

**FACTORS INFLUENCING THE UPTAKE OF COVID-19 VACCINATION
AMONG BODA-BODA RIDERS IN MATHARE SUB-COUNTY, KENYA**

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DECLARATION

I, the undersigned, declare that this Thesis is my original work and has not been previously presented for a degree or any other award in any other university

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DEDICATION

I dedicate this work to the Nairobi County Health Department through the NMS (Nairobi Metropolitan Services) for possible adoption to help improve the health financing status of communities living in the slums within the city. I also dedicate this research to my family and particularly my wife – Jacinta who gave me the permission to sit long hours in the night trying to work on the report and sometimes stayed behind with me to help with editorial work. Finally, I humbly dedicate this work to my supervisors Dr. Kezia Njoroge and Professor Wanja Mwaura-Tenambergen and who have been extremely supportive to ensure that this work is completed on time.

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ABSTRACT

Due to the massive spread of the virus, there was a lot of advocacy and wide spread of information on the importance of vaccination that would help and control the spread of the virus. However, this was met by resistance and rejection by the people raising serious concerns. It appeared there was scanty knowledge on the factors associated with vaccine intake in Kenya, with a recent survey estimating the COVID 19 vaccine acceptance among Kenyans to be around 16.28%. The main objective of the study was to establish the factors that influences uptake of COVID-19 vaccination among Boda-Boda riders in Mathare Sub-County in Nairobi. Specific objectives were to determine the influence of respondents' perception, prior exposure, government policy, accessibility, and individual factors on uptake of COVID-19 vaccination among Boda-Boda riders in Mathare. The study adopted cross-sectional survey design. The study population were the Boda-Boda riders within mathare sub county. A total sample of 140 study participants participated in the study. The study adopted simple random sampling technique to achieve the sample size. The study used questionnaire to collect primary data. Pre-eststing was done in Ruaraka Sub-County. Collected data was entered and analyzed using SPSS v21 and descriptive and inferential statistics (Chi-square and logistics regression analysis) were done. The results show that majority 99 (70.7%) of the Boda-Boda riders ranged between the age of 17-30. Majority 105 (75.0%) were not vaccinated while a quarter 35 (25.0%) had been vaccinated. Majority 137 (97.9%) of the respondents posited that they were old enough to make decisions on COVID 19 vaccination. The majority of the respondents indicated that their faith did not prohibit the taking up of the COVID -19 vaccine, however, the church and Muslims did not actively encourage their followers to get vaccinated instead adopting COVID-19. Many of the respondents claimed that the haste with which the vaccines were developed rendered them unsafe for use, and that because getting vaccinated did not fully guarantee COVID-19 immunity, getting the vaccine was not suitable for humans. mandatory COVID-19 vaccine policies by the government had negative consequences on public trust, vaccine safety assurance, and human rights among other concern. Boda-Boda operators who had a positive view towards the vaccine more likely to go for the vaccination (OR= 1.21, $p<0.05$), those with correct information about the vaccine were more likely to be vaccinated (OR=1.022, $p<0.05$) those who had once experience severe COVID-19 infection were more likely to go for COVID -19 vaccination (OR=1.439, $p<0.05$), those aware aware of the existing policy framework on COVID-19 vaccination were more likely to be vaccinated (OR=1.171, $p<0.05$), Where policy on vaccination was not fully enforced Boda-Boda riders were less likely to go for the vaccination (OR=0.79, $p<0.05$), those who had no knowledge about the seriousness of COVID-19 infection were less likely to go for vaccination (OR=0.704, $p<0.05$). The Ministry of Health should organize for more educational campaigns involving the Boda-Boda riders as active participants through public road campaigns and Barraza's and also organize training activities for the riders through various groups/ Sacco's in order to reduce the negative perception. The Ministry of Health should continue with educational communication on COVID-19 vaccination uptake both on print media such as newspapers, radios and television to counter the misleading information about vaccinations

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CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

Just like many other respiratory viruses, corona virus spread through droplets that are expelled from the mouth or nose when one breathes, coughs, sneezes, or talks. It takes approximately 2-14 days to test positive for the virus. The rapid spread of Coronavirus resulted in great health, economic, environmental and social concerns for the entire human population as measures such as lockdowns, wearing of masks in public places and the use of hand sanitizers was put in place. There has since been development of various vaccines to help curb the spread of the disease. The development of these vaccines has been a very welcomed as they allowed for partial if not full reopening of the world's economy as well as saving numerous lives. Despite vaccines' reprieve from the pandemic, uptake of these vaccines has been met with varying degrees of acceptance. The virus as well spread in African continent where it was reported of 8million cases as of 2021 with more than 150,000 deaths. South Africa and Egypt being among the countries that were hardest hit. However, despite the impending danger, most Africans are hesitant to take the vaccination. This COVID-19 vaccine hesitancy can be attributed to several factors such as denial of the existence of COVID-19, misinformation, attitude, religion and the lack of trust the in pharmaceutical industry.

This study was anchored on the service delivery pillar. The service delivery pillar of health systems management plays a crucial role in the uptake of COVID-19 vaccination. It encompasses various aspects that directly impact the efficient and effective distribution and administration of vaccines. there's are various ways in which the service delivery pillar influences the uptake of COVID-19 vaccination. Efficient management of vaccine distribution is essential to ensure that vaccines reach their intended destinations on time. Health information systems help track vaccine shipments, monitor storage conditions (temperature control), and ensure equitable distribution to various healthcare facilities.

Efficient workflows within healthcare facilities are critical for timely vaccinations. Health information systems can help healthcare workers manage the vaccination process, from verifying patient identity to documenting the administration of the vaccine.

Health information systems enable healthcare providers to report and track adverse events, ensuring a rapid response if any issues arise. Health information systems can provide real-time inventory data, allowing for timely restocking and minimizing wastage. In summary, the service delivery pillar of health information systems plays a central role in the successful uptake of COVID-19 vaccination. It ensures that vaccines are distributed efficiently, administered safely, and monitored effectively, contributing to public health efforts to combat the pandemic comprehensively

The uptake of COVID-19 vaccination is influenced by a wide range of factors, encompassing individual, social, cultural, and systemic elements. Understanding these factors is crucial for designing effective vaccination campaigns and strategies. The overview of the factors influencing the uptake of COVID-19 vaccination.

In USA, the study Crawshaw et al. (2022) on the factor that affected COVID-19 vaccination acceptance and uptake by the general public, their study revealed that concerns on safety and erroneous beliefs on the vaccine safety, efficacy and necessity were associated with lower vaccine acceptance, while mistrust of the governments and other public health agencies were further associated with lower vaccination acceptance while factors such as proximal social influences such as peer-to peer and group norms were associated with positive acceptance of the vaccines. Further, knowledge and social influences affected the COVID-19 acceptance and uptake.

In Indonesia, study done by Faturohman et al. (2022), on the factors that influenced the COVID-19 vaccine acceptance suggested or revealed that high perceived usefulness led to higher COVID-19 vaccine acceptance as well as the high perceived ease of use increased their perceived usefulness and thus higher uptake while their perceived religiosity did not affect their uptake of the COVID-19 vaccine acceptance as well as the sources of information.

In Bangladesh, a study done by Roy et al. (2023) on the various potential factors that influenced COVID-19 vaccine uptake, acceptance and hesitancy among the university students. The study employed binary logistics regression to assess the association between various potential factors on vaccine acceptance and their study 10 predictors and safety and efficacy were highly significant in the uptake while political roles had both

positive and negative effects on the COVID-19 uptake and acceptance. Communication and trust were found to be positive and significant associations while rumors had negative associations in the COVID-19 uptake and acceptance.

In West Africa, Cameroon, study done Ambe et al. (2023), among the nurse, their study findings revealed that negative actors that affected uptake of COVID-19 uptake included the beliefs that vaccines were dangerous and could lead to death, and individual perceptions that no one could affect their decisions on vaccine uptake, while belief factors, social influence/peers and family and lack of knowledge all affected the uptake of the vaccines. In Kenya, study done by Mohamed et al (2022) pointed that the level of education and source of the information such as, the high income levels, religious affiliations radios and social media were key in the uptake of the COVID-19 while age and occupation did not affect the uptake of the COVID-19 vaccines.

Perception plays a significant role in influencing the uptake of COVID-19 vaccination. People's beliefs, attitudes, and perceptions about the vaccines can strongly influence their decision to get vaccinated or not. Individuals are more likely to get vaccinated if they believe that the COVID-19 vaccines are safe and effective. Concerns about vaccine safety can deter people from taking the vaccine, while confidence in its effectiveness can motivate them to get vaccinated. An individual's perception of their own risk of contracting COVID-19 can influence their motivation to get vaccinated (Piltch-Loeb et al., 2021). Those who perceive themselves as at higher risk, either due to age, occupation, or underlying health conditions, are more likely to seek vaccination. The perception of how severe COVID-19 is can influence vaccination decisions. Understanding the potentially serious health consequences of COVID-19 can motivate individuals to get vaccinated to protect themselves and others. Perception is a multifaceted aspect that plays a critical role in the uptake of COVID-19 vaccination. Public health campaigns should prioritize providing accurate information, building trust, addressing concerns, and leveraging positive social influences to promote vaccination and combat vaccine hesitancy (Piltch-Loeb et al., 2021).

Prior exposure to the coronavirus, either through previous infection or known as natural immunity, can influence the uptake of COVID-19 vaccination. Individuals who have

previously been infected with COVID-19 may believe that they have developed natural immunity and are therefore less susceptible to reinfection. This perception of protection might lead some people to delay or forego vaccination. The perception of risk may vary among individuals who have had prior exposure to the virus. Some may perceive themselves as at lower risk of severe illness or reinfection, especially in the short term, which can influence their vaccination decisions. Robertson et al. (2021) suggests that immunity acquired through natural infection can vary in its duration and effectiveness. People may not fully understand that natural immunity may wane over time or provide limited protection against new variants, making vaccination still important. While prior exposure to the coronavirus can provide some level of immunity, it's essential for individuals to understand that vaccination offers additional benefits and can enhance their protection, especially in the context of evolving variants. Public health messaging should emphasize the importance of vaccination for both previously infected and uninfected individuals to achieve widespread immunity and control the spread of COVID-19 (Robertson et al., 2021).

According to Nikolovski et al. (2021) government policies play a significant role in influencing the uptake of vaccination among the population. These policies can shape public perception, access to vaccines, and the legal and logistical framework surrounding vaccination campaigns. When governments implement mandatory vaccination policies, requiring certain segments of the population to get vaccinated, it can significantly increase vaccine uptake. For example, healthcare workers or students may be required to receive certain vaccines as a condition of employment or enrollment in schools. Governments can require vaccination for specific activities or access to certain places. For instance, proof of COVID-19 vaccination may be mandated for international travel or entry into certain venues (Nikolovski et al., 2021). This can serve as a strong incentive for individuals to get vaccinated. Government policies can shape the vaccination landscape by mandating requirements, providing incentives, ensuring equitable access, and communicating the importance of vaccination to the public. Effective policy measures should be evidence-based, transparent, and considerate of public health needs and individual rights (Nikolovski et al., 2021).

Individual factors play a crucial role in influencing the uptake of vaccination. People's personal beliefs, attitudes, and characteristics can significantly impact their decision to get vaccinated. An individual's perception of their own risk of contracting a particular disease can influence their motivation to get vaccinated. Those who perceive themselves as at higher risk are more likely to seek vaccination (Nguyen et al 2021). Knowledge about vaccines, including their safety and effectiveness, is a significant determinant of vaccine uptake. Access to accurate information can positively influence vaccination decisions. Personal attitudes and beliefs about vaccines play a crucial role. Individuals with positive attitudes toward vaccines are more likely to get vaccinated, while those with negative beliefs or misconceptions may hesitate. Understanding these individual factors is essential for designing tailored vaccination campaigns and interventions that address specific concerns and motivations within different population segments. Public health efforts should aim to provide accurate information, build trust, and address barriers to vaccination.

Accessibility to COVID-19 vaccination is a critical factor that strongly influences the uptake of vaccination. Ensuring easy and equitable access to vaccines is essential for achieving widespread immunization and controlling the spread of the virus. The physical distance to vaccination sites plays a significant role in uptake. When vaccination centers are conveniently located, individuals are more likely to get vaccinated. The number of vaccination sites and their distribution within communities is essential. Having multiple sites, including mobile clinics and pop-up vaccination centers, can improve accessibility. Accessibility to COVID-19 vaccination is a fundamental determinant of vaccine uptake. Governments and healthcare systems must consider the diverse needs and challenges of their populations and implement strategies to make vaccines as accessible as possible. Addressing accessibility issues helps remove barriers and increases the likelihood that individuals will get vaccinated, contributing to achieving herd immunity and controlling the spread of the virus.

In Kenya, as of 2021, 320,000 cases and 5500 deaths had been reported, signaling the toll that the disease had on the country. The government rolled out the mass vaccination program in hope of reaching majority of its population and preventing the mass spreading

of the virus. However, the program continues to face high hesitancy of 36.5% among the citizens. To try and reduce these rates, the government put in place measures to reduce the spread and increase vaccination uptake. This study was taken in the context of Mathare Sub-county in Nairobi; located to the east of Nairobi's central business district. It is Nairobi's second largest informal settlement after Kibera, with an area of about 3 square kilometers. The sub-county has a population of about 194,000 people (Kimani, 2021). Such areas are one of high concern as respiratory diseases such as COVID 19 can be easily spread.

1.2 Statement of the Problem

Vaccination is very important in control the spread of many infectious diseases including COVID-19 which triggered global pandemic but herd immunity could work with high vaccination rate in the general population. Despite the importance of vaccines in the control of infectious disease such as COVID-19, the acceptance and uptake of these vaccines is hampered and hindered by myriads of factors. High uptake of COVID-19 vaccines as needed to achieve the optimal effectiveness within the general population and data indicated that the benefits of the vaccine uptake to decrease the rate of hospitalization for COVID-19 was greatly reduced by the hesitancy of many people due to various factors such as personal/individual factors, negative perception about the vaccine safety and efficacy, government policy and prior exposure.

Due to the massive spread of the virus, there was a lot of advocacy and wide spread of information on the importance of vaccination that would help and control the spread of the virus. However, this was met by resistance and rejection by the people raising serious concerns. It appeared there was scanty knowledge on the factors associated with vaccine intake in Kenya, with a recent survey estimating the COVID 19 vaccine acceptance among Kenyans to be around 16.28% (pharmaceutical technology, 2022). Given the knowledge gap in the Kenyan context, a comprehensive study was necessary for the country. This study focused on finding out the factors that could be leading to vaccine hesitancy in Mathare representing one of the largest informal settlements in Nairobi County and is one of the areas where the COVID 19 virus spread risk is high due to its large population. Representing one of the highest occupations at risk of exposure and

with a 48.8% COVID 19 vaccination rate in Nairobi this rate is quite alarming. Thus it was critical to understand the factors that influence their decision to get vaccinated. Boda-Boda riders interact with nearly all the residents of the area hence are a good target group for study.

1.3 Purpose of the Study

In this case the study focused on evaluating COVID 19 vaccination hesitancy and its determinants among the Boda-Boda riders in Mathare sub-county Kenya.

1.4 Objectives of the Study

The study was guided by the following objectives:

1.4.1 Broad Objectives

To establish the factors that influences uptake of COVID-19 vaccination among Boda-Boda riders in Mathare.

1.4.2 Specific Objectives

- i. To determine how perception on COVID 19 Vaccine influences uptake of vaccination among Boda-Boda riders in Mathare.
- ii. To determine how prior exposure to Corona virus influences the uptake of vaccination among Boda-Boda riders in Mathare.
- iii. To examine the influence of the government policy on the uptake of vaccination among Boda-Boda riders in Mathare.
- iv. To determine how individual factors influences uptake of vaccination among Boda-Boda riders in Mathare.
- v. To determine how accessibility to COVID-19 vaccination influences uptake of vaccination among Boda-Boda riders in Mathare.

1.5 Research Questions

To achieve the objectives stated in section 14.2, the following research questions were formulated:

- i. How does perception on COVID 19 Vaccine influences uptake of vaccination among Boda-Boda riders in Mathare?

- ii. How do prior exposure to Corona virus influences the uptake of vaccination among Boda-Boda riders in Mathare?
- iii. To what extent does the government policy influence the uptake of vaccination among Boda-Boda riders in Mathare?
- iv. How do individual factors influence uptake of vaccination among Boda-Boda riders in Mathare?
- v. How does accessibility to COVID-19 vaccination influence uptake of vaccination among Boda-Boda riders in Mathare?

1.6 Justification of the Study

Vaccination is vital in the preventing spread of COVID-19 pandemic. By 2009, the country had 91,151 motorcycles. Today, many Kenyans prefer Boda-Boda to send on errands. In remote and inaccessible areas, Mathare being one of the densely populated slums with inaccessible road network, it's therefore the major form of transport and this transport system also helps residents to beat traffic jam. Many Kenyans both in cities and rural areas prefer to use Boda-Boda riders because they maneuver easily where taxis and buses cannot. However, their exact number could be disputed since quite a number of the young riders are not formally members of any Sacco neither do they have any formal government registration. As per the data obtained from Jumuia Hospital – Mathare, out of 7000 people who have been vaccinated at the facility for the last 9 months less than 30 Boda-Boda riders have been vaccinated. Considering the level of high risk level of which unvaccinated rider would give to an innocent citizen seeking their services, it was therefore of great concern to consider further research to find out reasons for low vaccine uptake among Boda-Boda riders in order to develop effective strategies and recommendations ensuring higher and more equitable vaccination coverage across Mathare sub-county among the Boda-Boda riders.

1.7 Limitations of the study

For more conclusive results, more varied professions could be incorporated. Non-responsiveness: The target population may fail to respond effectively owing to the nature of the study. However, to avoid misconceptions, the aim of the study was explained to the

respondents the Boda-Boda riders whom were sampled using simple random sampling. The study was limited to only Boda-Boda riders in Mathare Sub-county.

1.8 Delimitation of the Study

In this study, the study was limited to Boda-Boda riders as a selected segment of the population specifically within Mathare sub-county. In addition, only these five variables were addressed in this study prior exposure to COVID-19, perception of COVID-19 vaccines, individual factors and government policies and vaccine accessibility on COVID-19 vaccines uptake. The sample as derived from the Boda-Boda riders in Mathare Sub-County and the primary data was collected using questionnaire which were entered and analyzed using SPSS v20 using both the descriptive and inferential statistics.

1.9 Significance of the Study

Development practitioners (Government Institutions, INGOs, and NNGOs), health service providers, and health advocates may get enriching information from the findings. Further, the study may also contribute to the global knowledge on vaccination acceptance in developing economies like Kenya.

The study may provide critical knowledge to the healthcare providers and academicians as well as other researchers on the factors that affected the uptake of COVID-19 vaccine in terms of perception, prior exposure, individual factors that affected vaccine uptake, government policy and accessibility on the vaccine uptake.

1.10 Assumptions of the Study

In this research work, the researcher assumed that participants provided honest and truthful responses to the questions in the questionnaire since the researcher would take time to explain each question in the questionnaire in a national language that they could easily understand and that the researcher would preserve their anonymity and confidentiality to maximize truthfulness by ensuring that they do not indicate their names in the questionnaire forms.

1.11 Operational Definition of terms

Government Policy	This term was used to refer to a law or regulation adopted by the government as a statement of intent and is used as procedure or protocol.
Individual factors	It takes under consideration the aspects that square measure distinctive to a private Boda-Boda rider. It was meant to be as a results of birth connected aspects like race, gender, culture etc. and aspects associated with human evolution and socialization like attitudes, temperament, motives, values, shallowness, education, employment etc. during this analysis, it's wont to ask individual's instructional level, information of COVID-19 vaccination and faith.
Perception	This term was used to refer to pre-conceived understanding or interpretation about the subject matter, namely the COVID 19 Vaccine.
Prior exposure	This term was used in the study to imply ones' previous encounter with the virus.
Vaccine accessibility	this term was used to refer to the ability of the people to access COVID-19 vaccine

CHAPTER TWO

REVIEW OF LITERATURE

2.1 Introduction

The chapter peruses factors influencing the uptake of COVID-19 vaccines. The chapter is divided along the study's key aspects: factors that influence COVID 19 vaccination uptake, theoretical framework and conceptual framework. The chapter as well examines some studies along the five research questions reviewed to identify the empirical gap which various research questions seek to address. This includes factors such as perception, prior exposure to COVID-19 virus, policy, individual factors and vaccine accessibility on vaccination uptake.

2.2 Theoretical Framework

Some theories and factors that could influence the uptake of COVID-19 vaccination among motorcyclists in Kenya. This topic involves a combination of health behavior, social, and cultural factors

2.2.1 Health Belief Model

The Health Belief Model (HBM) is a widely used theoretical framework in health psychology and public health that can be applied to understand the factors influencing the uptake of COVID-19 vaccines. The model suggests that individuals' decisions to engage in health-related behaviors, such as getting vaccinated, are influenced by their perceptions of several key factors. Here's how the Health Belief Model can be applied to COVID-19 vaccine uptake.

Perceived Susceptibility: According to the HBM, individuals are more likely to take health-related actions if they perceive themselves as susceptible to a particular health threat. In the context of COVID-19 vaccination: People who believe they are at high risk of contracting COVID-19 due to their work, living conditions, or social interactions may be more inclined to get vaccinated. Messaging that highlights the risk of COVID-19 among specific populations, such as healthcare workers or those in close-contact professions like motorcycling, can enhance perceived susceptibility.

Perceived Severity: The HBM posits that individuals are more likely to take action if they perceive the health threat as severe. Regarding COVID-19 vaccination: People who understand the potential severity of COVID-19, including its potential for severe illness, hospitalization, and death, may be more motivated to get vaccinated. Public health campaigns can emphasize the seriousness of COVID-19 and its impact on individuals, communities, and healthcare systems

Perceived Benefits: The HBM suggests that individuals assess the benefits of taking a specific health action, such as getting vaccinated. In the context of COVID-19 vaccination: People may be more willing to get vaccinated if they believe the vaccines are effective at preventing COVID-19 infection and its complications. Highlighting the benefits of vaccination, such as reducing the risk of transmission and contributing to herd immunity, can be persuasive.

Perceived Barriers: Perceived barriers, as outlined in the HBM, can hinder health-related actions. For COVID-19 vaccination. Barriers could include concerns about vaccine side effects, the cost of vaccination, access to vaccination centers, or the time required to get vaccinated. Strategies to reduce barriers may involve providing information about vaccine safety, offering free or low-cost vaccinations, and improving vaccination accessibility. The HBM suggests that individuals are more likely to take action when they receive cues to do so. In the context of COVID-19 vaccination, cues to action can include healthcare provider recommendations, reminders from employers, and public health campaigns. Encouraging healthcare providers to actively recommend vaccination and conducting targeted vaccination campaigns can serve as cues to action. Self-efficacy refers to an individual's belief in their ability to successfully perform a health-related behavior. In the case of COVID-19 vaccination, people with higher self-efficacy regarding vaccination may be more confident in their ability to schedule and receive the vaccine. Public health efforts can focus on building confidence by providing clear instructions and addressing common concerns.

Applying the Health Belief Model to the uptake of COVID-19 vaccines involves considering these factors and tailoring interventions and messaging to address individuals' perceptions and beliefs. It's important to conduct research to understand the

specific beliefs and barriers in the target population, such as motorcyclists in Kenya, to design effective vaccination promotion strategies.

2.2.2 Social Cognitive Theory

The Social Cognitive Theory (SCT), developed by Albert Bandura, focuses on the influence of social factors, observational learning, and self-efficacy in shaping human behavior. When applied to the uptake of COVID-19 vaccines, SCT offers valuable insights into how social and cognitive factors can impact individuals' decisions to get vaccinated. Here's how SCT can be related to COVID-19 vaccine uptake: SCT emphasizes that people learn by observing the actions and behaviors of others, particularly those they consider role models. In the context of COVID-19 vaccine uptake: Observing friends, family members, or trusted community members getting vaccinated can positively influence individuals' attitudes and intentions toward vaccination. Public health campaigns can use testimonials and stories of individuals who have received the vaccine to encourage others to follow suit.

Social Norms: SCT highlights the importance of social norms and peer influence. In terms of COVID-19 vaccination, if individuals perceive that getting vaccinated is a widely accepted and expected behavior within their social networks or communities, they may be more likely to get vaccinated. Peer pressure or encouragement from social networks can play a significant role in vaccination decisions. **Self-Efficacy:** Self-efficacy refers to an individual's belief in their ability to perform a specific behavior successfully. In the context of COVID-19 vaccination, individuals with high self-efficacy regarding vaccination are more likely to believe they can navigate the vaccination process, including making an appointment, getting to the vaccination site, and dealing with any potential side effects. Public health messaging should focus on building self-efficacy by providing clear information and addressing common concerns and misconceptions about vaccines.

Outcome Expectations: SCT suggests that individuals make decisions based on their expectations of the outcomes of their actions. Regarding COVID-19 vaccination, people may be more inclined to get vaccinated if they believe that receiving the vaccine will lead to positive outcomes, such as protection against COVID-19, reduced transmission, and a

return to normalcy. Public health campaigns should emphasize the benefits and positive outcomes associated with vaccination while addressing concerns about potential side effects.

SCT proposes that behavior is influenced by a dynamic interplay between personal factors, environmental factors, and behavior itself. Therefore, interventions should consider these interactions. Creating environments that facilitate easy access to vaccination centers and providing incentives or rewards for vaccination can influence behavior. Public health campaigns can work in tandem with community organizations to create a supportive environment for vaccination. Applying the Social Cognitive Theory to the uptake of COVID-19 vaccines involves recognizing the power of social influences, the importance of self-efficacy, and the need to address both individual and environmental factors. Effective public health strategies should leverage these insights to promote vaccination and create a supportive culture of vaccination within communities

2.2.3 Theory of Planned Behavior

The Theory of Planned Behavior (TPB) is a well-established psychological model that can be applied to understand and predict the uptake of COVID-19 vaccines. This theory posits that individual intentions to engage in a specific behavior, such as getting vaccinated, are influenced by three key factors: attitudes, subjective norms, and perceived behavioral control. The motorcyclist attitudes towards COVID-19 vaccination, influenced by information and messaging, can impact their intention to get vaccinated. Subjective norms that is the opinions and behaviors of their peers and social networks can influence their decision. Perceived behavioral control that includes factors like ease of access, cost, and convenience of vaccination locations can affect their uptake. Here's how TPB can be related to COVID-19 vaccine uptake among the motorcyclist..

Attitudes refer to an individual's evaluation of the behavior in question. In the context of COVID-19 vaccination, positive attitudes toward COVID-19 vaccination are likely to result in a higher intention to get vaccinated. This includes beliefs that vaccination is effective at preventing COVID-19 and that the benefits outweigh any potential drawbacks. Public health campaigns can influence attitudes by providing clear and accurate information about vaccine safety and efficacy.

Subjective norms relate to perceived social pressure and the influence of significant others. In terms of COVID-19 vaccination, if individuals believe that people important to them (e.g., family, friends, colleagues) expect them to get vaccinated, this can positively influence their intention to do so. Messaging can emphasize that getting vaccinated is a responsible and socially accepted behavior. Encouragement from trusted individuals, such as healthcare providers, can strengthen subjective norms

Perceived behavioral control reflects an individual's perception of their ability to perform the behavior. In the context of COVID-19 vaccination, if individuals perceive that they have control over the decision to get vaccinated (e.g., easy access to vaccination sites, no major barriers), this can enhance their intention to get vaccinated. Reducing practical barriers (e.g., making vaccination sites easily accessible, offering flexible hours) can improve perceived behavioral control.

According to TPB, intention is the immediate antecedent to behavior. Individuals with a strong intention to get vaccinated are more likely to follow through and actually get vaccinated. Public health campaigns can focus on strengthening individuals' intentions to get vaccinated by addressing their attitudes, subjective norms, and perceived behavioral control. Ultimately, the intention to get vaccinated should lead to the actual behavior of vaccination. However, the TPB acknowledges that external factors can still intervene between intention and behavior. Strategies should not only aim to influence intention but also facilitate the translation of intention into action. This may include ensuring easy access to vaccination sites, providing reminders, and addressing any remaining barriers. TPB recognizes that individual characteristics, such as demographics and past experiences, can influence the TPB variables. These factors should be considered when designing interventions. Tailoring messages and approaches to specific demographic groups and addressing unique concerns can be effective.

Applying the Theory of Planned Behavior to the uptake of COVID-19 vaccines involves recognizing the role of attitudes, subjective norms, and perceived behavioral control in shaping intentions and behaviors. Public health efforts should focus on changing these factors to encourage vaccination, while also addressing practical barriers and considering individual differences.

2.3 Empirical Review

2.3.1 Uptake of COVID-19 Vaccine

The uptake of COVID-19 vaccination is influenced by a wide range of factors, encompassing individual, social, cultural, and systemic elements. Understanding these factors is crucial for designing effective vaccination campaigns and strategies. To effectively promote COVID-19 vaccination, public health efforts must consider these multifaceted factors and tailor strategies to address the specific challenges and needs of different populations. It requires a combination of education, communication, access, trust-building, and policy interventions. Factors influencing the uptake of COVID-19 vaccination can include the vaccine hesitancy. Some individuals are hesitant or skeptical about the COVID-19 vaccines due to concerns about safety, side effects, or misinformation. Further Vaccine Efficacy and Safety may affect the confidence in the safety and effectiveness of the vaccines is a significant determinant of uptake.

Access and Convenience: The availability and accessibility of vaccination centers play a vital role. Ease of scheduling appointments and proximity to vaccination sites are critical while the healthcare Provider Recommendations from healthcare professionals can greatly influence individuals' decisions to get vaccinated. The availability of vaccines and the speed of distribution can affect uptake. Delays or shortages can lead to frustration and reduced willingness to get vaccinated.

Information and Communication: Accurate and clear information about the vaccines, their benefits, and the vaccination process is essential. Misinformation and disinformation can hinder uptake. Social Norm can affect the uptake. The behavior of friends, family, and peers can impact an individual's decision. Positive social norms and peer pressure can encourage vaccination. An individual's perception of their risk of contracting COVID-19 and the severity of the disease can influence their motivation to get vaccinated. The effectiveness of vaccination campaigns and the clarity of messages can impact public perception and behavior.

2.3.2 Perception and COVID 19 Vaccine Uptake

Perception plays a significant role in influencing the uptake of COVID-19 vaccination. People's beliefs, attitudes, and perceptions about the vaccines can strongly influence their

decision to get vaccinated or not. Some key aspects of how perception influences vaccine uptake.

Perceived Safety and Efficacy: Individuals are more likely to get vaccinated if they believe that the COVID-19 vaccines are safe and effective. Concerns about vaccine safety can deter people from taking the vaccine, while confidence in its effectiveness can motivate them to get vaccinated. An individual's perception of their own risk of contracting COVID-19 can influence their motivation to get vaccinated. Those who perceive themselves as at higher risk, either due to age, occupation, or underlying health conditions, are more likely to seek vaccination. The perception of how severe COVID-19 is can influence vaccination decisions. Understanding the potentially serious health consequences of COVID-19 can motivate individuals to get vaccinated to protect themselves and others. People's sources of information about COVID-19 vaccines can shape their perceptions. Information from trusted sources, such as healthcare professionals and reputable health organizations, can positively influence vaccine uptake. Conversely, misinformation or disinformation can lead to vaccine hesitancy. The attitudes and behaviors of friends, family members, and peers can strongly affect an individual's perception of the vaccine. Positive experiences and recommendations from trusted individuals can encourage vaccination.

Media coverage and public discourse about the vaccines can shape public perception. Balanced and accurate reporting can build confidence, while sensationalism or negative coverage can fuel vaccine hesitancy. Trust in the healthcare system, including healthcare providers and government agencies, is a crucial factor. When people trust the entities responsible for vaccine distribution and administration, they are more likely to get vaccinated.

Cultural beliefs and community values can influence perceptions of the vaccine. Public health messaging should respect cultural norms and engage community leaders to build trust. Past experiences with vaccines, either positive or negative, can shape perceptions of COVID-19 vaccines. People who have had positive experiences with vaccines in the past may be more inclined to get vaccinated. Fear of the unknown, fear of side effects, or general vaccine-related anxiety can negatively impact perceptions and deter vaccination.

Perceptions of how easy it is to access and receive the vaccine can influence uptake. Perceived barriers, such as difficulty scheduling appointments or long wait times, can discourage vaccination. Government policies and recommendations regarding the vaccine can shape public perception. Clear, consistent, and evidence-based guidance from authorities is essential. Perception of different vaccine brands or types can vary. Some individuals may have preferences or concerns about specific vaccines based on their perceived differences in safety and efficacy.

In summary, perception is a multifaceted aspect that plays a critical role in the uptake of COVID-19 vaccination. Public health campaigns should prioritize providing accurate information, building trust, addressing concerns, and leveraging positive social influences to promote vaccination and combat vaccine hesitancy.

A study conducted by Osur et.al (2022) on COVID-19 vaccination intention and attitudes of community health volunteers in Kenya; individual, and social factors, as well as vaccine-specific concerns on vaccination intention, were investigated using a cross-sectional research methodology. Nairobi, Mombasa, Trans Nzoia, and Kajiado counties in Kenya were chosen for the research based on urbanization levels. According to the findings of the research, 81% of community health volunteers in Kenya's four investigated counties planned to get the COVID-19 vaccine, while just 19% were hesitant or refused the vaccine. The research was done during the COVID-19 lockdown and under restrictions on mobility therefore telephone surveys were the most suitable. The current research study used interviews and other data collection tools to dispel preconceptions and issues that might have been overlooked by telephone surveys.

Shah et al. (2022) conducted a research on how perceptions and knowledge impacted adult COVID-19 vaccine fear in Kenya. Cross-sectional research commenced in 2021 among general adult patients at six different healthcare institutions in Kenya. The majority of participants agreed that vaccination was necessary to protect themselves and others against COVID-19 while 40.5% said they were reluctant to take the vaccine because of its perceived negative effects. Limitation of this study was that participants were recruited from a range of healthcare settings, both inside and outside the hospital, to begin the study. Due to this, it is possible that the sample may not reflect the whole

Kenyan population, especially rural Kenyans. Even though the questionnaires were anonymous, they were conducted in a hospital setting, so some patients may have been hesitant to disclose their true vaccination status out of fear of being stereotyped.

Osur et.al. (2021) undertook a study to assess COVID-19 vaccine health-seeking perceptions and attitudes among Kenyan youth and to identify determinants of COVID vaccine health-seeking attitudes on COVID-19 vaccination. The research used a mixed-method approach, including a cross-sectional survey and in-depth group discussions in 47 counties spread throughout urban, peri-urban, and rural areas. Online platform users between the ages of 18 and 35 were the subjects of the interviews. According to the study, vaccine fear was reported to be 58% among youth. The major reason for COVID-19 vaccination apprehension among youth was a lack of knowledge and worries about vaccine safety and efficacy. Other factors included a lack of faith in the Ministry of Health and the notion that mass vaccination is ineffective. This study was however limited to only youths as its target group and online platforms to conduct the interviews, focus groups, and questionnaires. The current research takes participants from a wider age range into account and does not depend just on digital sources.

2.3.3 Prior Exposure and COVID 19 Vaccine Uptake

Prior exposure to the coronavirus, either through previous infection or known as natural immunity, can influence the uptake of COVID-19 vaccination. Prior exposure to the virus can affect an individual's decision to get vaccinated through various ways inclusive of the following. Individuals who have previously been infected with COVID-19 may believe that they have developed natural immunity and are therefore less susceptible to reinfection. This perception of protection might lead some people to delay or forego vaccination. The perception of risk may vary among individuals who have had prior exposure to the virus. Some may perceive themselves as at lower risk of severe illness or reinfection, especially in the short term, which can influence their vaccination decisions. Prior exposure to the virus does not guarantee complete protection, and some individuals may develop vaccine hesitancy based on the belief that they are already immune. This can be a barrier to vaccination. Public health authorities typically recommend vaccination even for individuals with prior COVID-19 infection. Clear communication from these

authorities can help individuals understand the importance of vaccination even after prior exposure. Widespread vaccination, even among those with prior exposure, contributes to community immunity or herd immunity. Encouraging individuals with prior exposure to get vaccinated can help achieve higher vaccination rates in the population, reducing overall transmission. While prior exposure to the coronavirus can provide some level of immunity, it's essential for individuals to understand that vaccination offers additional benefits and can enhance their protection, especially in the context of evolving variants. Public health messaging should emphasize the importance of vaccination for both previously infected and uninfected individuals to achieve widespread immunity and control the spread of COVID-19.

In a study conducted by Pogue (2020), the study used questionnaires in a survey across the USA. The study revealed that those who were aware of many people with the disease were not likely to have intention of getting vaccinated than those who did not know anyone. The findings of the study also indicated that individuals who had a previous COVID-19 diagnosis or were unclear if they had a previous diagnosis had a lower likelihood of being vaccinated or having a strong desire to be vaccinated in comparison to people who had never had COVID-19 before. However, vaccination status was self-reported, leaving it open to the possibility of social desirability bias.

2.3.4 Government Policy and COVID 19 Vaccine Uptake

Government policies play a significant role in influencing the uptake of vaccination among the population. These policies can shape public perception, access to vaccines, and the legal and logistical framework surrounding vaccination campaigns. Various methods by the government policies can impact vaccination rates: When governments implement mandatory vaccination policies, requiring certain segments of the population to get vaccinated, it can significantly increase vaccine uptake. For example, healthcare workers or students may be required to receive certain vaccines as a condition of employment or enrollment in schools. Governments can require vaccination for specific activities or access to certain places. For instance, proof of COVID-19 vaccination may be mandated for international travel or entry into certain venues. This can serve as a strong incentive for individuals to get vaccinated. Some governments have introduced

digital or paper vaccine passports that allow vaccinated individuals to participate in various activities or travel freely. The existence of such programs can motivate people to get vaccinated to regain certain privileges. Government-led public health campaigns can provide information about the importance of vaccination, address concerns, and promote the benefits of immunization. Clear and consistent messaging from authorities can increase public confidence in vaccines.

Governments may provide subsidies for vaccines or offer incentives to encourage vaccination. This can include free vaccines, transportation assistance, or other tangible benefits. Communication and Information Policies by the government can affect the uptake of the vaccines. Governments can regulate the dissemination of vaccine-related information, ensuring that it is accurate and reliable. Efforts to combat misinformation and disinformation are critical to building trust in vaccination.

Investments in vaccination infrastructure, such as setting up vaccination centers, mobile clinics, and outreach programs, can enhance access and convenience for the public. Laws and regulations related to vaccination can influence uptake. For example, some jurisdictions may have laws allowing for exemptions from vaccination requirements based on religious or philosophical beliefs, which can impact vaccination rates. Government decisions regarding emergency use authorizations (EUAs) for vaccines can affect public trust. Transparency and rigorous evaluation of vaccine safety and efficacy are essential for building confidence in EUAs. Government agencies can engage in proactive outreach efforts, particularly in underserved communities, to educate residents about vaccines and provide convenient access.

During public health crises, government policies and communication strategies can significantly impact vaccination rates. Effective crisis management can prioritize vaccination efforts and address public concerns. Collaboration between government and private sector entities, including healthcare providers and businesses, can facilitate vaccination efforts and provide additional incentives. Government policies can shape the vaccination landscape by mandating requirements, providing incentives, ensuring equitable access, and communicating the importance of vaccination to the public.

Effective policy measures should be evidence-based, transparent, and considerate of public health needs and individual rights.

Schmelz and Bowles (2022) performed research on resistance to voluntary COVID-19 vaccination as a dynamic process. Three cross-sectional surveys were used to create the panel survey, done between the years 2020 and 2021. The results showed evidence of the first two waves of COVID-19 in Germany, proving that making the vaccine mandatory may have slowed vaccination rates. According to the findings, mandatory COVID-19 vaccine policies have had negative outcome on public trust, vaccine safety assurance, and human rights among other concerns.

Anjorin et al (2021) undertook an international research to find out possible coronavirus vaccination hesitancy among Africans. An online survey was devised and disseminated across 29 African countries using Google Forms. The survey asked respondents about the qualities they would want to see in a COVID-19 vaccination program where about 40% of people wanted vaccinations to be mandatory. Mandatory vaccination was observed in as much as it has the potential to speed up vaccine adoption and herd immunity. It might, however, diminish patients' confidence in healthcare personnel, jeopardize individual autonomy, and raise ethical concerns if it disproportionately affects the most vulnerable members of society.

2.3.5 Individual Factors and COVID 19 Vaccine Uptake

Individual factors play a crucial role in influencing the uptake of vaccination. People's personal beliefs, attitudes, and characteristics can significantly impact their decision to get vaccinated. Some key individual factors that influence vaccination uptake. An individual's perception of their own risk of contracting a particular disease can influence their motivation to get vaccinated. Those who perceive themselves as at higher risk are more likely to seek vaccination. Knowledge about vaccines, including their safety and effectiveness, is a significant determinant of vaccine uptake. Access to accurate information can positively influence vaccination decisions. Personal attitudes and beliefs about vaccines play a crucial role. Individuals with positive attitudes toward vaccines are more likely to get vaccinated, while those with negative beliefs or misconceptions may hesitate. The perceived benefits of vaccination, such as protection against illness,

prevention of transmission, and community immunity, can motivate individuals to get vaccinated.

Barriers to vaccination, such as concerns about side effects, access issues, or time constraints, can deter individuals from getting vaccinated. Previous experiences with vaccines, including any adverse reactions, can influence perceptions. Positive experiences may encourage vaccination, while negative experiences can lead to hesitancy. Beliefs about health and the importance of preventive measures can impact vaccine uptake. Those who prioritize health and prevention are more likely to get vaccinated.

Cultural and religious beliefs can influence vaccine decisions. Some individuals may have religious objections or cultural concerns that affect their choices. The influence of friends, family, and peers can be significant. Recommendations from trusted individuals can encourage vaccination, while negative attitudes within one's social circle can deter it. Psychological factors such as fear, anxiety, or vaccine-related phobias can influence vaccination decisions. Effective communication can help address these concerns. The ease of accessing vaccination services can impact uptake. Convenient locations, flexible hours, and minimal wait times can encourage vaccination.

Socioeconomic factors, including income and education, can influence vaccine uptake. Individuals with higher socioeconomic status may have greater access and resources for vaccination. Age, gender, and other demographic factors can affect vaccination rates. For example, vaccination recommendations may vary by age group. Peer pressure and the behavior of close contacts can influence individual decisions. People may be more likely to get vaccinated if they see friends and family doing the same. Media coverage and information sources can shape perceptions of vaccines. Accurate and balanced reporting is essential to combat vaccine misinformation. Understanding these individual factors is essential for designing tailored vaccination campaigns and interventions that address specific concerns and motivations within different population segments. Public health efforts should aim to provide accurate information, build trust, and address barriers to vaccination.

A study conducted by Leng (2021) with an objective to provide individual preferences for COVID-19 vaccinations in China, and to assess the factors influencing vaccination

decision-making to facilitate vaccination coverage. The study was conducted across six Chinese provinces selected by the stratified random sampling method and the choice of the vaccination was through seven attributes: vaccine effectiveness, side effects accessibility, number of doses, vaccination sites, duration of vaccine protection, and proportion of acquaintances vaccinated. Conditional logic and latent class models were used to identify preferences. Education as a factor in this study was as follows: Low education as from nine years of schooling and below was 30.59%; Medium education as from 9 years to 12 years of schooling was 42.96% and High education that is 12 years of schooling and above was 26.45%. The study used a random sampling method hence no targeted individuals as from these study questioners would be used and specific people targeted hence more accurate result may be obtained. The current study seeks to examine the uptake of COVID- 19 vaccination among the Boda-Boda riders.

A research conducted by Elhaida et al., 2021 seeking to provide data and vital information for the Malaysian government on strategies aimed at increasing public understanding on uptake of COVID-19 vaccine, found out that, to date, there existed no published article about the level of knowledge of the COVID-19 vaccine among the Malaysian population. From a study conducted earlier, there was evidence of poor knowledge being a hindrance to uptake of the HPV vaccine in Malaysia. Inadequacy of Knowledge on COVID-19 vaccine was attributed to poor education background, poor socioeconomic status and picking information from peer layman while it was notable that people associated with high education level, high income or high risk individuals were well acquitted to COVID-19 vaccine. The major limitation to this study is that having being conducted on an online sample, there could have been chances that people in remote areas were not involved. To counter this challenge, a study need to be done that bares in mind people who cannot access online platforms by using questionnaires to obtain the data.

A study conducted by Pogue et al. (2020) aimed to investigate the acceptability of COVID-19 vaccines and its predictors in addition to the attitudes towards these vaccines among the public and reasons for the decline of vaccination. This study conducted an online survey from June to September 2020, collecting data from 26,852 adults aged 19

or older on six continents as part of 60 nationally representative surveys due to the difficulties in doing in-person research during the ongoing COVID19 outbreak. Methodologies for online and telephone surveys were employed. In addition to examining people's knowledge, attitudes, and acceptance of vaccine confidence around the world, the study also polled people on a national level. A variety of elements, such as reliable sources, and actions are taken in search of information. Further research should investigate the link between political polarizations, to better comprehend these intricate. The current study aims to examine the relationship between knowledge in relation to the uptake of COVID 19 vaccination in the Kenyan context

A study by Sambo (2020) found out that religious fanaticism is a significant aspect in aiding vaccine acceptance in African countries with communities that have developed strong religious values over a long period of time. Though many religious organizations support the vaccination idea, hesitancy has been reported at individual clergy level. It is important to note that religious leaders have massive influence over their followers thus their statements can greatly reduce or increase the likelihood of vaccine acceptability and subsequent uptake if they were to be involved in mobilization processes of the masses to get vaccinated against COVID-19.

2.3.6 Vaccine Accessibility and COVID 19 Vaccination Uptake

Accessibility to COVID-19 vaccination is a critical factor that strongly influences the uptake of vaccination. Ensuring easy and equitable access to vaccines is essential for achieving widespread immunization and controlling the spread of the virus. Accessibility of vaccines can have various impacts vaccination uptake. The physical distance to vaccination sites plays a significant role in uptake. When vaccination centers are conveniently located, individuals are more likely to get vaccinated.

Availability of Vaccination Site. The number of vaccination sites and their distribution within communities is essential. Having multiple sites, including mobile clinics and pop-up vaccination centers, can improve accessibility. Offering flexible hours of operation, including evenings and weekends, accommodates individuals with varying schedules and work hours. Simplified and user-friendly appointment scheduling systems, including online and phone options, reduce barriers and encourage individuals to register for

vaccination. Allowing walk-in vaccinations without appointments can remove a significant barrier for those who may have difficulty scheduling in advance or using online systems.

Offering home vaccination services for individuals who are homebound or have mobility issues ensures that everyone has access to vaccination. Making vaccine-related information available in multiple languages and formats, including accessible formats for individuals with disabilities, ensures that diverse populations can access essential information. Ensuring equitable access for underserved and vulnerable populations, including racial and ethnic minorities, low-income communities, and rural areas, is critical to addressing health disparities. Outreach efforts that proactively engage communities, provide information, and assist with vaccination appointments can increase accessibility and trust.

Prioritizing vaccination in settings with vulnerable populations, such as nursing homes, correctional facilities, and homeless shelters, addresses unique accessibility challenges. Providing assistance to individuals who may face language barriers or technology challenges during the registration and vaccination process enhances accessibility. Reducing or eliminating costs associated with vaccination, including fees or insurance requirements, improves accessibility for those with limited financial resources. Raising public awareness about the availability of vaccines and vaccination sites is crucial to ensuring that individuals know where and how to get vaccinated. Effective management of vaccine supply to prevent shortages and ensure consistent availability is vital for accessibility. In summary, accessibility to COVID-19 vaccination is a fundamental determinant of vaccine uptake. Governments and healthcare systems must consider the diverse needs and challenges of their populations and implement strategies to make vaccines as accessible as possible. Addressing accessibility issues helps remove barriers and increases the likelihood that individuals will get vaccinated, contributing to achieving herd immunity and controlling the spread of the virus.

A study conducted by Rotenberg and Cooper (2001) argued that people with disabilities must be prioritized because the overarching goal of COVID-19 vaccination programs is to reduce mortality and morbidity. Despite alarming infection and mortality rates, as well

as advocacy from the WHO, Disabled People's Organizations and disabled advocates governments and policymakers have frequently failed to explicitly include this population in vaccination programs. Even in countries where people with disabilities are prioritized, COVID 19 vaccine accessibility is still a challenge. These obstacles, however, are not insurmountable. The United Kingdom's specialized, low-sensory clinics for vaccinating people with intellectual disabilities, as well as campaigns to reach people with learning disabilities, have bridged the significant vaccine gap between the general population and people with learning disabilities. Unfortunately, these clinics and accessible strategies are the exception rather than the rule. This is a phenomenon that is and may be even be exaggerated in some cases hereby necessitating a look into the context of Kenya and especially among low and middle income areas of the country.

Chen and Wang (2021), in a study analyzed the factor of geographical distribution of healthcare facilities, patients' residential locations, and transportation resources as an influence to physical access to healthcare services (e.g., car ownership, access to public transit). Healthcare accessibility to COVID- 19 vaccination has long been assessed using a variety of spatial measures, including service density, proximity to healthcare centers, and more complex spatial interaction models. While vaccination campaigns are underway, a promising research agenda is to investigate the spatial complementarity between vaccine supply and demand from a geographical standpoint, such as determining whether the distribution of vaccination clinics and dose allocations can accommodate the unequal disease landscape and whether vaccination gaps exist in certain high-risk communities.

A study conducted by Krieger (2021) posited that despite the global equity pledges, by the end of April 2021, three-quarters of the 1 billion COVID-19 vaccine doses administered globally had been administered in only ten countries while the African countries only got 2% of all doses administered globally, corresponding to a coverage of only 1.4% of the continent's population. The result is a limited pool of vaccines to choose from and a dependency of African countries to vaccines donations by the governments of China, Russia, and India to launch national COVID-19 immunization campaigns. The approach has further highlighted the regional disparities with eight countries (Burkina

Faso, Burundi, Chad, Central African Republic, Eritrea, Madagascar, Tanzania, and Sahrawi Republic) had yet to receive any supply and begin immunization, whereas Seychelles, with nearly 60 percent of its population fully vaccinated, is ranked second globally, only behind Gibraltar. With the knowledge of the disparity is critical to understand the local disparities of vaccine availability in the country employing mixed research design to understand its influence on vaccination.

2.4 Conceptual Framework

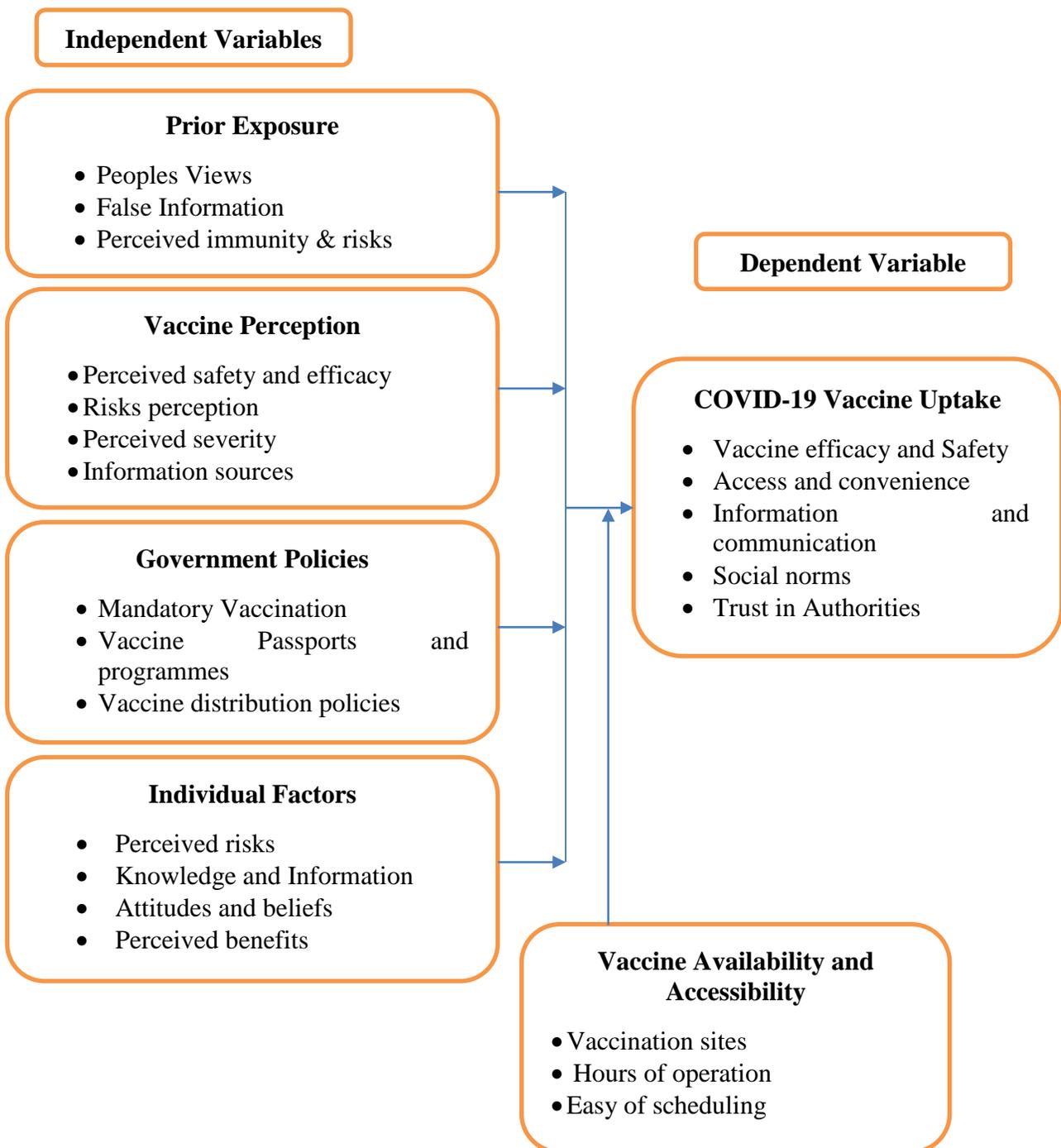
A conceptual framework is a structured way of organizing and presenting ideas, concepts, theories, or variables in a visual or written format. It provides a clear structure for understanding the relationships and connections between different elements of a topic or research area. Overall, a conceptual framework serves as a roadmap for understanding, analyzing, and discussing complex topics. It provides a foundation for research, analysis, and decision-making by visually representing the relationships and interactions between key elements.

The study conceptualizes a number of factors associated with COVID-19 intake. These factors include knowledge, religion, occupation and prior virus exposure. These factors are treated as independent variables. COVID-19 intake is the dependent variable. According to Shah et al. (2022), perception is one the key factors that influence decision a person decides to take up COVID-19 vaccine. How ones perceive a situation and acts upon it is heavily influenced by the person's attitude and knowledge one has on the subject matter.

Prior exposure to anything gives firsthand experience on an issue that has impacted a person. Exposure to certain subjects such as disease have ripple effect as the experience determines ones undertaking when faced with the same or a similar situation, this case applies to of area of study as respiratory diseases affect nearly all the persons of the world on different scales. Policies are formulated with many aspects in mind to safe guard the people against impeding threats or enhance standings. Vaccine accessibility plays a part in the uptake of COVID-19 vaccination. Presence of enough vaccines in local health centers is key to increase the rates of vaccination in any areas

Figure 2.1:

Conceptual Framework



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The research design and methodology for this study are presented in this chapter. The following subsections comprise the chapter: study design, target population, sample and sampling technique, description of research instruments, and data analysis procedure.

3.2 Research Design

Cross-sectional survey design was used and the outcomes predicted to be statistically representative and cross-sectional survey design approach was considered appropriate for this study as it involved data collection at one particular single time and the researcher does not manipulate the variables or arrange the events that follow. The choice of this research design was based on the fact that the study collected, analyzed and interpreted data on an existing phenomenon without manipulation on the factors influencing the uptake of covid-19 vaccination among boda-boda riders in Mathare Sub-County, Kenya

3.3 Study Site

The study was conducted in Mathare Sub-County which is situated in Nairobi County. The research was conducted at the various Boda-Boda Bus stops within Mathare sub-county a total of 15 bus stops located at designated areas within the slum.

3.4 Target Population

According to Kumar (2019), identifies a target population as a group for which the researcher wishes to draw generalization upon. The targeted study population consisted of Boda-Boda riders within Mathare sub county. The population of Boda-Boda cyclist in Mathare Subcounty are not well tabulated and they included both males and females that range between 20-45 years.

3.4 Sample Size and Sampling Procedures

3.4.1 Sampling Procedures

The study used a probability sampling approach, specifically simple random sampling. This approach allowed the researcher to swiftly reach the desired sample, saving time, money, and effort (Teddlie & Tashakkori, 2009). The respondents were members of the specific Boda-Boda bus stop at the different locations within Mathare sub-county, Nairobi. From each bus stage a total of 9 Boda-Boda riders were selected randomly.

3.4.2 Sample Size

Since the target population of Boda-Boda riders in Mathare is unknown. To arrive at a representative number of respondents, this study used the following sample size formula for an infinite population. (Godden, 2004):

$$SS = \frac{Z^2 \times p(1-p)}{M^2}$$

Where:

SS= Sample Size for infinite population,

Z = Z value (e.g. 1.96 for 95% confidence level)

P = population proportion (0.1(10%)).

M = Margin of Error at 5% (0.05)

$$\frac{1.96^2 * .1(1-.1)}{.05^2}$$
$$\frac{3.8416 * .09}{.0025}$$
$$\frac{0.345744}{.0025}$$
$$n = 138$$

3.5 Inclusion and Exclusion Criteria

3.5.1 Inclusion Criteria

The study included all Boda-Boda Riders specifically working within Mathare sub – county located at the 15 Boda-Boda Bus stages. The riders were of age groups between 17-45 years old and were all given consent forms to sign as proof of voluntary agreement to participate in the study.

3.5.2 Exclusion Criteria

All Boda-Boda Riders not working within Mathare Sub- County or any other riders who are not Boda-Boda Riders. All other residents of Mathare sub-county who are not Boda-Boda Riders and any other motorists.

3.6 Research Instrument

3.6.1 Questionnaire Method

Questionnaire was used as the key data collection tool. Questionnaire was used because it was friendly in terms of saving time; it was self-administered and is able to reach out to a huge number of participants. The questionnaire was used to collect data from all the sampled Boda-Boda riders from Mathare. The items in the questionnaire were structured. This is ensured that in-depth data is collected regarding the effect of corona virus vaccination. Questions were also based on the Likert scale. The items on the Likert scale are categorized as follows: Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), and Strongly Disagree (SD) (SD). The scale aided the researcher in determining the extent to which respondents agreed on various issues related to the research objectives under consideration. The tool was arranged into various sections based on study objectives. These sections covered background information and the study objectives.

3.6.2 Pre-test Study Tool

The research instruments were pre- tested in order to standardize them before the actual study. In this study, the pre-test study was done using selected Boda-Boda riders using simple and random sampling procedures from Ruaraka Sub-County, Kenya. This aided in identifying potential challenges that respondents may experience and determining whether the questions in the research instrument produce the necessary data for the study.

Using simple random sampling, the researcher selected 30 respondents, which equaled to 22 percent of the study sample size of 138 subjects. The respondents were Boda-Boda riders selected randomly from 5 different Boda-Boda Bus stages within Ruaraka sub-county, Nairobi each stage having 6 riders. Following the collection of instrument responses, the instruments were corrected and adjusted to increase their dependability.

3.7 Validity and Reliability of the Research Instruments

3.7.1 Validity of the Research Instruments

The researcher undertook content validity to confirm that the instruments covered the study's topic matter as intended. Validity was the extent to which the scores from a measure represent the variable they are intended to. It was a judgment based on various types of evidence.

3.7.2 Reliability of the Research Instruments

The split half approach was utilized by the researcher to determine the consistency of the measuring instruments in returning the same measurements when employed at different times, the study used a 49-items questionnaire so as to establish the reliability with the help of SPSS.

3.8 Data Collection Procedure

The primary data was collected using the questionnaire and was done in Mathare Sub-County. Data collection took three weeks to be completed. A total of 145 questionnaires were administered and 140 of them well filled. To display the quantitative data collected by questionnaire, descriptive and inferential statistics was employed. The findings were prepared in terms of frequencies and percentages, as well as tables and figures. Data coding was done through the Statistical Package for the Social Sciences version 21. Chi-square and logistics analysis was done to compute Inferential statistics.

3.9 Data Analysis Procedure

This section describes how data collected was analyzed. The collected data was first keyed in to the IBM SPSS. This involved creation of unique codes for all the variables, then keying in the requisite data collected during the survey which was further processed and recoded to facilitate statistical analysis. Inferential statistics involved the use of the logistic regression, mainly used to determine the cause and effect relationship existing

among variables. Ideally, logistic regression is used when the dependent variable is dichotomous or binary in nature. In this study the dependent variable is uptake of COVID-19 vaccinations which was coded into two mutually exclusive outcomes namely; ‘Ever Vaccinated’ and ‘Never vaccinated’.

The logistic regression is mathematically expressed as;

$$f(p) = \frac{1}{1 + e^{-p}} \dots\dots\dots 1$$

We can simplify equation 1 as follows:

$$\text{logit}(p) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots\dots + \beta_n X_n \dots\dots\dots 2$$

Where:

p = probability of presence of the characteristic of interest

β_0 = representation of the reference group

$\beta_1, \dots\dots\dots \beta_n$ = the regression coefficients associated with the reference group

$X_1, \dots\dots X_n$ = The covariates of interest.

3.10 Ethical Considerations

The participants were assured of their security and informed on the purpose of the research. In terms of ethics, research standards and regulations were observed such as: Application for research permit from the Kenya Methodist University and National Commission for Science, Technology and Innovation permit number - License No: NACOSTI/P/23/22848.

The personal identity of a participant and anonymity of the respondent was respected in this study; finally, the researcher informed in advance the parish authorities and other participants who participated in the study and obtain their consent. Participants were informed to feel free to disengage during the interview as per their wish.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

Data analysis and discussion of the findings on factors influencing the uptake of COVID-19 vaccination among Boda-Boda riders in Mathare Sub-County, Kenya is presented in frequencies, percentages, tables and figures with a focus on: Demographic information, COVID 19 vaccination uptake, Individual factors, Perception, Influence of prior exposure, Policies, Vaccine accessibility and influence of government policies on uptake of COVID-19 vaccination.

4.2 Response rate

Response rate to the distributed questionnaires was 100% this was due to the method of questionnaire distribution which involved face to face and involved direct selection of the riders at various bus stops and later assisting them with reading the questionnaires, issuing them with writing materials e.g. Pens without leaving the data collection materials behind for collection later. For those who were not able to read and write, the researcher assisted them with reading the questionnaires in a language they could understand especially the Kikuyu, Kiswahili and Luo languages mostly used in the area.

4.3 Reliability results

In order to determine the reliability of the instrument, the study used a 49-items questionnaire so as to establish the reliability with the help of SPSS. The data to determine reliability was collected from 30 respondents who were not part of the final sample. The application comes in handy in processing the random subsets of items and in computing the resulting correlations. Table 4.1 shows the output of reliability statistics.

Table 0.1***Cronbach's alpha reliability coefficients***

Variables	No. of Items	Cronbach's Alpha
Individual Factors	12	.687
Prior exposure on COVID-19	16	.757
Perceptions of COVID-19 vaccination	12	.626
Policies on COVID-19 vaccination Uptake	8	.758
Vaccine accessibility	6	.776
COVID 19 vaccination uptake	10	.646
Overall	62	.726

The reliability was computed with the help of SPSS using Cronbach's alpha for a 62-items questionnaire. Upon computation, alpha of .726 was obtained. According to Taber, (2018) Cronbach alpha values of 0.7 or higher indicate acceptable internal consistency thus questionnaire was accepted as reliable.

4.4 Demographic Information

The study ought to investigate the demographic characteristics of the respondents that took part in the study. The demographic characteristics sought included gender, age, marital status and education level of the Boda-Boda riders who took part in the study. The researcher sought to examine the sex distribution of the Boda-Boda riders who took part in the study. An overwhelming majority 133 (95%) of the Boda-Boda riders who took part in the study were male while a few 7 (5%) of them were female. This indicated that the female gender has not entirely embraced Boda-Boda industry as a major source of income for the family especially in Mathare sub-county. This therefore means the findings of this research study would therefore be gender biased and would therefore have majority inputs from the male riders. However, the 7 female riders were equally given the opportunity to give their feedbacks through answering the questionnaires without discrimination.

The researcher sought to examine the age-bracket of the Boda-Boda riders who took part in the study. The majority 99 (70.7%) of the Boda-Boda riders who took part in the study ranged between the age of 17-30, slightly a quarter of them 38 (27.1%) ranged between 31-45 and a few of them 3 (2.1%) were of 45 and above years of age. This clearly shows a vast majority of the respondents were of youthful age. This is economically productive age group very essential for socio-political and economic

development of any country. It is with this background that the researcher felt it is extremely essential to assess the factors that impact their uptake of COVID-19 vaccination considering the heavy economic burdens that they likely to face in case of getting infected with the disease both to themselves and their families and also the customers that they carry.

Table 0.2

Demographic information

Demographic Variables		Frequency (%)
Gender	Male	133(95)
	Female	7(5)
Marital Status	Single	60(43)
	Married	79(56.3)
	Others	1(0.8)
Education Level	University level	14(10)
	College level	54(38.6)
	Secondary level	69(49.3)
	None	3(1.4)
Age Bracket	Above 45	3(2.1)
	31-45	38(27.1)
	17-30	99(70.7)
	0-16	0(0)

The researcher sought to examine the marital status of the Boda-Boda riders who took part in the study. More than a half 79 (56.3%) of the Boda-Boda riders who took part in the study were married; slightly less than a half 60 (43.0%) of the respondents were single while a few of them 1 (0.8%) were others e.g. divorced. Majority of the riders being married is very significant factor for this research study since it introduces the fact of additional responsibility on the part of the riders by protecting the family members from acquiring the COVID-19 disease during their usual work which involves having their customers with unknown COVID-19 status sited at a very close extremity to them therefore putting them at a very high risk level of contracting COVID-19 infection. It is therefore important to find out whether the riders

understand the risk they would be putting their loved ones due to their hesitancy to receive the jab.

The researcher sought to examine the education level of the Boda-Boda riders who took part in the study. With regards to educational background, slightly less than a half 69 (49.3%) of the respondents was form 4 leavers and 54 (38.6%) were college graduates. Another 14 (10%) had university level education. The educational findings of this study are quite significant since it helps to quantify the knowledge gap and understanding of the study topic by the respondents. Majority of the respondents more than half of the respondents were form 4 leavers hence it means there was need for more educational engagements with them in order for them to have a deeper understanding of COVID-19 vaccination and all factors associated with it.

4.5 COVID- 19 Vaccination Uptake

The study sought to examine the factors influencing the uptake of COVID-19 vaccination among Boda-Boda riders in Mathare sub-county, Nairobi, Kenya. Various items were presented to the riders where they were asked to indicate their opinion on whether they strongly disagreed, disagreed, neutral, agreed or strongly agreed as per vaccination uptake. The respondents were asked whether they have received COVID-19 vaccine. Their distribution is summarized in table 4.3.

Table 0.3

Vaccine received

	Frequency	Percent (%)
NO	105	75.0
YES	35	25.0

A vast majority 105 (75.0%) of the respondents indicated NO while a quarter 35 (25.0%) indicated YES. This shows that most of the Boda-Boda riders had not been vaccinated. This finding agrees with the finding by Salai, et al (2022) that found out that indeed a large population of the people were not willing to participate in the vaccination exercise against COVID -19 despite spirited efforts put in place by the governments including issuing the vaccine for free, a mystery which this study would wish to unravel.

The study was further interested in the type of vaccine received for those who had been vaccinated thus 35 (25%) of the respondents. Table 4.4 shows the distribution of the respondents by the type of vaccine received.

Table 0.4

Type of vaccine received

Type of Vaccine	Frequency	Percent (%)
Moderna	5	14.29
Johnson	20	57.14
AstraZeneca	10	28.57

Majority of the respondents 20 (57.14 %) took Johnson Johnson vaccine which requires only one jab of injection while 10 (28.57%) took AstraZeneca which require 2 injections and a booster in order to complete full immunity. A few of respondents 5 (14.29 %) took Moderna vaccine which was the last vaccine to be introduced in Kenya one month, as of the time of data collection requiring 2 doses to achieve full immunity. This implies that Johnson Johnson's vaccine was the most preferred vaccine over the other vaccines. Therefore, from the study we can conclude that 20 (57.14%) of the respondents who received Johnson Johnson were fully vaccinated as per WHO COVID-19 vaccination guidelines. The study further sought to examine the number of doses the respondents had received. Table 4.5 presents the summary of distribution of the respondents by the number of dosage received.

Table 0.5

Number of doses received

No. of Dosage Received	Frequency	Percent (%)
1	21	60
2	14	40

Table 0.6***Responses on vaccination***

Statement	SD		D		U		SA		A	
	f	%	f	%	f	%	f	%	f	%
I have not been fully vaccinated	22	15.8	12	8.6	15	10.8	66	46.8	25	18.0
I will not be taking the third booster of COVID-19 vaccine	21	15.1	14	10.1	14	10.1	63	44.8	28	20.1
I took a vaccine that requires only one shot (e.g. Johnsons and Johnsons)	58	41.4	39	27.9	6	4.3	21	15.0	16	11.4

When the respondents were asked to indicate the number of doses they had undertaken, more than a half 21 (60%) of the vaccinated respondents indicated they had received 1 dose while more than a third 14 (40%) on the other hand had received two doses of vaccines. This means that most of the vaccinated respondents had not taken the second dosage as compared to the first dosage. When the respondents were asked to indicate whether they were not fully vaccinated, less than a third of them 34 (24.4 %) of the respondents indicated that they had been fully vaccinated, while a few of them 15 (10.8%) were not decided. Further, slightly less than two third of the vaccinated respondents 91 (64.8%) confirmed that indeed they have not been vaccinated. This shows that majority of the respondents were not vaccinated and out of those who were vaccinated still about 15 respondents had not made up their minds on going to take the second dose of vaccination in order to achieve full vaccination as per the guidelines by the ministry of health.

Furthermore, the respondents were asked whether they would be taking the third booster to curb the virus. A quarter of the respondents 35 (25.2%) agreed that they would be taking the booster as advised by the government in order to achieve full immunity while a few of them 14 (10.1%) were not yet decided. Slightly less than two third 91 (64.7%) of the respondents were strongly against the booster majority of whom had not taken any vaccine as at the time of data collection. With regards to how many shots those vaccines that the respondents took especially those who took vaccines that require 1 shot of injection, less than a quarter 21 (15%) of the

respondents indeed confirmed they had taken the vaccine that only required one shot. In this case slightly above two third 119 (85%) of the respondents confirmed that they did not partake the vaccine that only required one shot, However, out of the 119 (85%) that did not receive the vaccine requiring 1 shot , 105 (75%)of the respondents did not receive any vaccine at all hence only 14 (10 %) had received the other forms vaccines and stuck with that decision while a few of them 6 (4.3%) were not yet decided as to whether they wanted to 1 shot injection or multiple injection vaccine.

This study finding agrees Lazarus *et al* and Wong *et al* found out that more individuals exhibited higher rejection rates for a highly effective vaccine with unknown side effects (44%) than when faced with a less effective vaccine with lesser side effects (38%). According to the Centers for Disease Control and Prevention (CDC) clinical trials, the efficacy of Oxford/AstraZeneca is between 76 and 86 per cent, while that of Johnson and Johnson is 66.3 per cent while Moderna and Pfizer-Biotech are rated at 94.1 per cent and 95 per cent, respectively (mkahenda@standardmedia.co.ke) however the respondents in this study did not care about the efficacy of each particular vaccine but more emphasis was on the convenience of receiving the jab. Most people preferred Johnson Johnson since you are only required to come ones for the jab hence saving on time they have to queue in hospitals waiting for the jab considering that the nature of their job any wasted time would lead to unprecedented revenue losses. The immediate side effects of the vaccines as at the point of injection could also be a contributing factor as to why many of the respondents opted for Johnson Johnson which was reported to have non or very minimal side effects if any as opposed to the other types of vaccines which in many cases have numerous side effects which sometimes would compromise their daily activity as on the day of vaccination.

4.6 Influence of Individual Factors on COVID 19 Vaccine Uptakes

The study sought to examine the influence of individual factors on the uptake of COVID-19 vaccine among Boda-Boda riders in Mathare. Table below shows the distribution of the respondents by individual factors on the uptake of COVID-19 vaccine.

Table 0.7***General individual factors on the uptake of covid-19 vaccine***

Statement	SD		D		U		A		SA	
	%	f	%	f	%	f	%	f	%	f
I'm old enough to make a decision against COVID-19	1.4	2	-	0	0.7	1	51.1	72	46.6	65
I am grouped as a vulnerable individual	15.8	22	56.1	79	5.8	8	16.5	23	5.8	8
Vaccines boosts one immunity against COVID-19	6.5	9	5.8	8	8.0	11	50.0	70	29.7	42
I need at least two doses of Astra Zeneca vaccine being offered in my local hospital	30.9	43	22.1	31	13.2	18	24.3	34	9.8	14
As an adult I am allowed to take COVID-19 vaccines	2.2	3	2.2	3	5.1	7	47.4	66	43.1	60

An overwhelming majority 137 (97.9%) of the respondents posited that they were old enough to make decisions on COVID 19 vaccination. Slightly more than two thirds 101 (71.9%) of the respondents did not want to be classified as a vulnerable individual. Regarding the personal knowledge on COVID 19 being a serious illness an overwhelming majority 122 (87.1%) of the respondents acknowledged that COVID-19 is a serious illness, slightly less than two thirds, 89 (63.3%) of the respondents indicated that they required the vaccine to prevent COVID 19 infection. With regards to whether they were positive that vaccine boosts ones' immunity, a vast majority 112 (79.7%) of the respondents agreed with the statement. Slightly more than a half 74 (53%) of the respondents did think they needed at least two doses of Astra Zeneca vaccine. An overwhelming majority 127 (90.5%) of the respondents indicated that as adults they were allowed to take the COVID -19 vaccine.

Cross-sectional research commenced in 2021 among general adult patients at six different healthcare institutions in Kenya. The majority of participants agreed that vaccination was necessary to protect themselves and others against COVID-19 while 57(40.5%) said they were reluctant to take the vaccine because of its perceived negative effects. In the same line, a research conducted by Elhaida et al., 2021 sought to provide data and vital information for the Malaysian government on strategies aimed at increasing public understanding on uptake of COVID-19 vaccine, the

findings agreed with this study with its results indicating that there was evidence of poor knowledge being a hindrance to uptake of the HPV vaccine in Malaysia which agrees with this research finding.

According to the study findings by Kutasi et al. (2022) on understanding hesitancy with revealed preferences across COVID-19 vaccine types. The existing literature on vaccine hesitancy considers the act of taking a vaccine as a decision under uncertainty, where the individual has to compare the potential risks and benefits of getting vaccinated. As a result, the personal beliefs and the trusted source of information, besides demographic and socio-economic characteristics play a critical role in vaccine hesitancy. Previous literature shows that individuals who trust the public authorities and the scientists tend to be less hesitant while those who believe in conspiracy theories tend to be more hesitant against the vaccine uptake. The study sought to examine how religion influenced the uptake of COVID-19 among Boda-Boda riders in Mathare sub-county Nairobi County. The information is represented in Table 4.8.

Slightly less than two thirds 88 (63.2%) of respondents were unsure of the churches contribution in mobilizing members to get vaccinated. Of the respondents only slightly more than a quarter 40(28.9%) thought that the church was helpful in mobilizing its members to get vaccinated. However, a few 11(7.9%) of the respondents did not think the church was helpful. The majority of the respondents indicated that their faith did not prohibit them from taking up of the COVID 19 vaccine, however, the church and Muslims did not actively encourage their followers to get vaccinated instead adopting COVID 19 regulation measures such as social distancing in the places of worship in the line. From the table an overwhelming majority 120 (85.5%) of respondents indicated that churches in Mathare observed COVID 19 regulations.

Table 0.8***How religion influenced the uptake of COVID-19***

Statement	SD		D		U		A		SA	
	f	%	f	%	f	%	f	%	f	%
The Kenyan Church leaders were very helpful in mobilizing church members and local to vaccinate against COVID-19	4	2.6	7	5.3	88	63.2	15	10.5	26	18.4
Many churches in Mathare observed COVID-19 regulations such as social distancing going a long way in boosting preventive measures	4	2.6	5	3.9	11	7.9	98	69.7	22	15.8
Muslim leaders in Mathare mobilized Islamic community leaving in Mathare to go for vaccination with them leading from the front to 1st receive the COVID-19 jab	0	-	10	7.1	105	75.0	10	7.1	15	10.8

Only a few 9 (6.5%) did not think the churches deployed preventative measures against COVID 19. A study by Sambo (2020) posited that religious fanaticism is an important factor in determining the likelihood of COVID-19 acceptance in African countries. African communities have developed strong religious values over time, which can be equated with the concept of religious fanaticism. While major faith institutions typically support the principles underlying vaccination's public health goals, hesitancy has been documented at the level of individual clergy, and concerns have been raised across some religious organizations. An overwhelming majority 120 (85.8%) of respondents indicated that they were unsure that Muslim leaders mobilized the Mathare Islam community to get COVID 19 vaccination. Of the respondents only a few 25 (17.8%) thought the Muslim leaders mobilized their members to get vaccinated.

This study agrees with a study by Sambo (2020) posited that religious fanaticism to be an important factor in determining the likelihood of COVID-19 acceptance in

African countries. In his observation, religious leaders have had enormous influence over their Christians/followers in recent years. They have frequently assisted their followers in their health-seeking behaviors. As a result, their statements can significantly reduce or increase the likelihood of vaccine acceptability and uptake. Nonetheless, some religious leaders have expressed concern that COVID-19 vaccination plans in Africa may create an "ethical quandary" for their followers.

Religion and science must work together to achieve an effective public health prevention response, such as COVID-19 vaccination because the role of religious leaders cannot be overstated. Despite majority of the respondents acknowledging that COVID 19 was a serious illness, know that vaccines boost one's immunity and many indicating that as adults they have the authority to get vaccinated, less than two thirds of them indicated they required to get vaccinated and half of them stating the lack of need to get a second shot of Astra Zeneca vaccine. This provides a proof that the respondents had limited knowledge on the uptake of the vaccines. In the same line, research conducted by Elhaida et al., 2021 sought to provide data and vital information for the Malaysian government on strategies aimed at increasing public understanding on uptake of COVID-19 vaccine whose results agree with the study findings indicating that there was evidence of poor knowledge being a hindrance to uptake of the HPV vaccine in Malaysia. Inadequacy of Knowledge on COVID-19 vaccine was attributed to poor education background, poor socioeconomic status and picking information from peer layman while it was notable that people associated with high education level, high income or high risk individuals were well acquitted to COVID-19 vaccine.

4.7 Perception of Covid-19 Vaccination

The study sought to examine the perception of COVID-19 vaccination among Boda-Boda riders and how the perception influenced the uptake of COVID-19 vaccination. Slightly above two third 99(70.7%) of the respondent agreed that COVID-19 vaccination is an effective way of controlling the COVID-19 virus. Slightly more than two third 97(69.1%) of boda-boda riders in Mathare agreed they always believe that people need to take the vaccine although one can still get the COVID-19 virus after vaccinations and 32(23%) disagreed. Slightly above two third 99 (70.7%) of the

respondent disagreed that COVID-19 vaccination had been rapidly developed and approved without proper testing done.

Table 0.9

The general perception of COVID-19 vaccination among Boda-Boda rider

Statement	SD		D		U		SA		A	
	f	%	f	%	f	%	f	%	f	%
I believe that COVID-19 vaccination is an effective way of controlling the COVID-19 virus	19	13.6	13	9.3	9	6.4	72	51.4	27	19.3
I always believe that people need to take the vaccine although one can still get the COVID-19 virus after vaccinations	17	12.2	15	10.8	11	7.9	52	37.4	44	31.7
I always believe that COVID-19 vaccinations have been rapidly developed and approved too soon without proper testing done	35	25.0	64	45.7	13	9.3	13	9.3	15	10.7
I believe that COVID-19 Vaccination is adequate protection against COVID-19 Infection	11	7.9	29	20.9	52	37.4	31	22.3	16	11.5
I believe that pharmaceutical companies are producing safe and effective COVID-19 vaccines used in Kenya.	25	17.9	12	8.6	14	10.0	77	55.0	12	8.6
COVID-19 has directly affected my income	10	7.1	8	5.7	11	7.9	24	17.1	87	62.1

Osur et.al (2021) undertook a study to assess COVID-19 vaccine health-seeking perceptions and attitudes among Kenyan youth and to identify determinants of COVID vaccine health-seeking attitudes on COVID-19 vaccination. The research used a mixed-method approach, including a cross-sectional survey and in-depth group discussions in 47 counties spread throughout urban, peri-urban, and rural areas. The major reason for COVID-19 vaccination apprehension among youth was a lack of knowledge and worries about vaccine safety and efficacy. Other factors included a lack of faith in the Ministry of Health and the notion that mass vaccination is ineffective.

Slightly less than two third 89 (63.6%) of the respondent agreed about believing that pharmaceutical companies are producing safe and effective COVID-19 vaccines used in Kenya. According to a study by Osur et.al (2021), vaccine fear was reported to be 58% among youth. The major reason for COVID-19 vaccination apprehension among youth was a lack of knowledge and worries about vaccine safety and efficacy. Majority of the boda-boda riders 111 (79.2%) agreed COVID-19 has directly affected my income.

The study sought to examine the false information among boda-boda riders in Mathare sub-county Kenya. Various items were presented to the boda-boda riders. The boda-boda riders were asked to indicate their opinions on whether the statement was strongly disagreeing, disagree, neutral, agree and strongly agree. Shah et al. (2022) conducted a research on how perceptions and knowledge impacted adult COVID-19 vaccine fear in Kenya. Cross-sectional research commenced in 2021 among general adult patients at six different healthcare institutions in Kenya. The majority of participants agreed that vaccination was necessary to protect themselves and others against COVID-19 while 57 (40.5%) said they were reluctant to take the vaccine because of its perceived negative effects.

Strongly above two third 100 (71.4%) of the boda-boda riders agreed about believing that COVID-19 vaccine might cause health complications in future after uptake. On the other hand, a few of the respondent 22 (15.7%) disagreed and 18 (12.9%) were neutral about the belief that COVID-19 vaccine might cause health complications in future after uptake. The above table shows that slightly more than two thirds 99 (70.7%) of the respondent did not believe that COVID-19 vaccinations had been rapidly developed and approved too soon without proper testing done whereas a slightly less than a quarter 28 (20%) of the respondent thought that the vaccine were hurriedly developed.

Slightly less than a half 64 (45.7%) agreed in believing that COVID-19 vaccines made Europe or America are safer than those made in other countries of the world. On the other hand, a quarter of them 40 (28.6%) disagreed while a quarter 36 (25.7%) were neutral. Slightly above two third 103 (73.7%) of the respondent agreed that COVID-19 vaccine messes up with one's genetics while a few of the boda-boda riders 22 (15.6%) disagreed and 15 (10.6%) were neutral.

Table 0.10***The false information among boda-boda riders***

Statement	SD		D		U		SA		A	
	f	%	f	%	f	%	f	%	f	%
I always believe that COVID-19 vaccine might cause health complications in future after uptake	9	6.4	13	9.3	18	12.9	77	55.0	23	16.4
I always believe that COVID-19 vaccinations have been rapidly developed and approved too soon without proper testing done	35	25.0	64	45.7	13	9.3	13	9.3	15	10.7
I always believe that COVID-19 vaccines made in Europe or America are safer than those made in other countries of the world	21	15.0	19	13.6	36	25.7	58	41.4	6	4.3
COVID-19 vaccine mess up with one's genetics	14	9.9	8	5.7	15	10.6	80	56.7	24	17.0

In conclusion, the respondent of the question if they agree that COVID-19 vaccination is an effective way of controlling the COVID-19 virus the majority 105 (75%) of the respondent said YES and a quarter 35 (25%) said NO and those who believed slightly above two third 99 (70.7%) of the respondent agreed while 32 (22.9%) disagreed. Those who believed that people need to take the vaccine although one can still get the COVID-19 virus after vaccinations slightly more than two third 97 (69.1%) agreed while 32 (23%) disagreed.

There were slightly above two third 99 (70.7%) of the respondent disagreed and slightly less than a quarter 28 (20%) who believed that COVID-19 vaccinations have been rapidly developed and approved too soon without proper testing done. Slightly more than a third 52 (37.4%) of the boda-boda riders were neutral about believing that COVID-19 infection and a third of the respondent 47 (33.8%) agreed about believing that COVID-19 infection. Most of the respondent slightly less than two third 89 (63.6%) of the respondent agreed about believing that pharmaceutical companies are

producing safe and effective COVID-19 vaccines used in Kenya and slightly above a quarter 37 (26.5%) disagreed. About how COVID-19 has directly affected their income majority of the boda-boda riders 112 (79.2%) agreed COVID-19 has directly affected my income while a few of the boda-boda riders 18 (12.8%) disagreed.

Strongly above two third 100 (71.4%) of the boda-boda riders agreed in believing that COVID-19 vaccine might cause health complications in future after uptake and a few of the respondent 22 (15.7%) disagreed in believing that COVID-19 vaccine might cause health complications in future after uptake. Majority of the respondent slightly less than a half 64 (45.7%) agreed and a quarter of them 40 (28.6%) disagreed in believing that COVID-19 vaccines made Europe or America are safer than those made in other countries of the world. Slightly above two third 103 (73.7%) of the respondent agreed that COVID-19 vaccine messes up with one's genetics while a few of the boda-boda riders 22 (15.6%) disagreed.

Osuri et.al. (2021) undertook a study to assess COVID-19 vaccine health-seeking perceptions and attitudes among Kenyan youth and to identify determinants of COVID vaccine health-seeking attitudes on COVID-19 vaccination. The research used a mixed-method approach, including a cross-sectional survey and in-depth group discussions in 47 counties spread throughout urban, peri-urban, and rural areas. Online platform users between the ages of 18 and 35 were the subjects of the interviews. According to the study, vaccine fear was reported to be 58% among youth. The major reason for COVID-19 vaccination apprehension among youth was a lack of knowledge and worries about vaccine safety and efficacy. Other factors included a lack of faith in the Ministry of Health and the notion that mass vaccination is ineffective.

4.8 Influence of prior exposure on COVID-19 vaccination Uptake

The study sought to examine how prior exposure affected covid-19 vaccination uptake among Boda-Boda riders in Mathare sub-county Nairobi County. The tables below represent the responses by the respondents.

Table 0.11***Influence of prior exposure on COVID-19 vaccination Uptake***

Statement	SD		D		U		SA		A	
	f	%	f	%	f	%	f	%	f	%
I would like to take COVID - 19 vaccine to avoid another infection of COVID-19	8	5.7	22	15.7	11	7.9	61	43.6	38	27.1
Being hospitalized with COVID-19 infection made me realize how bad COVID-19 infection is	35	25.2	72	51.8	16	11.5	11	7.9	5	3.6
I did not realize I had COVID-19 until after symptoms	42	30.7	58	42.3	17	12.4	19	13.9	1	0.7
I had very mild symptoms when I had COVID-19	51	36.7	54	38.8	16	11.5	16	11.5	2	1.4
I was sick for a long time which made me lose a lot of income	55	39.6	52	37.4	14	10.1	14	10.1	4	2.9

Slightly less than a half of the respondents 30 (21.4%) disagreed and slightly above two thirds 99 (70.7%) of the respondents agreed that they would like to take COVID-19 vaccine to avoid another infection. Majority of the respondents 108 (77.0 %) disagreed while a few of the respondents 16 (11.5%) agreed that being hospitalized with COVID-19 infection made them realize how bad COVID-19 infection was. Slightly above two thirds of the respondents 102 (73.0%) disagreed, a few of the respondents 20 (14.6%) agreed that they did not realize they had COVID-19 until after symptoms. Majority of the respondents 106 (75.5%) disagreed; a few of the respondents 18 (12.9%) agreed that they had very mild symptoms when they had COVID-19. From the table, majority of the respondents 108 (77.0%) disagreed, a few of the respondents 18 (13.0%) was agreed that they were sick for a long time which made them loose a lot of income. In relation to the statement; Influence of prior exposure on COVID-19 vaccination Uptake, slightly above two thirds 99 (70.7%) of the respondents agreed that they would have liked to take COVID -19 vaccine to avoid another infection of COVID-19. As to whether being hospitalized with COVID-19 infection made them realize how bad COVID-19 infection was, majority of the respondents 108 (77.0 %) disagreed.

On whether they thought they were dying when they had COVID -19, slightly above majority of the respondents 103 (73.5%) disagreed. On whether they did not realize they had COVID-19 until after symptoms, slightly above two thirds of the respondents 102 (73.0%) disagreed, a few of the respondents 20 (14.6%) agreed. On whether they had very mild symptoms when they had COVID-19, majority of the respondents 106 (75.5%) disagreed, a few of the respondents 18 (12.9%) agreed. The current study findings appear to be in hand with Nguyen et al. (2021) who conducted a study on changes in COVID-19 vaccine receipt and intention to vaccinate by socioeconomic variables and geographic location in the United States. The findings of the study indicated that individuals who had a previous COVID-19 diagnosis or were unclear if they had a previous diagnosis had a lower likelihood of being vaccinated or having a strong desire to be vaccinated in comparison to people who had never had COVID-19 before. The study findings revealed that prior-exposer plays an impact role on vaccine uptake. Adedeji-Adenola, et al. (2022) also strengthens the study findings by reporting that previous diagnosis of COVID-19 were shown to have a substantial impact on awareness among citizens in Nigeria. The study findings revealed that prior-exposer plays an impact role on vaccine uptake. Adedeji-Adenola, et al. (2022) also strengthens the study findings by reporting that previous diagnosis of COVID-19 were shown to have a substantial impact on awareness among citizens in Nigeria.

4.9 Policies Influencing COVID- 19 Vaccination Uptake

The study sought to examine policies influencing COVID-19 vaccination uptake among Boda-Boda riders in Mathare Sub County. Various items were presented to the Boda-Boda riders. The Boda-Boda riders were asked to indicate their opinion on whether the statement strongly disagree, disagree, neutral, agree, and strongly agree. Majority 107 (76.1%) strongly disagreed and disagreed while a few of them 17 (12.1%) strongly agreed and agreed. Therefore, the respondents did not take the vaccine because they wanted to travel outside the country. Slightly less than two thirds 86 (61.1%) of the respondents disagreed while a few of them 16 (11.5%) agreed on the government announcement of not to give services to the unvaccinated persons COVID-19 vaccines forced them to take the vaccine.

Slightly less than two thirds 87 (62.1%) of the respondents agreed while a few of them 1 (0.7%) of the respondents strongly disagreed on the matter concerning

washings of hands and putting on masks could prevent them from getting COVID-19. This shows that majority of the Boda-Boda riders agreed to take precaution on how they would not get infected easily by COVID-19, majority 106 (75.7%) of the respondents agreed that lack of COVID- 19 vaccination could lead to risk of serious medical complications in case of pre-existing commodities. When the respondents were asked to indicate their views on whether they were aware that COVID-19 vaccine boosters can only be taken when they have taken the first shot overwhelming majority 126 (90.0%) acknowledged that was the case. This shows that they are aware of what may lead thereafter. Slightly above two thirds 97 (69.3%) disagreed while a few of them 19 (13.5%) of the respondents agreed that they had to take the COVID-19 vaccine because they wanted to be given services at the government offices. This shows that very few people were forced to take the vaccine so that they would get services.

Table 0.12

Policies influencing COVID- 19 vaccination uptake

Statement	SD		D		U		SA		A	
	f	%	F	%	f	%	f	%	f	%
Washing of hands and putting on mask could prevent me from getting COVID-19	1	0.7	3	2.1	21	15.0	87	62.1	28	20.0
Lack of COVID-19 vaccination could lead to risk of serious medical complications in case of pre-existing commodities	2	1.4	9	6.4	23	16.4	82	58.6	24	17.1
I am aware that COVID-19 vaccine boosters can only be taken when I have taken the first shot	-	-	-	-	3	2.1	126	90.0	11	7.9
I had to take the COVID-19 vaccine because I wanted to be given services at the government officers.	35	25.0	62	44.3	24	17.1	3	2.1	16	11.4
I need to take COVID-19 vaccine because I plan to travel outside the country.	46	33.3	59	42.8	15	10.9	4	2.9	14	10.1
The government announcement of not to give services to the unvaccinated persons COVID-19 vaccines forced me to take the vaccine	32	23.0	53	38.1	38	27.3	6	4.3	10	7.2

In relation to the questions in the table above slightly less than two thirds 87 (62.1%) of the respondents agreed while a few of them 1 (0.7%) of the respondents strongly disagreed on the matter concerning washing of hands and putting on masks could prevent them from getting COVID- 19. This shows that majority of the Boda-Boda riders agreed to take precaution on how they would not get infected easily by COVID- 19. In addition, majority 106 (75.7%) of the respondents agreed that lack of COVID-19 vaccination could lead to risk of serious medical complications in case of pre-existing commodities. In the same line, Schmelz and Bowles, (2022) conducted a study on opposition to voluntary and mandated COVID-19 vaccination as a dynamic process. The findings provided evidence of the first two waves of the pandemic in Germany, indicating that making the vaccine mandatory may have slowed vaccination rates. Therefore, be there policies and regulations sensitizing on the importance of COVID-19 vaccination uptake, there could be reduced spread and attack of the pandemic. This concludes that the vaccine was important and it was a mandate for everyone to get vaccinated. Therefore, more engagements with Boda-Boda riders would entice them to take up vaccination.

When the respondents were asked to indicate whether they were aware that COVID-19 vaccine booster can only be taken the first shot overwhelming majority 126 (90%) agreed. This shows they were aware of what may lead thereafter. Moreover, slightly above two thirds 97 (69.3%) disagreed that they had to take the COVID-19 vaccine because they wanted to be given services at the government offices. This shows that very few people were forced to take the vaccine so that they would get services. Urging in the same trajectory, Bardosh et al, (2022) study on the COVID-19 vaccination policy's unforeseen implications, illustrated why mandates, passports, and restrictions may create more harm than good. Anjorin et al (2021) also observes that mandatory vaccination was observed in as much as it has the potential to speed up vaccine adoption and herd immunity. It might, however, diminish patients' confidence in healthcare personnel, jeopardize individual autonomy, and raise ethical concerns if it disproportionately affects the most vulnerable members of society. On whether they should show that COVID-19 vaccine certificate at their workplace, slightly less than two thirds 86 (61.1%) of the respondents disagreed while a few of them 16 (11.5%) agreed on the government announcement of not to give services to the unvaccinated people COVID- 19 vaccine forced them to take the vaccine.

Slightly more than a half 72 (51.1%) of the respondents disagreed as to whether they cannot get service in any office without the COVID- 19 certificate. This shows that the decision made would only favor the ones who have only been vaccinated. Adding more weight, Mills and Ruettenauer (2021) conducted an empirical analysis from April to September 2021 to investigate the association between the implementation of COVID-19 certification and observed vaccination uptake. The study findings revealed that when compared to countries whose uptake was already average or higher; countries with below-average pre-intervention uptake had a more significant rise in daily vaccinations. The study findings were slightly disagreed with Mills and Ruettenauer (2021) study that found out that the influence of imposing policies mandating vaccination increased the rates of vaccination with the study areas imposing proof of vaccination in order to acquire certain services. This could be because of the nature of job carried out by the Boda-Boda riders that does not require them to be in any office especially in the slum area of Mathare.

4.10 Vaccine Accessibility of COVID- 19

The study is done to examine COVID- 19 vaccine accessibility among Boda-Boda riders in Mathare sub-county. Various items were presented to the Boda-Boda riders. The Boda-Boda riders were asked to indicate their opinion on whether they strongly disagree, disagree, neutral, agree, and strongly agree with the statement. The table below shows the information.

A few of the respondents 12 (8.5%) disagreed and the majority 114 (81.4%) agreed that COVID-19 vaccines were always available at the facility. A few 7 (5%) of the respondents, disagreed while an overwhelming majority 123 (87.9%) agreed that they could always easily get vaccinated in the health facility near them if they wanted. A few of the respondents 3 (2.1%) disagreed while the overwhelming majority 131 (93.5%) agreed that they could always get COVID-19 vaccine for free in the health facility. A few of the respondents 19 (13.6 %) disagreed while slightly above two thirds 101 (72.1%) agreed that everyone whom they knew who had gone to get a vaccine had always returned vaccinated. A few of the respondents 6 (4.3%) disagreed and an overwhelming majority 121 (86.5%) agreed that vaccines were always available near their local health facility. A few of the respondents 9 (6.5%) disagreed

while a majority 117 (83.4%) agreed that they always had many options of locations where they could get vaccinated.

Table 0.13

Vaccine Accessibility of COVID- 19

Statement	SD		D		U		SA		A	
	f	%	f	%	f	%	f	%	f	%
COVID-19 vaccines are always available at the facility	2	1.4	10	7.1	14	10.0	78	55.7	36	25.7
I can always easily get vaccinated in the health facility near me if I want	3	2.1	4	2.9	10	7.1	75	53.6	48	34.3
I can always get COVID-19 vaccine for free in the health facility	2	1.4	1	0.7	6	4.3	80	57.1	51	36.4
Everyone who I know who has gone to get a vaccine have always returned vaccinated	4	2.9	15	10.7	20	14.3	59	42.1	42	30.0
Vaccines are always available near my local health facility	1	0.7	5	3.6	13	9.3	61	43.6	60	42.9
I always have many options of locations where I can be vaccinated	2	0.7	8	5.8	14	10.1	53	38.1	63	45.3

Conclusively, respondents to the question of availability of COVID-19 vaccines at the facility replied positively with slightly more than a half 78 (55.7%) agreeing and only a few of them 2 (1.4%) who strongly disagreed. Those who believed they could get vaccinated in a health facility near them if they wanted; a few of them 3 (2.1%) strongly disagree with more than a half in agreement of the statement. There were respondents who thought they could always get COVID-19 vaccination for free in a health facility where a few of them 1 (0.7%) strongly agree disagreed and slightly more than a half 80 (57.1%) agreed. Another group of our respondents that thought everyone going for a vaccination returned vaccinated had a few of them 15 (10.7%) strongly agreeing while less than a half 59 (42.1%) agreeing with the statement. Moreover, there were respondents who believed vaccines were always available near their local health facility, a few of them 1 (0.7%) strongly agreed while slightly less than a half of them 61 (43.6%) agreed. Lastly was the respondents who always had many options of locations where they could be vaccinated, a few of them 1 (0.7%) strongly disagreed while slightly less than a half 63 (45.3%) strongly agreed. The findings of the study were in line with the study conducted by Krieger (2021), that indicate the availability of the vaccines despite being unequal in distributions some

countries had a good amount of vaccines for the citizens. However, despite availability of the vaccines in health facilities easily accessible to the respondents, the research findings clearly show that the government needed to do more than just availing the vaccines in hospitals in the neighborhood.

4.11 Inferential analysis

To determine the factors associated with uptake of COVID- 19 vaccine among Boda-Boda riders in Mathare sub-county, binary logistic regression was fitted into the collected data. As earlier mentioned in section 3.10, logistic is used when the dependent variable is binary in nature. In this case, the dependent variable was uptake of COVID-19 vaccination among Boda-Boda riders in Mathare sub-county. Uptake of COVID-19 vaccination was categorised into “Ever Vaccinated” and “Never Vaccinated”. Logistic regression also facilitated in determining the influence of each independent variable on the dependent variable.

The omnibus test of model coefficients demonstrates the models predictive ability after considering all the study variables as a block. As shown in Table 4.14 that the p – value of the model as a block was $p < 0.01$ which indicates that the model has great predictive ability.

Table 0.14
Omnibus Tests of Model Coefficients

	Chi-square	Df	Sig.
Step	54.570	10	0.001
Block	54.570	10	0.001
Model	54.570	10	0.001

Table 0.15

The Model Summary

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
508.783	0.665	0.752

As shown in Table 4.15 the five independent variables account for about 75.2 % of the variations in uptake of COVID-19 vaccine among boda-boda riders in Mathare Sub-county. This implies that about 24.8 % of the variation in uptake of COVID-19 vaccine is still not explained in this study. Therefore, more studies in this area are

needed to unearth all the factors influencing uptake of COVID-19 vaccine among Boda-Boda riders.

Table 0.16
Hosmer and Lemeshow Test

Chi-square	Df	Sig.
5.841	6	0.441

The Hosmer and Lemeshow Test is another measure of binary logistic model's fitness for prediction. The null hypothesis is that the model is fit against the alternative that the model is not fit. As presented in Table 4.16, the chi-square results, were $\chi^2 = 5.841$, $p=0.441$. Thus we failed to reject the null hypothesis. This implies that the model is fit for this study and possess significant predictive ability. It was concluded that the model is appropriate for this study.

Five independent variables measured using 5-point likert scale were included in this study. The first independent variable was perception towards COVID -19 vaccine which was measured using 5 likert scaled items each comprising of 6 perception scores. Consequently, the minimum possible perception score was 6 and maximum possible perception score was 30. Respondents whose Perception score ranged from 6 to 18 were classified as "Negative Perception about COVID-19 Vaccine", Those with a perception score of above 18 were deemed to have a "Positive Perception" about COVID-19 Vaccine.

The second independent variable was prior exposure to COVID-19. Prior exposure to covid 19 was measured in terms of; disease severity and cost of treatment. Disease severity had 6 items measured using 5-point likert scale. Consequently, the minimum score was 6 and the highest possible score was 30. Scores ranging from 6 to 18 denoted that the infection was not severe while scores above 18 indicated that the infection was severe. Cost of treatment had 5 Likert scaled items. Scores ranging from 5 to 15 denoted that their income had not reduced and therefore cost of accessing treatment was not a problem. Scores above 15 denoted that income had been substantially affected and therefore cost of treatment was a big issue.

The third variable was government policy on COVID -19 vaccination. This variable had two parameters namely; awareness of the policies and enforcement of policies on covid 19 vaccination. Awareness of covid 19 vaccination had 3 items measured using 5-point likert scale. Scores ranging from 3 to 9 was an indication of lack of awareness

of government policies on covid 19 vaccination while scores above 9 indicated that the respondents were aware of government policies on COVID 19 vaccination. On the other hand, enforcement of COVID 19 government policies had 5 items measured on a 5-point likert scale. Scores ranging from 5 to 15 indicated that the government policies on COVID 19 vaccination had not been fully implemented while scores above 15 indicated that the polies had been fully implemented.

The fourth variable was accessibility to COVID 19-vaccine. This variable had 6 questions measured on a 6 point likert scale. Scores ranging from 6 to 18 denoted that COVID 19 was not readily available to the Boda-Boda operators in Mathare sub-county while scores above 18 indicated that the vaccine was readily available to the Boda-Boda operators in Mathare sub-county.

The last variable was individual factors. Individual factors included knowledge about seriousness of COVID 19 infection and religious affiliation. Knowledge had 7 items measured on a 5 point likert scale. Scores ranging from 7 to 21 indicated that the respondents were not fully aware of the seriousness of COVID 19 infection. Scores above 21 indicated that the respondents were aware of the seriousness of COVID 19 infection. Religious affiliation was nominal scaled with 3 categories. Christians were in category 1 while Muslims and other religions were put in category 2 and 3 respectively. The Results of the analysis are as presented in Tables 4.14, 4.15, 4.16 and 4.17.

4.11.1 Multivariate logistic regression results.

The aim of multivariate logistic regression was to ascertain the influence of each predictor variable on the response variable. The procedure involved performing iterations using multivariate logistic regression. All the five predictors were regressed against the response variable. Table 4.17 presents the results of the analysis.

Table 0.17***Multivariate logistic regression results***

Variable			B	S.E.	df	Odds Ratios
Perception		Negative (RC)				1.000
	Perception	Positive	0.19	0.589	1	1.210
Information		Incorrect (RC)				1.000
	About	Correct	0.022	0.568	1	1.022
Prior exposure	Disease	Not Severe(RC)				1.000
	Severity	Severe	0.364	0.727	1	1.439
government policy		Not Aware(RC)				1.000
	Awareness	Aware	0.158	1.146	1	1.171
		Fully Enforced(RC)				1.000
	Policy	Not Fully Enforced	-			
individual factors	Enforcement	Enforced	0.231	0.534	1	0.794
		Others (RC)				1.000
		Christians	0.663	0.662	1	1.940
	Religion	Muslims	0.148	0.915	1	1.160
		Aware (RC)				1.000
		Not Aware	-			
	Knowledge	Not Aware	0.351	0.717	1	0.704
		Income Never Reduced(RC)				1.000
Accessibility	Income	Reduced	0.175	0.775	1	1.191
		Not Accessible (RC)				1.000
	Accessibility	Accessible	0.609	0.092	1	1.839

The first objective of this study was to establish whether Boda-Boda operator's perception towards COVID -19 vaccination is associated with uptake of the vaccine in Mathare Sub-County. The results of the analysis indicated that Boda-Boda's perception towards the COVID-19 vaccination was associated with the uptake of the same in Mathare sub-county. Boda-Boda operators who had a positive view towards the vaccine were 1.21 times more likely to go for the vaccination when compared to those who held a negative perception towards the same. Besides, Boda-Boda operators who had the correct information about the vaccine were 1.022 times more likely to be vaccinated when compared to counterparts who had incorrect information about the efficacy of the vaccine. The results were significant at 5% level. This study finding agrees with a study conducted by Shah et al. (2022) on how perceptions and

knowledge impacted adult COVID-19 vaccine fear in Kenya. Cross-sectional research commenced in 2021 among general adult patients at six different healthcare institutions in Kenya. The majority of participants agreed that vaccination was necessary to protect themselves and others against COVID-19 while 57 (40.5%) said they were reluctant to take the vaccine because of its perceived negative effects. It therefore means there was absolute need for the MOH to put more emphasis on educational campaigns on COVID-19 vaccination in order to bring clear understanding of all the aspects regarding vaccination and change the perception of the riders.

The second objective was to determine whether prior exposure to Corona virus influences the uptake of COVID-19 vaccination among Boda-Boda riders in the sub-county. Prior exposure to COVID-19 was assessed in terms of severity of the infection and income from the Boda-Boda business. The results of the study showed a significant relationship between prior exposure to the disease and uptake of COVID-19 vaccination. Boda-Boda operators who had once experience severe COVID-19 infection were 1.439 times more likely to go for COVID-19 vaccination when compared to their counterparts who once experience mild COVID-19 symptoms. In terms of income from the Boda-Boda business, operators who recorded reduced income were 1.191 times more likely to go for COVID-19 vaccination.

The results were scientifically significant with $P < 0.05$. This means that many riders were likely to go for subsequent vaccination jabs recommended by MOH as a result of having being victims of COVID-19 infection before and also due to the financial constraints that they suffered during treatment of the disease. However, this study finding disagreed with a study conducted by Pogue (2020), that used questionnaires in a survey across the USA. The study revealed that those who were aware of many people with the disease were not likely to have intention of getting vaccinated than those who did not know anyone. The findings of the study also indicated that individuals who had a previous COVID-19 diagnosis or were unclear if they had a previous diagnosis and had a lower likelihood of being vaccinated or having a strong desire to be vaccinated in comparison to people who had never had COVID-19 before.

The third objective of this study was to examine the influence of the government policy on vaccination on the uptake of COVID-19 vaccination among Boda-Boda riders in Mathare sub-county. Government policy on COVID-19 vaccination was assessed in terms of the extent to which it has been made aware to the general public and the extent to which it has been enforced. The results of the analysis demonstrated that government policy is a key factor influencing uptake of COVID-19 vaccination among Boda-Boda riders in Mathare Sub-County, Nairobi. Boda-Boda riders who were aware of the existing policy framework on COVID-19 vaccination were 1.171 times more likely to be vaccinated when compared to their counterparts who had no idea about existing policies on COVID-19 vaccination. The results also indicated enforcement of policies on COVID-19 vaccination increases the odds of uptake of the COVID-19 vaccine among the Boda-Boda riders in Mathare. Where policy on vaccination was not fully enforced Boda-Boda riders were 0.794 times less likely to go for the vaccination. The results were scientifically significant with p value less than 0.05. From this study findings, it is clear that stringent and forceful government policies on uptake of vaccination did not positively influence uptake of COVID-19 vaccination among the riders but instead created more doubts and reluctance towards the vaccination exercise; the haste and force used in the promotion of the vaccination exercise caused more doubts among the riders with regards to its safety.

This study agrees with findings from a study conducted by Schmelz and Bowles, (2022) performed research on resistance to voluntary COVID-19 vaccination as a dynamic process. Three cross-sectional surveys were used to create the panel survey, done between the years 2020 and 2021. The results showed evidence of the first two waves of COVID-19 in Germany, proving that making the vaccine mandatory may have slowed vaccination rates. According to the findings, mandatory COVID-19 vaccine policies have had negative outcome on public trust, vaccine safety assurance, and human rights among other concerns.

The fourth objective of this study was to determine whether individual factors influence uptake of COVID-19 vaccination among Boda-Boda riders in Mathare Sub-county. Individual factors included knowledge about severity of COVID -19 and one's religious affiliation. The results of the analysis revealed that knowledge about the severity of the COVID-19 infection is significantly associated with uptake of

COVID-19 vaccine among Boda-Boda riders. Riders who had no knowledge about the seriousness of COVID-19 infection were 0.704 times less likely to go for vaccination when compared to their counterparts who had knowledge about the seriousness of the COVID-19 infection. The results were significant at 5% level. From the study findings, there was no significant direct relationship between one's religious affiliation and uptake of COVID-19 vaccination. However, the fact that an overwhelming majority of the respondents were of Christian faith and a few of Islamic faith; the church and Muslims leaders did not actively encourage their followers to get vaccinated instead they adopted COVID-19 regulation measures communicated by the government such as social distancing in the places of worship, the church did not take any effort to educate and engage their members on all factors related to COVID-19 infections before implementing government preventive policies. Religion and science must work together to achieve an effective public health prevention response, such as COVID-19 vaccination because the role of religious leaders cannot be overstated.

This study finding agrees with a study by Sambo (2020) posited that religious fanaticism to be an important factor in determining the likelihood of COVID-19 acceptance in African countries. In his observation, religious leaders have had enormous influence over their Christians/followers in recent years. They have frequently assisted their followers in their health-seeking behaviors. As a result, their statements can significantly reduce or increase the likelihood of vaccine acceptability and uptake. Nonetheless, some religious leaders have expressed concern that COVID-19 vaccination plans in Africa may create an "ethical quandary" for their followers. In the same line, a research conducted by Elhaida et al.,2021 sought to provide data and vital information for the Malaysian government on strategies aimed at increasing public understanding on uptake of COVID-19 vaccine whose results agree with the study findings indicating that there was evidence of poor knowledge being a hindrance to uptake of the HPV vaccine in Malaysia. Inadequacy of Knowledge on COVID-19 vaccine was attributed to poor education background, poor socioeconomic status and picking information from peer layman while it was notable that people associated with high education level, high income or high risk individuals were well acquitted to COVID-19 vaccine.

The last objective of this study was to establish whether accessibility to COVID-19 Vaccination influences uptake of COVID-19 vaccination among Boda-Boda riders in Mathare sub-county. The results of the analysis did not show any significant relationship existing between accessibility of the vaccine and its uptake among Boda-Boda riders in Mathare sub-county. Many of the riders acknowledged existence of vaccine centers near their work and residential places however this availability did not influence their desire to get vaccinated and instead majority of the riders still chose not to go for vaccination despite its availability. These study findings agree with a study conducted by Chen & Wang, (2021) in a study analyzing the factor of geographical distribution of healthcare facilities, patients' residential locations, and transportation resources as an influence to physical access to healthcare services (e.g., car ownership, access to public transit). Healthcare accessibility to COVID-19 vaccination has long been assessed using a variety of spatial measures, including service density, proximity to healthcare centers, and more complex spatial interaction models. While vaccination campaigns are underway, a promising research agenda is to investigate the spatial complementarity between vaccine supply and demand from a geographical standpoint, such as determining whether the distribution of vaccination clinics and dose allocations can accommodate the unequal disease landscape and whether vaccination gaps exist in certain high-risk communities.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the descriptive and inferential statistics, conclusions in response to the research questions and finally presents the recommendations of this study on factors influencing the uptake of covid-19 vaccination among Boda-Boda riders in Mathare Sub-County, Kenya.

5.2 Summary

The main purpose of this study was to evaluate the factors that influences Boda-Boda riders' uptake of the COVID-19 vaccination in Kenya's Mathare Sub-county. The study employed probabilistic simple random sampling, to determine the sample size (138) riders in Mathare. Questionnaire was used to collect data from the sampled population, ensuring that reliable data on the determinants of vaccine hesitancy and uptake of COVID-19 virus vaccination is collected. A quantitative approach was used to analyze the data and presented using descriptive statistics.

Majority (75.0%) of the respondents had not been vaccinated, only 35% of the respondents had been vaccinated. Of the vaccinated respondents, majority (60%) had the first initial dose while 40% had received the required 2 doses. A third (33.6%) of the vaccinated respondents preferred Johnson Johnson vaccine. On the question on how policies affected the uptake of covid-19 vaccination, slightly above two thirds (69.3%) disagreed that they got vaccinated because they wanted to receive services from government offices.

Regarding the vaccine accessibility, slightly more than a half (55.7%) of the respondents agreed that they could get the vaccination at their local health facilities and that they could be vaccinated any time. Some of the respondents (10.7%) were also not sure whether those who went to be vaccinated returned vaccinated. In this study, the selected factors influencing COVID 19 vaccine uptake in Mathare. The procedure involved performing iterations using multivariate logistic regression. All the five predictors were regressed against the response variable. The results of R squared showed that individual factors, perception, prior exposure, policies and

vaccine accessibility explain only 0.752 (75.2%) of the variation in the dependent variable (COVID 19 vaccine uptake) which to some extent explains the variation. Inherently, this implies that 0.824 (82.4%) of the variation in the dependent variable is left unexplained.

Individual factors, policies and vaccine accessibility were positively related to the COVID 19 vaccine uptake among Boda-Boda riders. This means that a unit increase in the score of either of the factors, the rate of vaccine uptake increases by β units. On the other hand, perception, and prior exposure, had a negative slope. This implies that their relationship with the response variable (COVID 19 vaccine uptake) was an inverse relationship. That is, as the scores of perception and prior exposure increase, the scores of COVID 19 vaccine uptake decreases and vice versa. In other words, a unit increase in the perception, and prior exposure would lead to a decrease in the score of COVID 19 vaccine uptake by 0.084 and 0.012 units respectively.

The coefficient associated with the first independent variable; namely individual factors is 0.110 with a standard error of 0.053. The coefficient associated with the second independent variable, namely perception is -0.084 with a standard error of 0.071. The coefficient associated with the third variable; namely prior exposure is -0.012 with a standard error of 0.029. The coefficient associated with the fourth variable, namely policies is 0.308 with a standard error of 0.107. Finally, the coefficient associated with the fifth independent variable (vaccine accessibility) is -0.085 with a standard error of 0.040. From the results, the coefficients associated with the individual factors, perception, policies and vaccine accessibility were statistically significant since its associated p-value were less than the level of significance, $p < .05$. However, the coefficients associated with prior exposure were found to be statistically insignificant since their associated p-values were greater than the level of significance.

5.3 Conclusions

A number of conclusions can be drawn from the analysis and summary of this study on factors influencing the uptake of covid-19 vaccination among Boda-Boda riders in Mathare Sub-County, Kenya. A vast majority of the respondents had not been vaccinated and were not willing to participate in the vaccination exercise against

COVID -19 despite spirited efforts put in place by the government. Most of the vaccinated respondents had not taken the second dosage as compared to the first dosage and had no intention of taking the second dosage. Furthermore, the respondents were asked whether they would be taking the third booster to curb the virus, slightly less than two third of the respondents were strongly against the booster majority of whom had not taken any vaccine as at the time of data collection.

From the study findings, it is clear that most of the respondents were aware of what COVID-19 as a disease is but seems not to have deeper understanding of causes, symptoms or even risks associated with the disease. While majority of the respondents were aware that vaccination helps to prevent spread of the disease very few of them made effort to get vaccinated. Failure to acknowledge the fact that the Boda-Boda riders are greatly susceptible and exposed to easy spread of the disease with a majority of the respondents insisting they were not vulnerable. This clearly shows lack of proper knowledge concerning the disease including its mode of spread. Despite the fact that some of them had the COVID-19 infection before they were vaccinated, they still did not realize how serious the illness was.

In Mathare the overwhelming majority of the Boda-Boda respondents were of Christian faith and a few of Islamic faith. The majority of the respondents indicated that their faith did not prohibit the taking up of the COVID -19 vaccine, however, the church and Muslims did not actively encourage their followers to get vaccinated instead adopting COVID-19 regulation measures such as social distancing in the places of worship as per the ministry of health guidelines, the church did not take any effort to educate and engage their members on all factors related to COVID-19 infections before implementing government preventive policies. As pillars of the community, the religious leaders have enormous impact on all social factors of the Kenyan society and community members hence they ought to be on the forefront in advocating for the observance of the laid out policies and regulations that are meant to reduce the spread of COVID- 19 by helping to educate the followers on the illness and the various preventative measures.

Many of the respondents claimed that the haste with which the vaccines were developed rendered them unsafe for use, and that because getting vaccinated did not

fully guarantee COVID-19 immunity, getting the vaccine was not suitable for humans. Furthermore, growing concerns about the negative health effects of post-vaccination led to many respondents declining the COVID-19 vaccine. According to the study, vaccine fear was reported among the Boda-Boda riders; the major reason for COVID-19 vaccination apprehension was a lack of adequate knowledge and worries about vaccine safety and efficacy. Other factors included a lack of faith in the Ministry of Health and the notion that mass vaccination is ineffective.

According to the findings, mandatory COVID-19 vaccine policies by the government had negative consequences on public trust, vaccine safety assurance, and human rights among other concerns. Therefore, forceful implementation of COVID-19 vaccination through stringent measures did not achieve much with regards to getting more people vaccinated especially among the Boda-Boda riders in Mathare.

5.4 Recommendations

From the analysis, summary and conclusion of this study, there are a number of recommendations that when implemented could boost the uptake of vaccination in Kenya.

- i. The Ministry of Health should organize for more educational campaigns involving the Boda-Boda riders as active participants through public road campaigns and Barraza's and also organize training activities for the riders through various groups/ Sacco's in order to reduce the negative perception.
- ii. The Ministry of Health should actively involve all stakeholders of health systems including the local politicians, religious and community leaders, to champion for uptake of COVID-19 vaccination among community members.
- iii. The Ministry of Health should continue with educational communication on COVID-19 vaccination uptake both on print media such as newspapers, radios and television to counter the misleading information about vaccinations.
- iv. The government should consider reducing forceful implementation of vaccination activities through stringent policies that would in turn cause negative perception and instead offer leadership through persuasive means such as offering tax reliefs for partners/ organizations who participate in vaccination campaigns and

increased citizenry engagements on the importance of vaccination against COVID-19 and assure the public of its safety.

5.5 Recommendations for Further Studies

- i) There is need for further research to find out more factors that could be influencing uptake of COVID-19 among Boda-Boda riders in Mathare sub-county.
- ii) Uptake of COVID-19 in Mathare sub-county was noted to be generally low across the different demographic groupings in Mathare, there is therefore need to conduct a broader research proportionate to the entire population in Mathare sub-county.

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APPENDICES

APPENDIX I: CONSENT FORM TEMPLATE

Research Title: Factors Influencing The Uptake Of Covid-19 Vaccination Among Boda-Boda Riders In Mathare Sub-County, Kenya

John Gershom Otieno

HSM-3-0604-1/2020

Kenya Methodist University,

P.O. Box 45240-00100,

Nairobi, Kenya.

1. Introduction

This Consent Form contains information about the research named above. In order to be sure that you are informed about being in this research, we are asking you to read (or have read to you) this Consent Form. You will also be asked to sign it (or make your mark in front of a witness). We will give you a copy of this form. This consent form might contain some words that are unfamiliar to you. Please ask us to explain anything you may not understand.

2. Reason for the Research

You are being asked to take part in research to examine the influence of individual factors to uptake COVID-19 vaccination among Boda-Boda riders in sub-county.

3. General Information about Research

The primary data collection technique will be a questionnaire. The questionnaire will be utilized to obtain data from all of the Mathare Boda-Boda riders that were sampled. The questionnaire items will be semi-structured. This is done to guarantee that comprehensive data on the effects of corona virus vaccination is gathered. Furthermore, some of the questions will be evaluated using a Likert scale. The items on the Likert scale are categorized as follows: Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), and Strongly Disagree (SD) (SD). The tool will be arranged into various sections based on study objectives. These sections will cover background information and the study objectives.

4. Your Part in the Research

If you agree to be in the research, you will be required to fill in a questionnaire form. Your part in the research will last 10 minutes. This research is targeting specifically Boda-Boda riders within Mathare sub- county of either gender.

5. Possible Risks

The research questions are in English however, there shall be a translator in case of any respondent who does not fully understand English. The risk with translation it would fully rely on individual understanding of the translated version.

6. Possible Benefits

Development practitioners (Government Institutions, INGOs, and NNGOs), health service providers, and health advocates are set to benefit from the findings of this study on the major factors influencing uptake of COVID-19 vaccination among Boda-Boda riders in the Mathare sub county. The study is expected to arouse new interventions to increase the uptake of the vaccines. Further, the study is hoped to contribute to global knowledge on vaccination acceptance in developing economies like Kenya.

7. If You Decide Not to Be in the Research

You are free to decide if you want to be in this research. Your decision will not affect the health care you would normally receive.

8. Confidentiality

We will protect information about you and your taking part in this research to the best of our ability. You will not be named in any reports. Someone from the IRB might want to ask you questions about being in the research, but you do not have to answer them. A court of law could order medical records shown to other people, but that is unlikely.

9. Compensation

You will not be paid, since you do not have to take part in this research.

10. Staying in the Research

If you decide to take part in this research, we ask you to use only the questionnaire method as provided.

11. Alternatives to Participation

You do not have to participate in the research in order to receive medical services such as vaccination for COVID- 19.

12. Leaving the Research

You may leave the research at any time. If you choose to take part, you can change your mind at any time and withdraw.

Also, you may be asked to leave the research if (list applicable points):

- the researcher feels it is best for you, or
- you are not able to follow the research procedures, or
- The research is stopped.

13 If You Have a Problem or Have Other Questions

Please call

1. Dr. Kezia Njoroge - 0738970746, kezia.njoroge@kemu.ac.ke
2. Prof. Wanja Tenambergen - 0726678020, wanja.tenambergen@kemu.ac.ke

at any time during the research, if you:

- get sick, or
- have questions about the research.

14. Your rights as a Participant

This research has been reviewed and approved by the IRB of (Kenya Methodist University - Nairobi). An IRB is a committee that reviews research studies in order to help protect participants. If you have any questions about your rights as a research participant you may contact (Kenya Methodist University, (+254)725751878, P.O. Box 45240-00100, Nairobi, Kenya.

VOLUNTEER AGREEMENT

The above document describing the benefits, risks and procedures for the research titled:

(Factors Influencing the Uptake of Covid-19 Vaccination Among Boda-Boda Riders In Mathare Sub-County, Kenya) has been read and explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I agree to participate as a volunteer.

Date

Signature or mark of volunteer

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered and the volunteer has agreed to take part in the research.

Date

Signature of Witness

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

Date

Signature of Person Who Obtained Consent

APPENDIX II: Research QUESTIONNAIRE

My name is John Gershom, a student conducting a study on the factors influencing COVID-19 vaccination among Boda-Boda riders in Mathare Sub-county in Nairobi, Kenya. I would like your response to the questionnaire. This questionnaire should take you about ten minutes to complete. The information you provide will be kept strictly confidential, and you can choose to skip any questions that cause you any discomfort. Your help is much appreciated.

Section 1: Background information of the respondent

1. Sex

Male Female

2. Age (years)

.....

3. Marital status

Single Married Widowed Separated

4. Education Level

Primary
Secondary
College
University
None

Section 2: COVID 19 vaccination uptake

5. Have you received the COVID-19 Vaccine?

Yes No

If you answered YES move to question 6 and 7

If you answered NO move to question 8

6. How many doses of the vaccine did you receive?

1 2 Other

7. Which vaccine did you take?

Astra Zeneca Mordena Pfizer Johnson & Johnson

8. Please tick the most appropriate with regard to the following statements.

Key: SD- Strongly Disagree; D- Disagree; N- Neutral; A-Agree; SA- Strongly Agree

Statement	SD	D	N	A	SA
I have not been fully vaccinated against COVID-19					
I will not be taking the third booster of COVID-19 vaccine					
I took a vaccine that require only one shot (e.g. Johnsons and Johnsons)					
COVID-19 vaccination is very safe					

Section 3: Individual factors

Which is your Religion?

Christianity Muslim Hindu Buddhist Atheist Others

Does your religion prohibit you from taking the COVID-19 Vaccine?

Yes No

Please tick the most appropriate with regard to the following statements.

Key: SD- Strongly Disagree; D- Disagree; N- Neutral; A-Agree; SA- Strongly Agree

Statement	SD	D	N	A	SA
Knowledge					
I know that COVID-19 is a very serious illness					
I require COVID-19 vaccine to prevent COVID-19 infections?					
Vaccines boosts one immunity against COVID-19					
I need at least two doses of Astra Zeneca vaccine being offered in my local hospital					
I'm old enough to make a decision against COVID-19					
As an adult I am allowed to take COVID-19 vaccines					
I am grouped as a vulnerable individual					
Religion					
The Kenyan Church leaders were very helpful in mobilizing church members and local to vaccinate against COVID-19					
Many churches in Mathare observed COVID-19 regulations such as social distancing going a long way in boosting preventive measures					
Muslim leaders in Mathare mobilized Islamic community leaving in Mathare to go for vaccination with them leading					

from the front to 1 st receive the COVID-19 jab					
--	--	--	--	--	--

Section 4: Perception of COVID-19 vaccination

Do you agree that COVID-19 vaccination is an effective way of controlling the COVID-19 virus?

Yes No

Please tick the most appropriate with regard to the following statements.

Key: SD- Strongly Disagree; D- Disagree; N- Neutral; A-Agree; SA- Strongly Agree

Statement	SD	D	N	A	SA
People's perception					
I believe that COVID-19 vaccination is an effective way of controlling the COVID-19 virus					
I always believe that people need to take the vaccine although one can still get the COVID-19 virus after vaccinations					
I always believe that COVID-19 vaccinations have been rapidly developed and approved too soon without proper testing done					
I believe that COVID-19 Vaccination is adequate protection against COVID-19 Infection					
I believe that pharmaceutical companies are producing safe and effective COVID-19 vaccines used in Kenya.					
COVID-19 has directly affected my income					
False Information					
I always believe that COVID-19 vaccine might cause health complications in future after uptake					
COVID-19 does not exist therefore there is no need to take up covid-19 vaccination					
I always believe that COVID-19 vaccines made in Europe or America are safer than those made in other countries of the world					
COVID-19 vaccine mess up with ones genetics					
Even after recovering from COVID-19 people still rejected me because they thought I could still infect them with the COVID-19					

Section 5: Influence of prior exposure on COVID-19 vaccination Uptake

Please tick the most appropriate with regard to the following statements.

Key: SD- Strongly Disagree; D- Disagree; N- Neutral; A-Agree; SA- Strongly Agree

Statement	SD	D	N	A	SA
Disease severity					
I would like to take COVID -19 vaccine to avoid another infection of COVID-19					
Being hospitalized with COVID-19 infection made me realize how bad COVID-19 infection is					
I thought I was dying when I had COVID -19					
I did not realize I had COVID-19 until after symptoms					
I had very mild symptoms when I had COVID-19					
The disease made worse my pre- existing comorbidities					
Cost of Treatment					
I was sick for a long time which made me lose a lot of income					
I had to pay a lot of money for my hospitalization with COVID-19 not 140					
The cost of my treatment was easily covered by my insurer					
NHIF covered my COVID-19 treatment					
The financial burden associated with my treatment led to unprecedented predicament in my family					
Recovery Period					
It took me more than one month to recover from illness after contracting COVID-19					
After completing treatment for COVID-19 I still had some of the signs and symptoms of the disease					
After completing treatment I fully recovered					
Even after testing negative for COVID-19 I still feels very weak					
I was able to resume normal duties after testing negative for COVID-19					

Section 6: Policies influence COVID-19 vaccination Uptake

Please tick the most appropriate with regard to the following statements.

Key: SD- Strongly Disagree; D- Disagree; N- Neutral; A-Agree; SA- Strongly Agree

Statement	SD	D	N	A	SA
Awareness					
Washing of hands and putting on mask could prevent me from getting COVID-19					
Lack of COVID-19 vaccination could lead to risk of serious medical complications in case of pre-existing commodities					

I am aware that COVID-19 vaccine boosters can only be taken when I have taken the first shot						
Enforcement						
I had to take the COVID-19 vaccine because I wanted to be given services at the government offices.						
I must show my COVID-19 vaccines certificate at my work place						
I need to take COVID-19 vaccine because I plan to travel outside the country.						
The government announcement of not to give services to the unvaccinated persons COVID-19 vaccines forced me to take the vaccine						
I cannot get service in any office without the COVID-19 certificate.						

Section 7: Vaccine accessibility

Please tick the most appropriate with regard to the following statements.

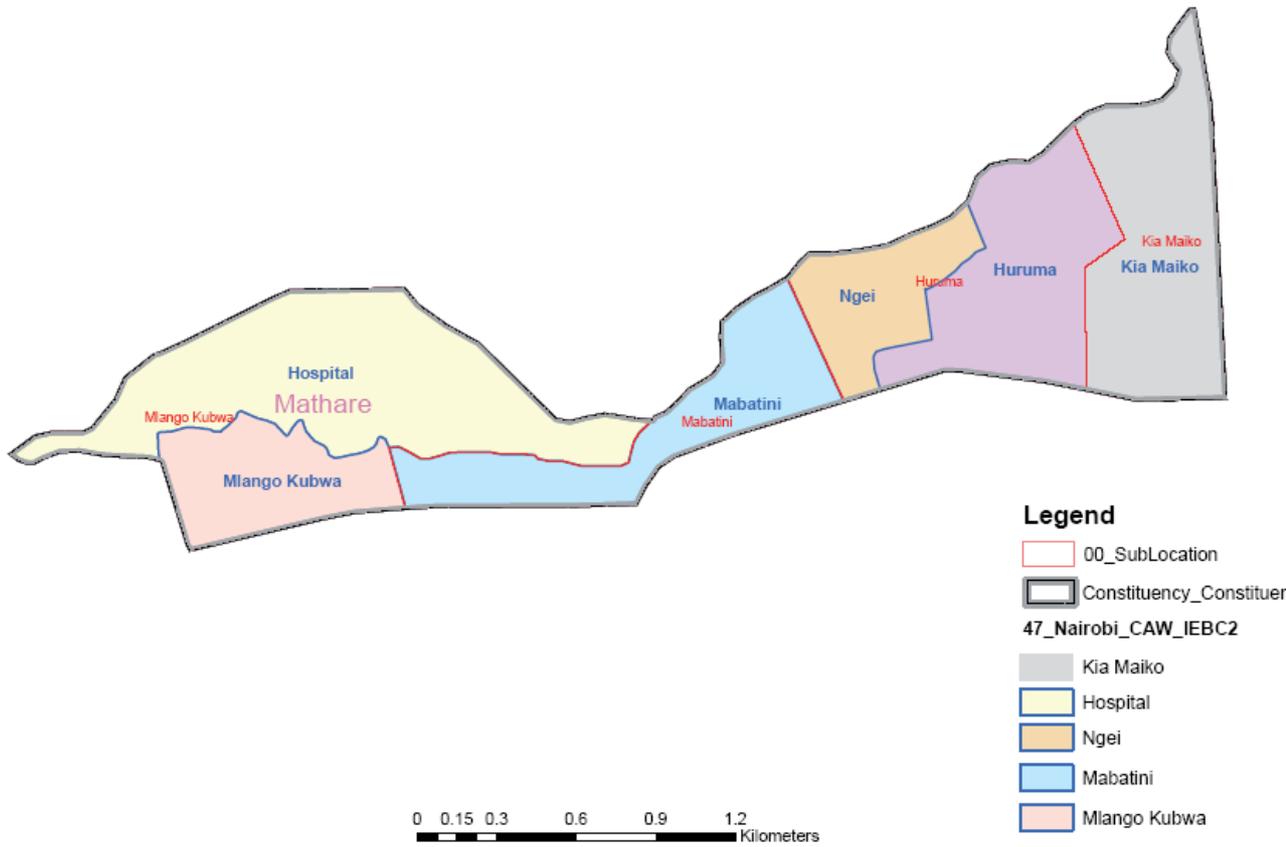
Key: SD- Strongly Disagree; D- Disagree; N- Neutral; A-Agree; SA- Strongly Agree

Statement	SD	D	N	A	SA
COVID-19 vaccines are always available at the facility					
I can always easily get vaccinated in the health facility near me if I want					
I can always get COVID-19 vaccine for free in the health facility					
Everyone who I know who has gone to get a vaccine have always returned vaccinated					
Vaccines are always available near my local health facility					
I always have many options of locations where I can be vaccinated					

Thank you for your cooperation.

APPENDIX III: MAP OF THE STUDY AREA

IEBC REVISED MATHARE CONSTITUENCY COUNTY ASSEMBLY WARDS



APPENDIX IV: NACOSTI LICENSE



REPUBLIC OF KENYA



NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY & INNOVATION

Ref No: **601257**

Date of Issue: **12/January/2023**

RESEARCH LICENSE



This is to Certify that Mr.. **JOHN GERSHOM OTIENO** of Kenya Methodist University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: **FACTORS INFLUENCING THE UPTAKE OF COVID-19 VACCINATION AMONG BODA BODA RIDERS IN MATHARE SUB-COUNTY, KENYA** for the period ending : **12/January/2024**.

License No: **NACOSTI/P/23/22848**

601257

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY &
INNOVATION

Verification QR Code



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Scan the QR Code using QR scanner application.

See overleaf for conditions

APPENDIX V: SERC APPROVAL LETTER



KENYA METHODIST UNIVERSITY

P. O. BOX 267 MERU - 60200, KENYA
TEL: 254-064-30301/31229/30367/31171

FAX: 254-64-30162
EMAIL: INFO@KEMU.AC.KE

December 7, 2022

KeMU/SERC/HSM/28/ 2022

John Gershon Otieno
HSM-3-0604-1/2020

Dear JOHN,

**SUBJECT: FACTORS INFLUENCING THE UPTAKE OF COVID -19 VACCINATION
AMONG BODA BODA RIDERS IN MATHARE SUB-COUNTY KENYA**

This is to inform you that Kenya Methodist University Scientific Ethics and Review Committee has reviewed and approved your research proposal. Your application approval number is KeMU/SERC/HSM/28/2022. The approval period is 7th December 2022 – 7th December 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 Kenya Methodist University Scientific Ethics and Review committee.
- 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 KeMU SERC within 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 KeMU SERC within 72 hours.
- V. Clearance for export of biological specimens must be obtained from relevant institutions.