lockdown is ceasing out. It's not clear how the disease reached the human beings however theories suggest it was contracted from world animals of China. It's therefore important to screen, isolate and inform people by in powering ithem in their good

livelihood. 19- 15% of the 1.8Million cases with COVID 19 world over are children (Covid et al., 2020)

Recovery Rate of the Covid-19 Infected children. Northern American study reported 6, recoveries out of the 48 sampled children. The 13Million COVID-19 infected children accounts for 19% of the total infected patients in the United States. In UK, according to lancet 2.6% of the 258,790 recorded cases of COVID 19 were children. Patients isolated at home were superior in recovery than those isolated in a central place. Factors considered is those children who tested positive with mild or no symptoms which place home care as a suitable place to recovery. These children shouldn't have some underlying conditions such as cardiovascular or any other chronic condition they can monitor themselves while at home as they keep in touch with their health care providers for advice. While at home maintenance of safety precautions of keeping distance of at least a meter apart, maintaining hygiene and opening of windows for fresh air circulation without forgetting wearing masks. Avoidance of visitors during this time. An effective monitoring system of the situation at least once daily is encouraged for at most two weeks when the body is expected to have cleared up the active virus. Rural area patients were noted to take a while to recover than the other counter parts. (Irfan et al., 2020) Also some viral drugs and cortisones, oxygen therapy and mechanical ventilation for the indicated patients have shown some positive effect in the recovery in the patients in other parts of the world like Iran For these therapies have shown reduction in recovery time by four days, where as in our region there is limited information on the same. Combination of drugs showed better and quicker recovery rate than a singular drug use This is in Northern part of Illinois in America.(Montoya, 2022) .An

availability of a health care especially a skilled care provider is an important tool influencing recovery in Covid-19 Infection and I believe in other ailments as well. Higher age was associated with higher risk of death. Other factors associated with recovery rate is sinus tachycardia is a predictor of prolonged stay of hospital with clinical deterioration which is demonstrated by a C-reactive protein elevation along with an abnormal chest X-Ray studied at Karachi .(Moeed and Huda, 2022) Children and adolescent covid-19 infected population account for 32% with females being more than but the male gender dead more than the counterpart. Reported by the John Hopkins University for the global community. In the low income countries the death rate is 0.9% for females and male is 0.8%, 2020.

Severity of the Covid-19 Infection. Even though **Covid**-19 Infection in children hasn't been that serious our concern is Covid-19 Is continue to spread among the children through the significant others i.e. parents and guardian and it has spread among the children to the extend that children have been hypoxic, have developed respiratory with multiorgan failure and some death among these children haven been reported.

Complications: A comparative study between America and Canada reported 18Children who complicated and required critical care from the 46 hospitals. Of the 100 children in Northern Iran who had covid-19-20 required PICU Care from Hindawi international journal of Pediatrics(Shahbaznejad et al., 2021)Still in Iran 54% in another study in the Canadian journal at Mofid Hospital in Tehran of the covid-19 infected children required ICU.

Mortality:-A study in North America revealed 4.2% death rate in the 48 children with covid-19-in their PICU in 46-Paediatic Hospital. (Shekerdemian et al., 2020)1 in every 25,000 Children

with Covid -19-in China lost their lives to the virus .59 Paediatric patients died in a study in Iran ,(Armin et al., 2022)2.3 Patterns of the Disease Corona virus was discovered in China at Huwan in 2019 thus the name COVID-19-There are five types of the corona viruses' strains; the alpha, beta, delta, gamma and the novel omicron. It's believed to spread mostly through droplets on a close proximity. Corona virus has resulted in mortality in Kenya among children . The first case of COVID-19- infection in Kenya was discovered in March, 2020. Then the infections covered all the regions of the country. (Ombajo et al., 2020) There have been very limited data to support locally. By January 2020 there was a general accumulative death of 5,640 Patients out of the 323,025 confirmed cases (Organization, 2021). Coast province was leading with the infection rate with Kwale County being at the top, While North Eastern province had the least number of infections. The reported death in children in Kenya was in the adolescent age which was reported with the maternal death of 6.2-10.9% (Shikuku et al., 2021) More boys' contracted corona virus than girls, most of them had fevers and their radiological CT. scan reveals pneumonia. Fatality cases were mostly with some co-morbidity. Most of the children who were infected by COVID-19-Recovered even though 57% required critical care intervention. Most patients had an adult family member or house hold contact with compatible symptoms of Covid-19. Co morbidity association ranges from liver transplant, Asthma and obesity. For herd immunity to protect we need to achieve a population vaccination rate of at least 75%. So far children depend on herd immunity for prevention and protection against Covid-19 for vaccination among them isn't proven safe yet. The guardian especially at KHN the mothers of 46.4 % had been exposed to SARs CoV-2-antibody testing. The interaction of these mothers to the community and especially to the children posed a great danger. More blood samples of the mothers were under way to

understand the pattern of infection and consequences. There is some infection with COVID 19 in children. Even though infection among children aren't fatal, the infection rate of 14% of the 22 % of the population is remarkable and it amounts to 6Million infections in the United States since the pandemic onset.(Balasubramanian et al., 2020). There is a median age of between 4.2 to 6.6Yearsand more boys affected than girls by more than 50 percent. Most of the affected had some co morbidity. In America the infection rate is higher. Since the pandemic in children represented 17.4% of the total accumulated cases(Pediatrics, 2020).The integration in the environment of how these children are living and intermingling with the rest of the population. The direct Pyschoneuropathy and the indirect pathway through the associated health behavior surrounding these children. The direct Pyschoneuropathy is related to other diseases that these children could be having that could be contributing to being infected by corona virus. Long standing co morbidities have been associated with people getting sick of other diseases and even dying in young age.83% in the USA and Canada had preexisting conditions with 35% being respiratory symptoms. Children who have died in Belgium, China, France and the United Kingdom whose death were not directly related to Covid-19 in Kenya the infection rate is much lower at between 1-5% and this could be due to the methodology surrounding screening of the children.

2.4 Factors associated with corona virus disease

Social demographic factors

The history of contact with patients who had SARS-CoV-2 has been hypothesized a lot. Now some evidence is emerging to prove that .Out of a population of 38 cases 85.6 % of the patients

PCR turned positive for COVID-19 in China in the Pediatric population (Şık et al., 2020).Due to this high infection rate many services have therefore been moved to tele-consultation online especially in families with children where face to face services are/were necessary. Low-income households who are known to be overcrowded makes infection from COVID 19 therefore to be high. Already one in every five children in the European OECD Countries lives in an overcrowded household. In Hungary the number has risen to even 50% of all children. it's even SARS-CoV-2 is associated with Kawasaki disease(Bretschger et al., 2020) An Autoimmune systemic inflammatory acute febrile vasculitis. The higher the age the more fatality it is in children. The older adolescents are with fatality rate of 0.4 % with an infection rate of 15% when the under-fives have a fatality rate of 0.1%. Neonates, infants, the young child who is 1-4Yrs-12-59Months.The older children 5-9Yrs- The younger adolescents 10-14Yrs-And the Older adolescents 15-19Yrs then the young adults 20-24Yrs.

Psychosocial factors have affected the disabled people who are not able to provide for their children so the children become susceptible to contracting Covid-19- too. The ACE receptors are used by some inhibitor drugs to control hypertension. This ACE-2-express a high release of proprotein convertase enzymes that enhances the corona virus entry into the host cell. So the ACE receptors that get implanted in a hypertensive child then expresses the release of the Proprotein convertase that could be used by Covid-19- disease and child becomes therefore susceptible to Corona virus infection. The ACE^2 being part of the counter regulatory RAA System is usually expressed in the lower tract along the alveolar epithelium .The entry of the corona virus facilitated by the proprotein convertase causes down regulation of the ACEs leading to inflammation involving alveolar interstium and capillaries ,leaky pulmonary blood vessels and

fibrosis (Sarzani et al., 2020).Some co morbidities are most common in the association in COVID-19-such as sickle cell anemia. Close contact is a predisposing factor to contact SARS-CoV2- Positive. Family members, with history of travel in endemic areas. Close proximity has attributed to infections and spread of the virus. Closure with reopening of schools is what was happening. Imposing of Curfew with police response to control the overcrowding. Curfew imposing had some consequences to the young again who didn't understand what was happening which lead to the death of the same children through police brutality where a 13years old boy was short at a slum in Nairobi when was found outside. This poses a health threat again to the children and general population. The mode of transmission is through droplets that could be got when one coughs or sneezes near someone. The virus is viable between 24hrs-4Days on the cupboards and copper respectively and in air at a distance of six feet. The aerosol that one breathes in could have accumulated enough to cause infection. How people stay or leave in their homes warrants investigation. It could have been a visitor into the house who was in an incubation period during the visiting time, but the close proximity in the talking is what may have contributed into the infection of the child. It could have been a positive family member or history of travel. The incubation period of corona virus is of up to. Ten days without symptoms. The indoor air contributed to ventilation of the housing could be compromised. Particles of infectious microscopic exhaled droplets from a corona virus individual can circulate in the air without escape which could impose hazard to the children around causing some transmission. Airborne transmission stands out as the main way of spread of SARS-CoV-2. Virions in respiratory aerosol have so far been detected. The layout and house designing along with occupancy, physical distancing and the heating styles are encouraged (Abouleish, 2021) hand

washing and face mask wearing are some of the strategies recommended. Corona virus is linked to pollution of both in/outdoor of environmental air circulation. Poor families are less resilient and more prone to job and earning losses. Their children were and will be disproportioned by school closures. They have and will be living into the poorer neighborhoods. These children lack adequate nutrition due to food insecurity and sanitation amenities all these will contribute to a vicious cycle of diseases not excluding the novel corona virus. These children will be are at high risk of being carriers. The reduced prevalence of vaccination among parents compromises the herd immunity. The Sensitivity and knowledge about the disease with the precautions taken to stop the spread including testing for prevention. This could cause some delay into the responding to the infection and seeking of medical care.

Management of Covid-19.

On identification of this CoVID-19 need to be isolated. Creation of isolation centers outside the normal pediatric wards has been advocated for even in our Country. This is one way of reducing the personnel interaction with the infected children. Once the patient is diagnosed with covid-19 is categorized as mild, moderate or severe. Mild cases are discharged home and screened for the same disease by tested for PCR from the patients within 21days.They are advised for isolation at home. The contacts are traced and also screened for Covid -19. Moderate cases are admitted. Treated with antihistamine and Azithromycin for three days. They get discharged once they stabilize within four days. Contacts also get followed up and screened for covid-19. After 21 days they get rescreened for Covid-19. The severe cases are mechanically ventilated in their care in a critical care unit. Antivirals for influenza can be started once a covid-19 child is diagnosed

waiting for antiviral therapy exclusion from molecular testing. This will improve the outcome ofcovid-19 care by avoiding some co morbidities. Multisystem inflammatory syndrome is expected to occur as a complication among the Pediatric population. Covid-19 due to the number of its death rate Covid-19 makes it the first pandemic of the 21st Century. Unless there is a reason to stop ACEs Inhibitors and Angiotensin Receptor blockers children on them should continue with the same drugs while on anti-retrovirals. Those children with severe lower respiratory tract infection, no severe but with underlying conditions that increase the immune compromise, fevers in the neonates need admissions. Fever and cough are the number one sign and symptom in Covid-19. Many children improve especially from their critical phase with support care so it's a mainstay of therapy. Provision of fluids and electrolytes with proper assessment and diagnosis and treatment of hypovolemia and empirical administration of antibiotics is indicated for especially pneumonia. Adequate calories and water intake is essential as well. Thrombi prophylaxis intervention is encouraged. Routine blood or urine examination or assessing other biochemical parameters along with some blood gases and serial chest examinations should be provided (Wati and Manggala, 2020)

Common Outcomes of Covid-19 Infection

In the US and Canada information is that some deaths have been reported among children (Shekerdemian et al., 2020) from a cross section study with some children cared for in the critical care units**.** In Canada study observed those children with some commodities their out come was poor. So great care on these patients Covid-19 Infected children associated with other health conditions is paramount. These include but not limited to isolation,(Farrar et al.,

2022).Chronic comorbidities is what too noted that resulted to worse from the children infected with Covid-19. Germany too had some children infected with covid-19-and even lost others. China study guideline was looking to a prognostic indicators for death due to covid-19 infection among children or admission to critical care unit indicators (Liu et al., 2022) .And similar to my study where some indicators that i picked which lead to death and critical care admission as some outcomes, was late hospital visit by the infected children with covid-19 among others. Still in China causes delays in seeking treatment by the Covid-19 infected children or delays in treating these infected children significantly resulted to high death toll (Bi et al., 2020),something that I as well observed in my study. A Third study in China in the springer link publication journal emphasized on timely treatment which resulted to good outcome for children recovered promptly,(Bi et al., 2020).

Mortality is detected to be higher in Africa especially the Sub-Sahara region. Placing East Africa with a death rate of 36.9% South Africa has 44.3% (Nachega et al., 2022) This study was done in the democratic republic of Congo which included Kenya .Although little is known among the pediatric population yet the co morbidities prevalence is noticeable making this study relevant.

2.5 Literature Gaps

Reviewed studies show that COVID-19-is a threat to children and the public health globally and especially in Low and middle income countries (LMICs) . There is reduction in infection rate and mortality in children but the burden had been unbearable especially with low-income

resources in a developing country like Kenya. As well the characteristics, factors and outcome had not been described in most of the studies (Ombajo et al., 2020) which is an important reason for this study. On average, five Covid -19 infected children were treated in a week at KNH. There is limited data on infection rate description and morbidity of corona virus in Kenya among the children.

Theoretical Framework

The use of Donna Wong's Atraumatic therapeutic philosophical care by the use of interventions that address physical and psychological alteration in children. The foundation lies in minimizing separation of the children from the care providers as we care for them which minimize distress. Here i mean, sick children are already traumatized by the infection attack, so all ways have to be factored in as we care for these children including as we pause isolation as a treatment measure, children should be accompanied by their significant other i.e. relatives while receiving health care in the hospital. For those who don't have parents, guardians should accompany them and this reduces the stress less and enhances healing. Hospital set ups should be safe for children as they get treatment. While parents are with these children in the hospital, they provide security from physical home as Dr. Donna puts it. Children are known for play as they recover which contributes a lot to recovery phase. This prevents pain as we enhance some partnership with the family in care provision. The use of pain management guidelines that serves as a foundation in atraumatic care. The theory places the family at the Centre of the child care. Just as the study approach places the intervening variables as seen is the conceptual model above. The model

supports the cultural values of the family as well the religious beliefs. This mode strengths the family's coping with stress related issue in the hospitalization of the child with illness.

The developmental needs of the child are integrated. The philosophy of care considers communication aspect of care. It embraces technology with safety in quality improvement. The relevance of this framework is that the child is treated wholistically and this quicken the recovery process and reflects to good outcome.

CHAPTER THREE: - METHODOLOGY

3.1 Study design

This study is a retrospective cross sectional analytical . A comparative study where 100 children who tested positive of Covid-19 infection were selected and data captured using an abstraction form. Another 200 children who didn't test positive for Covid-19 for they had no indication for screening were selected for comparison in data. Comparison was done on a 1:2 ratio of the children of the same age. The patients' records were obtained from the records unit of the hospital.

3.2 Population

The population was the children aged 0-12Yrs old who attended the hospital for screening and treatment services at KNH. Those children who attended to at the hospital between Ist Day of January 2019 up to Oct .1st, 2022.

3.3 Study Site

This study was conducted at KNH. It's the oldest teaching and referral hospital in Kenya at the heart of Nairobi the capital city with a bed capacity of 2000. Kenyatta National Hospital being a referral and teaching Hospital makes it suitable for even covid-19 patients being handled here. The hospital has senior, competent and experienced nursing and medical specialties with modern ICU Equipment. The hospital has a pediatric critical unit and with its experienced and long saving staff it places the Centre appropriately to handle the Covid-19 Children. The pediatric department has about a half of the hospital bed population including 250 Neonates. The location

of the institution places the hospital to be able to capture a good number of children that could be tested for covid-19 beside that the institution has a great capability of screening testing and caring for various conditions including Covid-19.

3.3.1 Inclusion criteria and Exclusion criteria

3.3.2 Inclusion criteria

Referred children along with all the children with rapid COVID 19 test positive results admitted and treated at KNH, while controls were children who were negative on screening for Covid-19 as well as those who did not have any signs of respiratory illness.

3.3.3 Exclusion criteria

i). Severe Incomplete children's files - with Important missing data.

3.3.4 Sample Size Calculation

The sample size formula below was used to estimate the **Sample size**. (Taro Yamane 1967

$$n = \frac{N}{1+N(e^2_1)}$$

Where: n = Sample Size N=Population e= Error Margin/Precision Data will be collected in about 5 Months from March, 22

For this study, we specified the confidence level as 95%, statistical significance at 5%. There were about (5) Five COVID Patients In a week totaling to (20) Twenty Patients in a Month. So,

$$n = \frac{N}{1+N(e^2 1)}$$

if N=20 with a Margin of Error of 0.05 Therefore

Sample Size Calculation $n=20/1+20\ (0.05^2)$

$n = 20/1+20\ (0.0025) = 20/1.05$

Which is n=19.05 in 5Months=100

So, the sample size was**100**Files.

5.1 Sampling Methods

Researcher used a consecutive sampling method where all pediatric patients health records with documented COVID-19-In the specified period, was used in the study till the desired number was arrived. The study sample used health records of all the children between 0-12Years old who attended the hospital between March, 2022 retrogressively till ninety-five children were reached as shown by the calculation below, with an equal number of children who were matched as a control of the same age in the same time the children attended with those with Covid-19. The children who turned negative and even for those that did not get tested for Covid-19 because for there was no reason for Covid-19 testing.

4.0 Data Collection Instruments and Procedures

Information of Covid-19-infection rate and outcome factors to infection and spread was got from the records patients files a secondary data which was retrieved from the hospital registry. Data was obtained from the data abstract form (Appendix 1). This is a standard instrument used to systematically collect information from documented reports. An Abstract is a standard instrument used to systematically collect data from documented report. Abstraction involves direct matching of information found in the records to the data element required for the study. The data that was then collected and will be comprised of the patients' demographics as well as social status on where and how they live, spacing in between along with the environment and level of education of the parents and vaccination status against corona virus. Association with other infections such as pneumonia, heart conditions and even the child's general health state.

Record safety was ensured that the researcher will extract the information from the patients' health records within the hospital registry confinement. Upon collection of the data the record files will immediately be returned to their designated section and hence ensure the records don't leave the safety of the hospitals Registry.

5.0 Pre-Testing

Pre-Testing of the data abstract form was done at the Mbagathi District Hospital where An Abstraction form of a presentation of 10% of the study sample size was used. That was 10 Children of age 0-12Years old with a double size of the sample as a control. The data instrument was then adjusted accordingly and a final form of the tool was made.

6.0 Data Analysis

The data was analyzed descriptively. The study used descriptive statistics which included percentages and frequencies to analyze the study data. This was done using the Statistical Package for Social Sciences (SPSS v. 25). A biostastician was involved in computing the data and analysis. In addition, chi-square test statistic and odds ratios were utilized as well to analyze the association between the study variables at 5% significance level at a P-Value set point of 0.05. Inferential statics will test the hypothesis and the generalizability of information to the entire population. Results of the study were presented in tables, charts and graphs, as appropriate. As well inferential statics were computed.

7.0 Ethical Considerations

Ethical clearance was sought from the University of Nairobi/ Kenyatta National Hospital Ethics and Research Committee (UON/KNH-ERC). The approval to conduct the study at Kenyatta National Hospital was also sought from relevant authorities at the hospital. In addition, appropriate authorization, to access patients' health records of targeted participants who meet the inclusion criteria, was sought from the Head of the Pediatric Unit and the Officer-In-Charge of the Records Department at KNH and Immunology department laboratory of the UON. Confidentiality forms were signed. The study data was processed by keeping confidentiality, anonymously and securely well for the purposes of the study only and due care was observed and safeguarded for integrity of the patients' records during data extraction. To ensure the safety of the patients' records, the researcher extracted the required information from the patients' health

records within the confines of the hospital's Registry, hence ensuring that the records didn't leave the safety of the hospital's Registry.

8. LIMITATIONS OF THE STUDY

Since the study utilized secondary data collected using a data abstraction form, some patients' health records may contain incomplete data. Missing data or even lack of needed information in the patients' records may limit its usability. To counter this limitation, the researcher undertook data cleaning prior to the final analysis of the study data by the Stastician.

The study was based on results gathered from a single hospital in the country. Thus, the findings may not be generalized to all other hospitals in the country due to differences in sizes, geographical location and institution set up. To counter this limitation, the researcher shall recommend a wider study involving other hospitals in the country to allow for comparison and generalization of the study findings.

Where the children came from was a limitation in data collection. To counter this, I recommend in the wider area of study should include where the children come from.

9. Dissemination of Study Findings

The study findings were disseminated through sharing copy of the final research project report with the Department of Nursing Sciences, University of Nairobi, and Kenyatta National Hospital administration. Presentations will be done in scientific workshops and conferences. between grade 4 and grade 6 as shown in **Table 1:-**

Table 1:- Demographic characteristics of children with rapid Covid-19 positive results admitted at Kenyatta national hospital.

	Frequency	Percentage
Gender		
Male	50	52.6
Female	45	47.4
Age		
0 - 28 days	6	6.3
1 - 3 months	15	15.8
4 - 6 months	12	12.6
>6 months	62	65.3
Education		
PP1 - PP2	9	9.2
Grade 1 - 3	12	13
Grade 4 - 6	14	14.8
Grade 7 or above	60	63
Individuals in household		
3	16	16.9
4	33	34.9
5	31	32.5
Over 5	15	15.7

CHAPTER FOUR: -RESULTS

4.1. Introduction

The study sought to establish the recovery rate, severity and factors associated with severity of Covid-19 infection among children with rapid Covid-19 positive results admitted at Kenyatta national hospital. A total sample size of 100 children was sought. A total of 95 files within the study period were retrieved and included in the study representing a 95% of the Files gathered.

4.2. Demographic characteristics of children with rapid Covid-19 positive results admitted at Kenyatta national hospital.

4.2.1. Gender of children with Covid-19 disease (n = 95)

Majority, 52.5% (n =50) of the children were Male while 47.4% (n =45) of them were female as showed in Figure 1.

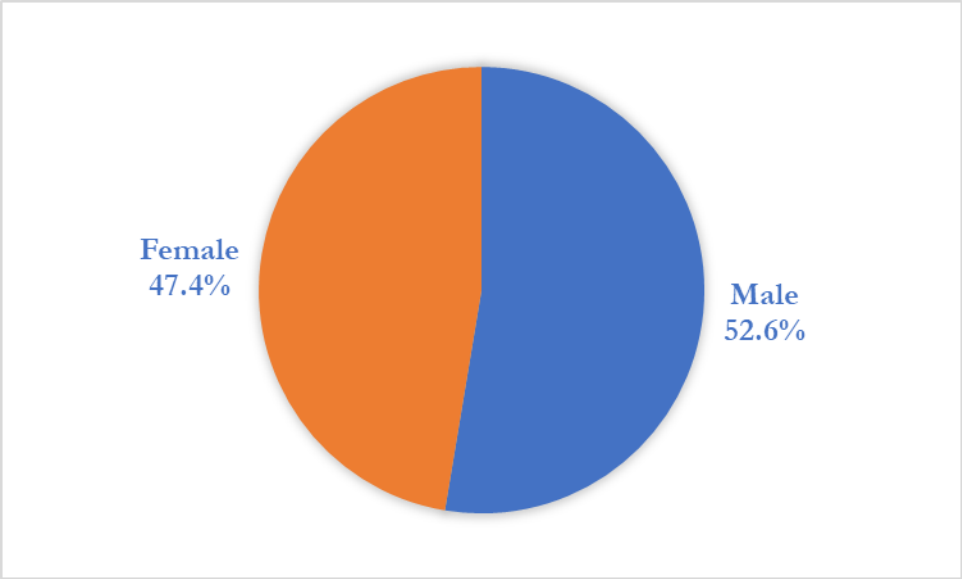


Figure 1: Gender of children with Covid-19 disease

4.2.2. Age of the children with Covid-19 disease

In investigating the age of patients, 65.3% (n =62) were aged more than six months, 15.8% (n =15) were aged between 1 – 3 months, 12.6% (n =15) were aged between 4 – 6 months as shown in Figure 2.

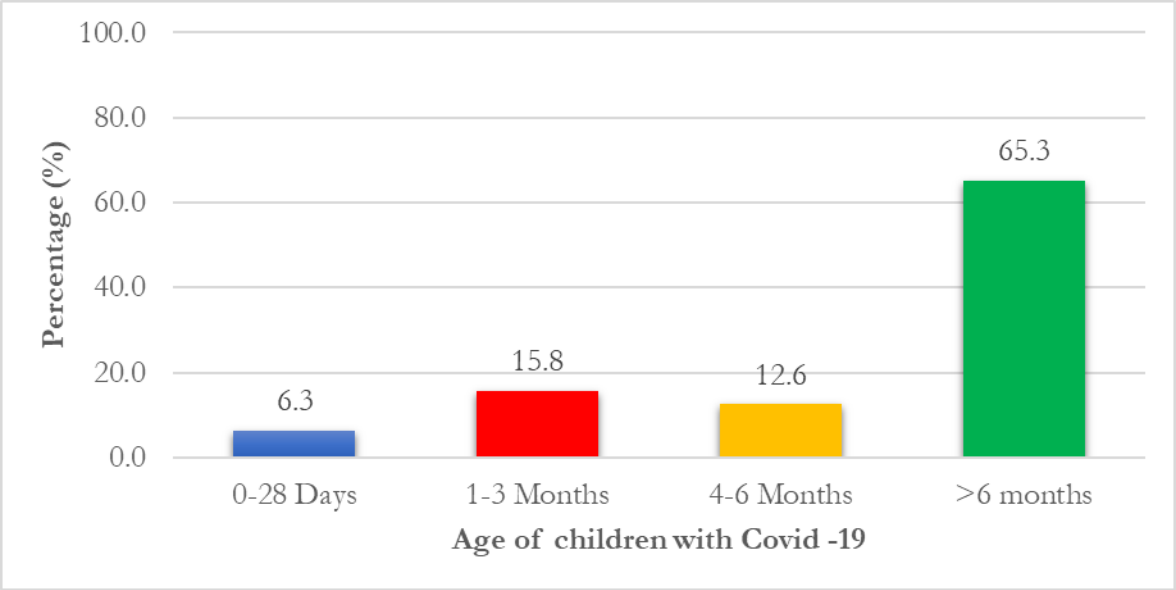


Figure 2: Age of children diagnosed with Covid-19

4.2.3. Level of education of children with Covid-19 disease (n =54)

Most of the patients 63 %(n =34) were in grade 7 and above while 14.8 %(n =8) were between grade 4 and grade 6 as shown in Figure 3.

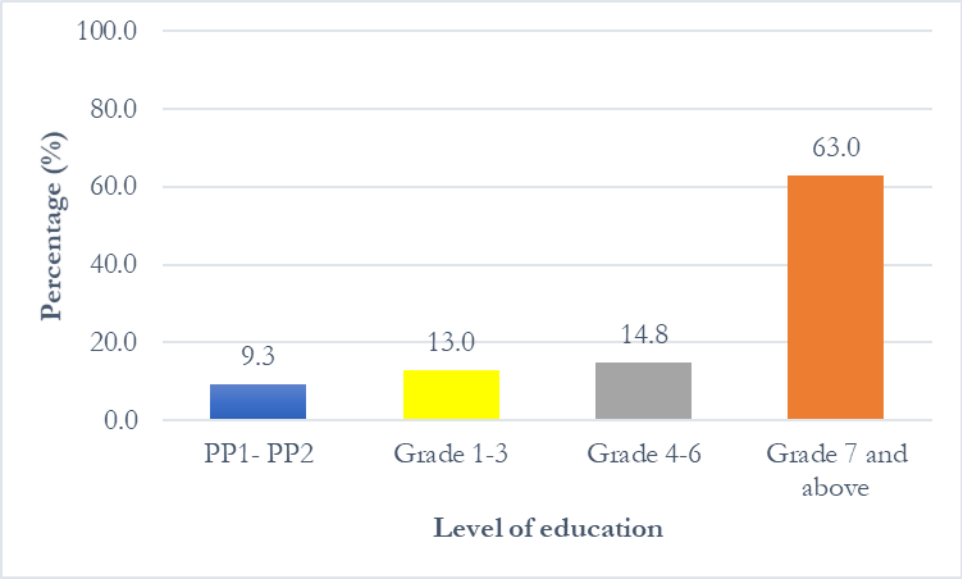


Figure 3: Level of education of children with Covid-19 disease

4.2.4. Number of individuals in household (n =83)

Number of individuals in household were investigated where, 34.9% (n =29) were four, 32.5% (n =27) were five in their household while 16.9% (n =14) were three members as shown in Figure 4.

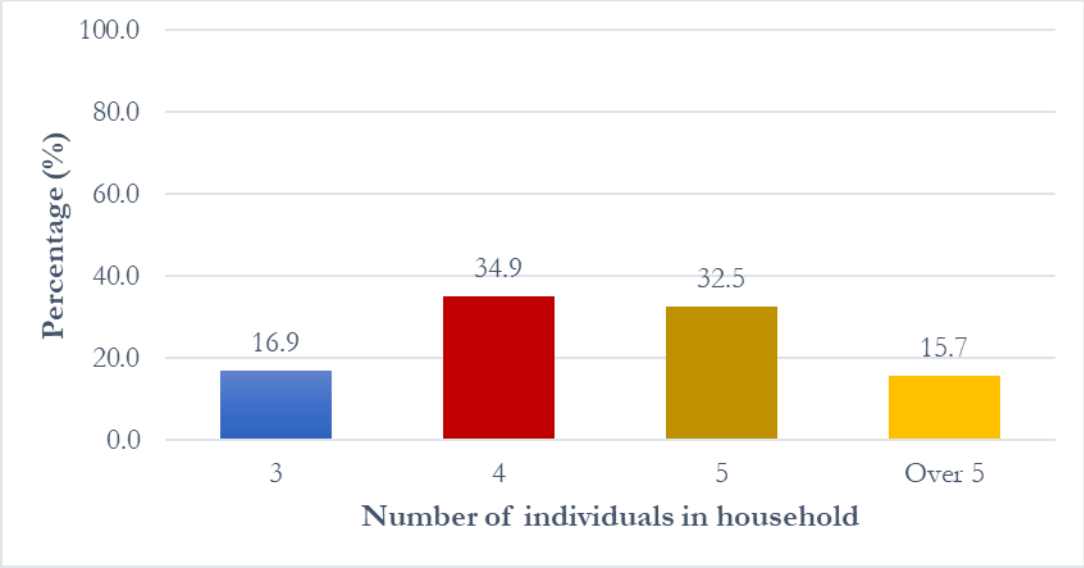


Figure 4: Number of individuals in household

Put all the demographic characteristics in one table and then the text can be in one paragraph.

4.3. Disease related characteristics among children diagnosed with Covid-19 admitted at Kenyatta national Hospital.

4.4. Severity of children admitted with COVID-19 at Kenyatta National Hospital

The severity of Covid-19 among children admitted at Kenyatta national hospital was investigated, 90.5% (n =86) were admitted for inpatient monitoring, 6.3% (n =6) had mild disease and were discharged for home isolation and 3.2% (n =3) of the patients were admitted for critical care as shown in Figure 5.

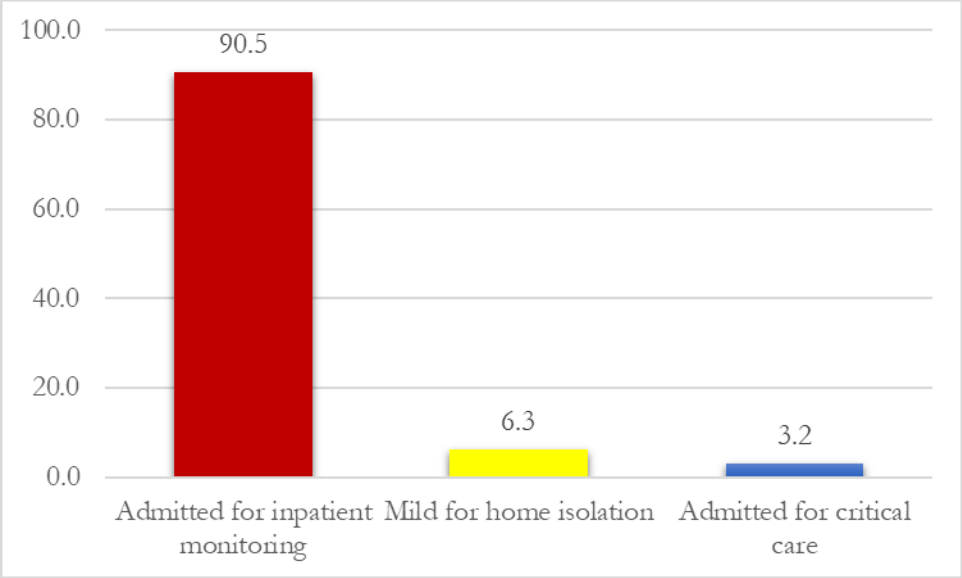


Figure 5: Severity of children admitted with COVID-19

4.5. Recovery rate of children admitted with COVID-19 at Kenyatta National Hospital

Half of the patients 50.5% (n =48) recovered and were discharged home, 47.4% (n =45) of the patients recovered with complication while mortality was 2.1% (n =2) as shown in Figure 6.

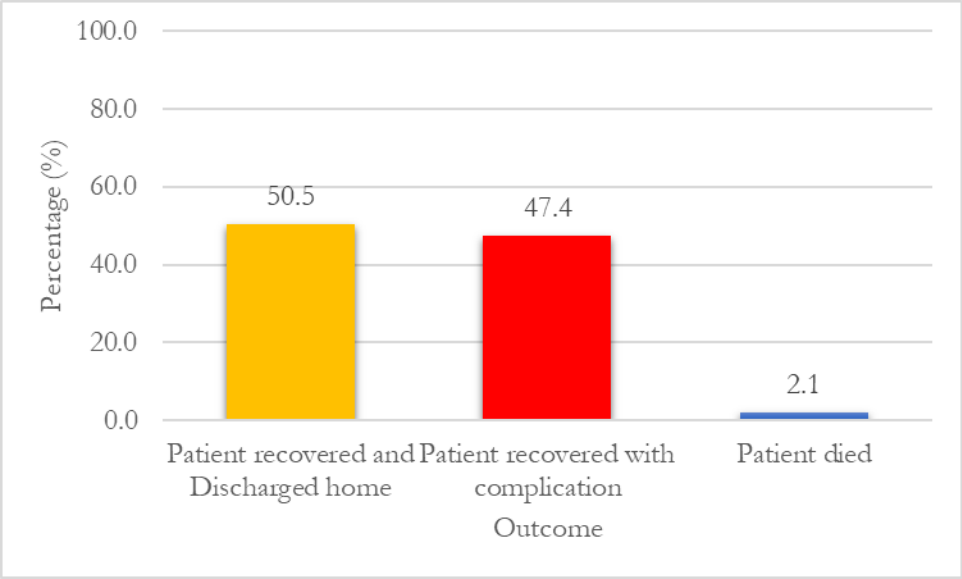


Figure 6:-Recovery rate of children admitted with COVID-19

4.6. Association between child characteristics and severity of infection among children with covid-19 infection admitted at Kenyatta national hospital

The findings from fisher's exact test established that there was significant association between having an underlying condition at a **(p <0.001),** presence of malnutrition at **(p =0.030**) and severity of Covid-19 disease as shown in table-**3:-.** Below on Pg 35.

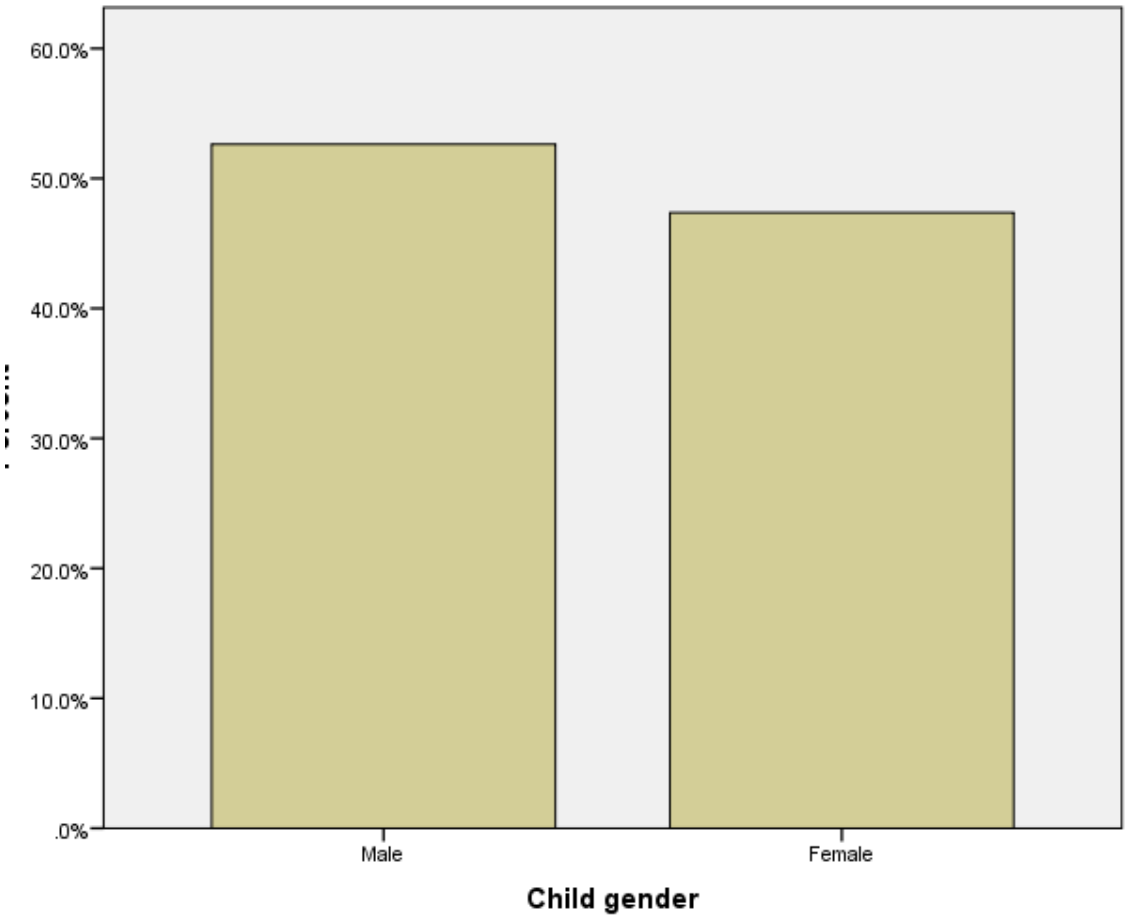
Table 2:- Association between child characteristics and severity of infection among children with covid-19 infection admitted at Kenyatta national hospital

	Severity of Covid-19			
Factors	**Mild for home isolation, n-(%)**	**Admitted for inpatient monitoring, n-(%)**	**Admitted for critical care, n-(%)**	**P-value**
Gender of the child				
Male	2(4.0)	47(94.0)	1(2.0)	0.476
Female	4(8.9)	39(86.7)	2(4.4)	
Age of child				
0-28 Days	0	6(100)	0	
1-3 Months	1(6.7)	12(80.0)	2(13.3)	0.352
4-6 Months	1(8.3)	11(91.7)	0	
>6 months	4(6.5)	57(91.9)	1(1.6)	
Level of education				
PP1- PP2	0	5(100)	0	
Grade 1-3	0	7(100)	0	0.778
Grade 4-6	0	8(100)	0	
Grade 7 and above	4(11.8)	29(85.3)	1(2.9)	
Number of individuals in household				
3	1(7.1)	13(92.9)	0	
4	2(6.9)	27(93.1)	0	0.759
5	2(7.4)	23(85.2)	2(7.4)	
Over 5	1(7.7)	11(84.6)	1(7.7)	
Other condition beside COVID				
Yes	3(3.3)	84(93.3)	3(3.3)	<0.001
No	3(60)	2(40)	0	
Time taken to get the child to Hospital				
1 Day	0	5(100)	0	
2 Days	2(13.3)	13(86.7)	0	0.412
3 Days	2(5.6)	34(94.4)	0	
More than 3 Days	2(5.1)	34(87.2)	3(7.7)	
Presence of malnutrition				
Yes	6(13.0)	39(84.8)	1(2.2)	0.030
No	0	47(95.9)	2(4.1)	

Majority (94.7%) of the patients had underlying conditions, 51.6% (n =49) had normal nutritional level. Further, 41.1% took more than three days to get their children to hospital. In investigating the type of care given, 85.3% (n =81) of the patients were admitted to the ward as shown in **Table 3 :-**

Table 3:-Disease related characteristics among children diagnosed with Covid-19 admitted at Kenyatta national hospital

Factors	**Frequency**	**Percent**
Underlying conditions present		
Yes	90	94.7
No	5	5.3
Type of underlying condition		
Pneumonia	43	45.3
Asthma	3	3.2
G/E	1	1.1
Others	48	50.5
Nutritional status		
Normal	49	51.6
Mild Malnutrition	10	10.5
Moderate/Severe Malnutrition	13	13.7
Others	23	24.2
Time taken to get the child to hospital		
1 Day	5	5.3
2 Days	15	15.8
3 Days	36	37.9
More than 3 Days	39	41.1
Type of care given		
Treated and Discharge home as an out Patient	9	9.5
Admitted in the Ward	81	85.3
Admitted in HDU	4	4.2
Admitted in CCU	1	1.1



Just like in other studies the boy child is attacked by COVID-19 more than the girl child as per the study in the American Paediatric academy (Calcaterra et al., 2021). As well in my study the boy child is affected by 52.63% more than the girl child. This is attributed to most likely to be due to the Toll like receptors variant that the boy child had more than a number of the girls which has life threating COVID-19 disease in males.There are also more hypothesis to try to explain this such like since the early days of pandemic that males were overal more susceptible to severe disesase than the females,others report of the chromosomes.

CHAPTER FIVE: - DISCUSSION

The chapter presents Introduction, discussion on COVID-19 Outcome, recovery rate, Influencing factors and the complication of the outcome as well as conclusion and recommendation on policy and practice.

5.1 Factors Influencing Recovery Rate

One factor influencing recovery is early hospital attendance. Those children who came early to the hospital following COVID-19 Infection got treated sent home for observation and cared for in the house. Unfortunately for those who took longer than three days some even died at a skewness of even -1.732. Which stood at 39 % of the population? As opposed to those who came early and even as early as a day, which was at a skew of 0.609? The delay was really significant at a P-Value of **≤ 0.001**. Day after infection was reported as well in China those children who came late had symptoms of COVID-19 as compared to those who reported early especially for those who just reported for screening 0n day 15 of infection 80%-90% Reported in the lacet infectious disease journal (Bi et al., 2020) showed some symptoms. Some were positive yet symptomless, so they were treated and these are those who came early.

5.1.1 Age of the child

Other influencing factors were such as age. Most studies reported that the older the child the more suspect able they were to Covid-19 Infection (KALIYAN et al., 2021) and so was my study .At a confidence interval of a lower bound of 3.17 and an upper bound of 3.57 with a std error of

0.099 .The age factor was reported by my Journal that the older the child the more prone to infection and also by (Bi et al., 2020) and as well in the achieves of academic emergency medicine study (Panahi et al., 2020) In other studies the younger children and those with neurological developmental issues where affected more and therefore there was need for special needs of Just like in other studies the boy child is attacked by COVID-19 more than the girl child (Calcaterra et al., 2021) as per the study in the American Paediatric academy. As well in my study the boy. Child is affected by 52.63% more than the girl child. Why is the boy child affected?

5.1.2 Sex: - Sex varied a lot, others reported boys to have been infected more than girls others reported the opposite. I saw boys were infected more than girls in the study

5.1.3 Underlying Condition: - My study revealed those who were affected most had some co morbidities such as pneumonia GE and asthma. (Panagouli et al., 2021).This was contrast to by other studies. Even though underlying conditions grossly contributed to the COVID-19 Infection, different studies had different conditions from congenital diseases to cardiac related conditions. The international journal of infectious disease in Elsevier also noted this (Tsankov et al., 2021)

Malnourished children also were affected more than the un-malnourished children. At 13 % Malnourished had Covid infection compared to 10% of those who didn't have which was a median of 4.00 with a variance of 0.957 (Zhu et al., 2022). The Lacet study 2020 reported 47Million children below five year who were severely and moderately malnourished in the Sub-Sahara African. These are among the children that I captured to have COVID-19 infection as well which increased the mortality rate as explained by the variance above. For now the mortality from malnutrition is at 45% in children below five year of age, with the mortality rate from COVID-19 of 2.1% from my study will definitely increase altogether the mortality rate among the children that we are fight had to control. Asthma and other respiratory conditions placed children at high risk of COVID-19 Infection. Studies reported that children with bronchial asthma progressed to getting covid-19 at a percentage of 56.6% studied at Zangiata Hospital in India. (Tashmatova and Khalmatova, 2021) My study report**t**ed similarly that asthma was the third of the evaluated conditions that were associated with COVID-19 in children. The first reported condition was gastroenteritis followed by community pneumonia. In other studies also reported some co morbidities were some of the influencing factors even those the conditions varied a lot in different countries. (KALIYAN et al., 2021)

5.2 Proximity: -It is important to evaluate children's closeness in school during outbreaks of respiratory disease this was associated with disease transmission from specially the parent's/ guardians. My study is similar to the study in Cochrane by (Panahi et al., 2020) On this. COVID-19. Infection among children all over especially in Sub Sahara Africa where closeness attributed a lot in infection. Also my study has reported death rate of 2.1% of death among the

patients who had COVID-19.This tillies with a comparative study that was conducted including Singapore Japan India, Malaysia India and China that revealed a 2.3% death rate (Wong et al., 2021).

Education: -5.3 The children in the higher level were older and therefore prone to infection. More important is the parent who had their level of education higher their children didn't suffer much in terms of their children being infected and this is attributed to knowledge that they had that they were able to bring the children to hospital earlier.

CHAPTER FIVE: - CONCLUSION

Covid-19 Attacks the young children more than the older ones. More children came late for treatment and that was the reason for admission even to ICU. We also report, Malnutrition contributed to the infection. The death was as a result of late treatment. Children need to be spaced in school and even at home if we are to curb the corona manes. There was therefore a great association between children Socio-demographic characteristic and severity of Infection The age of between 3-7Months were most Infected and even admitted into ICU and some even are the once who died. I Reject the NULL Hypothesis.

Death as an important outcome was as a result of treatment delay, a practice that has to be reversed to improve the quality of care among the Covid-19Infected children. Studying of vaccinations to children should be on the top priority and there is need for vaccinating children as early as possible in childhood. Proper balanced nutrition and great care of children with other ailments is essential.

Supportive care to these children for quick recovery and even their immediate family members in the circle.

Collaborative care with early consultations will prevent the spread and enhance the quality of care delivery.

Health education to the parents/Guardian teachers in schools on prevention measures and how to live in the community and house will definitely improve the out of the infection.

Frequent training and CMEs to be integral to care providers. There was strong association between children who complicated with those who came to the hospital early. Those who came to the hospital in the first day of the suspected COVID-19 Recovered well after treatment and sent home as opposed to those who came after three days for some of the are those who were admitted to ICU and other even dead. Therefore, accepting the Hypothesis

Another study is necessary on a wider scale that should even cover where these children come from.

CHAPTER SIX: - RECOMMENDATION.

- Even though recovered from the infection. Some were admitted into ICU. Policy development on the care of respiratory disease particularly outbreaks should focus on early intervention even if it's to make campaign and reach out to the venerable people, the children in school, low-income communities and less educated individuals.

- Outcome wasn't good for some children had to die unnecessary. Review of the guideline on how to address this issue and aligning the existing guideline to the current health issues prevailing.

- Frequent heath education especially during outbreak

- KHN and even the MOH Needs to develop some strategies that will have children be treated as early as possible onces infected with such diverse. Should be on the high alert and intervene through screening measure imposed should there be an outbreak. Development of vaccines to the children and that the vaccines will be mandatory free and to be implementation along with the other kepi vaccine in the Country.

- With the strong association of the close proximity of the children in the family leading to severe infections among the children and delays to seek treatment lead to HDU, ICU admission of these infected children who some had to die. Incorporating Clinical audit would pick out malpractice and show practionners the scientific way to practice and implement best practice.

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Appendix 1: Study Checklist/Data abstraction Form

TITLE: OUTCOME OF COVID-19-INFECTION IN CHILDREN AGED 0-12 YEARS AT KENYATTA NATIONALHOSPITAL

Investigator: Stanley Malo Rungua **Mobile-0722-314659**

Supervisors i). Dr. Angeline C. Kirui Tel No. **+254-720440665**

ii). Dr. S. Kimani Tel No. **+254-722384917**

The research assistants collected data using the Data abstraction form/Checklist with three sections namely demographic characteristics, recovery and outcome of Covid 19 Infection as shown below: -

Section: -A-Social Demographic Characteristic of the Child?

1. What is the child's gender?	**.Male Female Transgender Others** **1. 2. 3. 4.**
2. Age	**0-28Days 1-3Mths 4-6Mths 7Mths- 12Yrs** **1. 2. 3. 4.**
3. Level of education Child Is?	**P-1-2- Grade-1-3 Grade- 4-6 Others:-** **1 2. 3. 4.**
4. Living Space? Sch.	**There are In class? :-** **10-20 20-30 40-50 Over 50** **1. 2. 3. 4.**
5. Living Space at Home?	**How Many are they in the HseHold?** **3 4 5 Over 5** **1. 2. 3. 4.**

Social Demographic Characteristic of the Care giver: -

6 Education Level?	**Pry. Sec. College University** **1 2. 3. 4.**
7. Vaccinated against corona virus-Father?	**Yes No.** **1 2.**
	1 2 More than 2 None **1. 2. 3. 4.**
8. Doses	
	Yes. No. **1. 2.**
9. Vaccinated against corona virus-Mother?	**1 2 More than 2 None** **1. 2. 3. 4.**
10. Doses?	**Yes. No** **1. 2.**
11. Vaccinated against corona virus -/Guardian/Significant Others?	**1. 2. More than 2 None** **1. 2. 3. 4.**
12. Doses ?	**1 2** **1. 2.**

Section b) Factors Influencing children's' recovery from COVID 19 infection

1. What is the severity of Child infection at admission?

a) Mild for home Isolation b) Admitted for inpatient monitoring

c) Admitted for critical care d) others (specify).

2. Does Child have other medical Condition beside Corona virus Disease?

a) Yes b) No

3 Specify the Condition?

A) 1. Pneumonia b) 2. Asthma c 3. G/E d 4. Others

4. Nutritional Status

A). Normal b). Mild Malnutrition c). Moderate/Severe Malnutrition d). Others

Section c) Outcome of the COVID 19 infection in children

1. How long did child take to be taken to hospital?

a) 1Day

b). 2 Days

c). 3 Days

d). More than 3Days.

2. Type of care given

a) Treated and Discharge home as an out Patient

b) Admitted in the Ward.

c) Admitted in HDU

d) Admitted in CCU

3. **Patient Outcome**

A). Patient recovered and discharged home

B). Patient recovered with complications

c). Patient died. The ----------END

Appendix 2: LETTER OF APPROVAL TO CONDUCT A STUDY FROM

KNH/UON/ETHICS COMMITTEE

Stanley Malo-H56/87961/2016

School of Nursing Sciences

University of Nairobi

P.O.BOX 19676-00202

NAIROBI

Dear Sir/Madam

Ref:-REQUEST FOR REVIEW AND APPROVAL OF RESEARCH PROTOCOL

My Name is Stanley Malo, a postgraduate student at the department of nursing sciences. I am requesting for permission to carry out a study on **Outcome of COVID 19 infections among 0-12 Years at Kenyatta National Hospital**

The information obtained will be used for the intended purpose only.

Thank you

STANLEY MALO-H56/87961/2016

Appendix -3- RESEARCH BUDGET

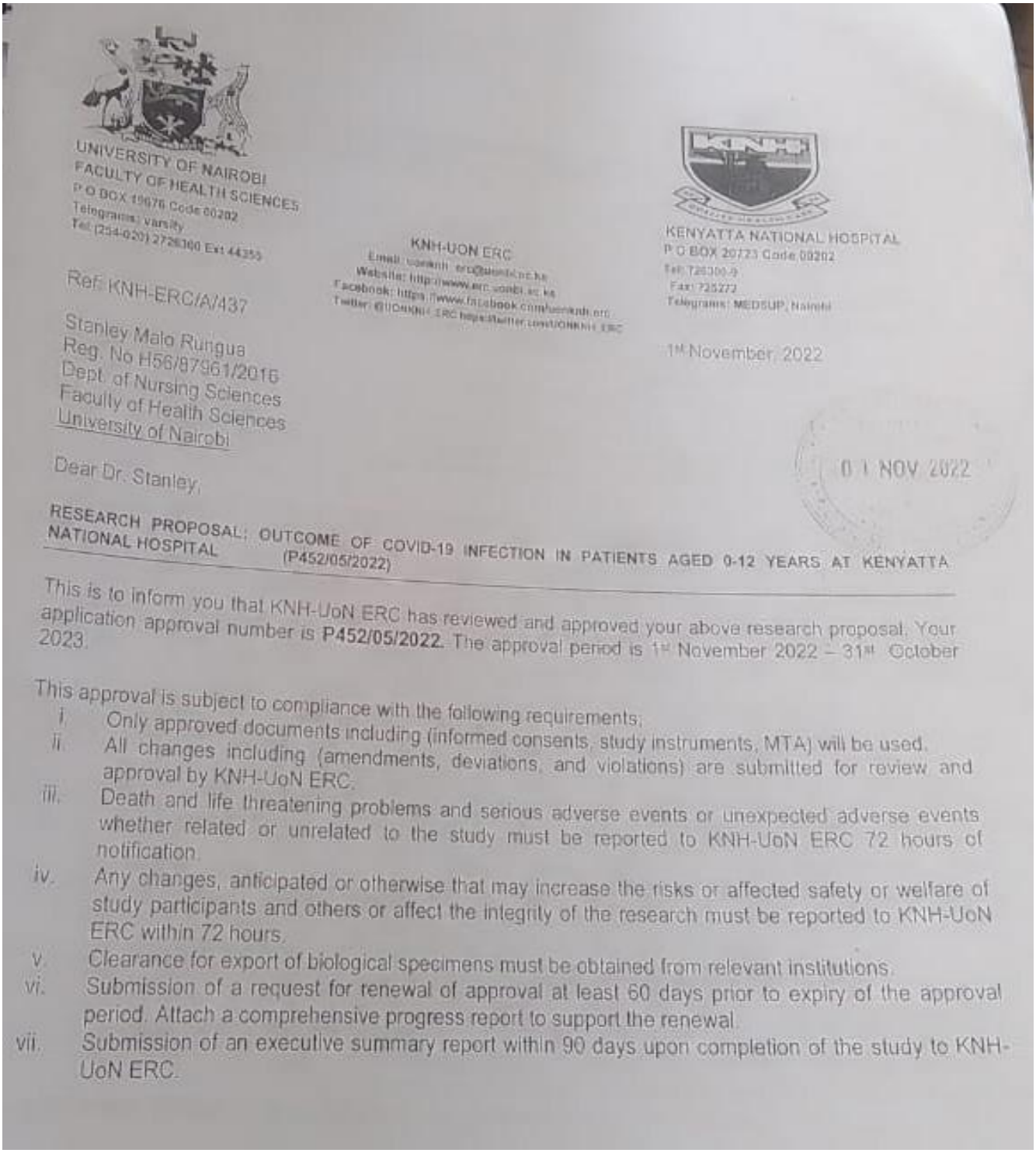
Serial No.	Components	Unit Measure	Duration No.	Cost Ksh.	Totals Ksh.
1.	**Personnel**				
2.	Research Assistants	3	56Days	@ Each-1500	252,000
3.	Biostatistician	1	Whole Job Basis	30,000	30,000
	Transcription Fee	1	Whole Job Basis	20,000	20,000
4	Transport	1Return	56Days	@ Each 100x3	5600
5.	**Printing**				
6	Questioner /Checklist	1	4Pgs	Each@10x100	400
7	Questioner / Checklist Practice	1	4Pgs	Each@10x10	100
8.	Final Report	**1**	100Pgs	Each @10x100	1000
	Photocopying				
9.	Questioner /Checklist	**100**	4Pgs	Each@3x100	1200
10.	Questioner / Checklist Practice	**10**	4Pg	Each@3x10	120
11	**Final Report**	**5**	100	Each@3x100	1500
12	**Binding**	**6**		600	3,600
13	**Other Costs**				
14	**Ethics**	**1**	1	5000	5000

	Committee				
15	**Note-Books**	**1**	3	Each@3x30	60
16	**Pens**	**1**	3	Each@3x10	30
17	**Airtime**	**1**	3	Each@3x5000	15000
Total				**335,610**	**335,610**

Appendix 4: Gantt chart /Work Plan

Year	2021-		2023					
Month	**June-Dec,**	**Jan-Mar**	**April**	**May**	**June**	**July**	**Aug,**	**Sept-To-date**
Proposal Development								
Proposal Submission to Ethics Committee/Development/Corrections								
Preparation of Research Tools								
Permission of Research From Institution								
Recruitment &Training								
Pretesting of Research Tools								
Data Collection								
Data Analysis & Report Writing								
Dissemination of Research Finding								
Manuscript Writing/Publication								

Appendix 5: ERC APPROVAL LETTER



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Facebook: https://www.facebook.com/uonknh.erc
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

Ref: KNH-ERC/A/437

1st November, 2022

Stanley Malo Rungua
Reg. No H56/87961/2016
Dept. of Nursing Sciences
Faculty of Health Sciences
University of Nairobi

01 NOV 2022

Dear Dr. Stanley,

RESEARCH PROPOSAL: OUTCOME OF COVID-19 INFECTION IN PATIENTS AGED 0-12 YEARS AT KENYATTA NATIONAL HOSPITAL (P452/05/2022)

This is to inform you that KNH-UoN ERC has reviewed and approved your above research proposal. Your application approval number is **P452/05/2022**. The approval period is 1st November 2022 – 31st October 2023.

This approval is subject to compliance with the following requirements:

i. Only approved documents including (informed consents, study instruments, MTA) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by KNH-UoN ERC.
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to KNH-UoN ERC 72 hours of notification.
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH-UoN ERC within 72 hours.
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to KNH-UoN ERC.

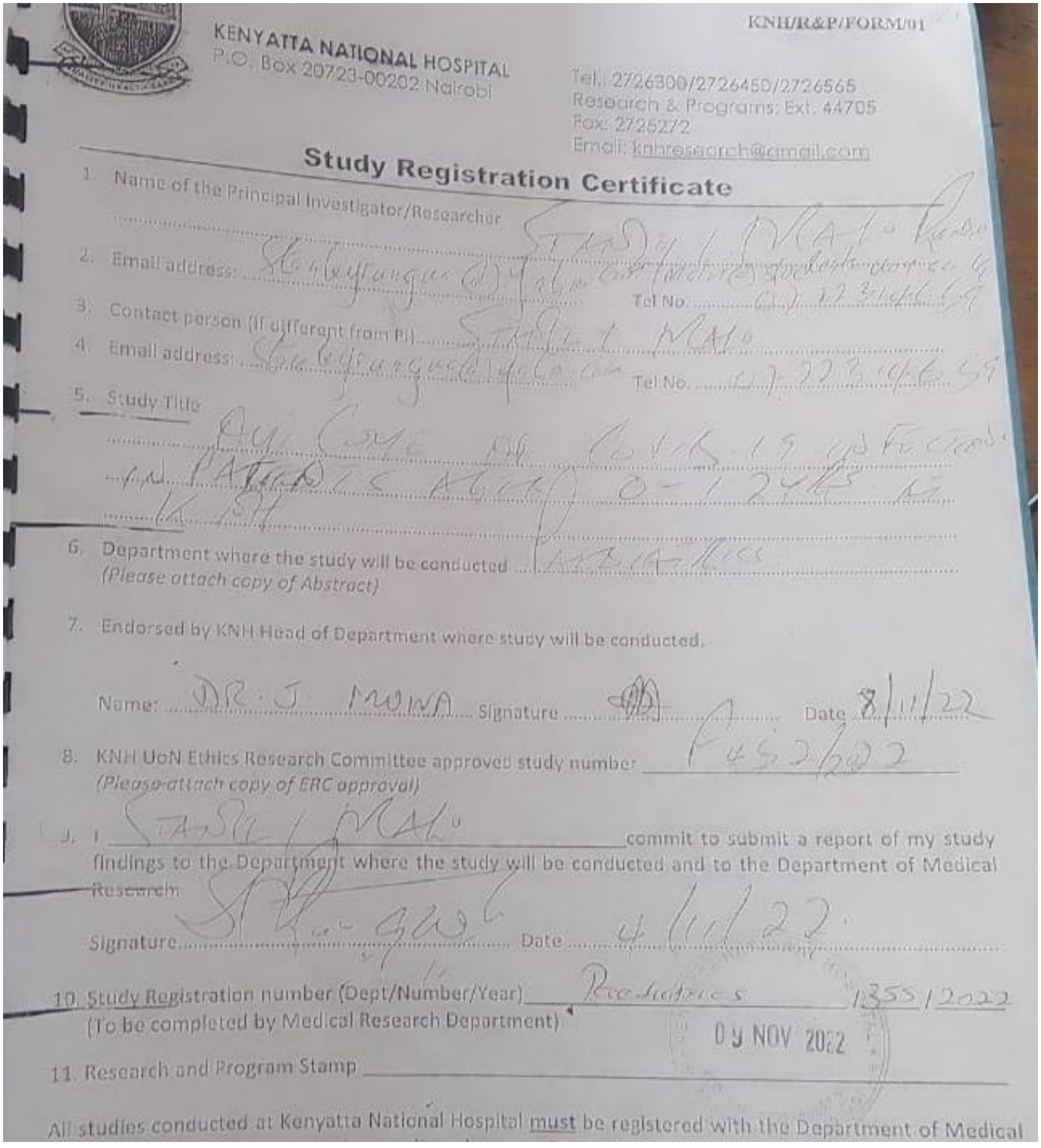
Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://research-portal.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely,

DR. BEATRICE K.M. AMUGUNE
SECRETARY, KNH-UoN ERC

c.c. The Dean, Faculty of Health Sciences, UoN
The Senior Director, CS, KNH
The Assistant Director, Health Information Dept., KNH
The Chairperson, KNH- UoN ERC
The Chair, Dept. of Nursing Sciences, UoN
Supervisors: Dr. Angeline Kirui, Dept of Nursing Sciences, UoN
Dr. Samuel Kimani, Dept. of Nursing Sciences, UoN

Appendix 6: KNH APPOVAL LETTER



KENYATTA NATIONAL HOSPITAL
P.O. Box 20723-00202 Nairobi

KNH/R&P/FORM/01

Tel.: 2726300/2726450/2726565
Research & Programs: Ext. 44705
Fax: 2725272
Email: knhresearch@gmail.com

Study Registration Certificate

1. Name of the Principal Investigator/Researcher ..... STANLEY MALO
2. Email address: ..... Tel No. .....
3. Contact person (if different from PI) ..... STANLEY MALO
4. Email address: ..... Tel No. .....
5. Study Title .....
6. Department where the study will be conducted ..... RADIOLOGY
   (Please attach copy of Abstract)
7. Endorsed by KNH Head of Department where study will be conducted.
   Name: DR. J MUWA Signature ..... Date 8/11/22
8. KNH UoN Ethics Research Committee approved study number: P452/10/2022
   (Please attach copy of ERC approval)
9. I STANLEY MALO commit to submit a report of my study findings to the Department where the study will be conducted and to the Department of Medical Research
   Signature ..... Date 4/11/22
10. Study Registration number (Dept/Number/Year) Radiology 1355/2022
    (To be completed by Medical Research Department)
    04 NOV 2022
11. Research and Program Stamp .....

All studies conducted at Kenyatta National Hospital must be registered with the Department of Medical

APPENDIX 7:PLAGIARISM REPORT

OUTCOME OF COVID-19- INFECTION IN PATIENTS AGED 0-12 YEARS AT KENYATTA NATIONAL HOSPITAL

ORIGINALITY REPORT

5%	5%	1%	1%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	erepository.uonbi.ac.ke Internet Source	3%
2	Submitted to Higher Education Commission Pakistan Student Paper	<1%
3	Submitted to Adtalem Global Education, Inc. Student Paper	<1%
4	ojshafshawaty.ac.id Internet Source	<1%
5	www.researchgate.net Internet Source	<1%
6	Submitted to Union University Student Paper	<1%
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	ugspace.ug.edu.gh	

10/11/2023

C.O.D

Dr. E. Mdwaka