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Determinants of COVID-19 Vaccine Uptake among Boda-Boda Riders in Mathare, Kenya

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Abstract

Coronavirus disease (COVID-2019) is a novel, highly infectious disease rapidly spreading worldwide. Kenya began the immunization campaign at the beginning of March 2021 with AstraZeneca vaccines, and by June 2022, a total of 18.5 million doses of the coronavirus vaccine had been administered. Due to low uptake of the Coronavirus Disease 2019 vaccine, the Kenyan government called for prioritizing interventions to improve vaccine uptake. This study examined the influence of perception, prior exposure to coronavirus, policy, individual factors, and access to Coronavirus Disease 2019 vaccines on uptake of COVID-19 vaccination among Boda-Boda cyclists in Mathare Sub-County, Nairobi. This was a cross-sectional study with a sample size of 138 Boda-Boda cyclists. The data were purely quantitative and were collected using a structured questionnaire. Simple random sampling was used to select respondents. Data were analyzed using SPSS version 21, and both descriptive and inferential statistics (chi-square, logistic regression) were used. The study found that only a quarter (35 [25%]) of respondents had been vaccinated, of whom 84 (60%) had received the first dose and 56 (40%) had received the required 2 doses. A third (47 [33.6%]) of vaccinated respondents preferred the Johnson & Johnson vaccine. Regarding how policies affected uptake of the COVID-19 vaccine, 97 (69.3%) disagreed that they got vaccinated because they wanted to receive services from government offices. Regarding vaccine accessibility, 78 (55.7%) of respondents agreed that they could get vaccinated at their local health facilities and at any time. The coefficients associated with individual factors, perceptions, policies, and vaccine accessibility were statistically significant ($P < .05$). The study recommends conducting more educational campaigns on the illness and the need for vaccination.

Keywords: *Uptake of COVID-2019 vaccine, accessibility, perception, government policy.*

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1.0 Introduction

The global community has been affected by the transmission of Coronavirus Disease 2019 (COVID-2019) (Shrestha et al., 2020; Khatiwada et al., 2021). Full-scale vaccination of community members can help prevent transmission from infected to uninfected individuals and reduce mortality, even though vaccines may not fully protect against COVID-2019 (Cascini et al., 2021). The rapid spread of COVID-2019 resulted in significant health, economic, environmental, and social concerns for the entire human population, as measures such as lockdowns, mask-wearing in public places, and the use of hand sanitizers were implemented. This prompted many scientists and the world at large to dedicate time and resources to developing a vaccine. In December 2020, scientists developed the first vaccine. This Pfizer-BioNTech COVID-2019 vaccine was approved by the U.S. Food and Drug Administration (FDA) and the UK government for administration to individuals 16 years of age and older (Tanne, 2021). Soon after, many more vaccines were developed as alternatives to Pfizer's. However, the virus developed mutations, giving rise to new variants such as Delta and Omicron. These new variants have left most of the initial vaccines requiring booster shots to increase their effectiveness (Burki, 2022). The development of these vaccines has been very welcome, as they have allowed for partial, if not full, reopening of the world's economy and have saved numerous lives. Despite vaccines' reprieve from the pandemic, uptake has been met with varying degrees of acceptance. In the US, the vaccine acceptance rate among citizens is 54% (Lindholt et al., 2021). Sallam (2021) posited that vaccine acceptance among adults varied, with the highest rates in Ecuador (97.0%) and China (91.3%), while Kuwait had the lowest acceptance rate for the 2019 coronavirus vaccination (23.6%). These findings were well-integrated and explained using the Health Belief Model or the Theory of Planned Behavior, which anchored this study.

The virus also spread across the African continent, with 8 million cases reported as of 2021 and more than 150,000 deaths. South Africa and Egypt were among the countries hardest hit. However, despite the impending danger, most Africans are hesitant to take the vaccine. This COVID-19 vaccine hesitancy can be attributed to several factors, including denial of the existence of COVID-19, misinformation, attitudes, religion, and a lack of trust in the pharmaceutical industry (Afolabi & Ilesanmi, 2021). In Kenya, as of 2021, 320,000 cases and 5500 deaths had been reported, signaling the toll the disease had on the country. The government rolled out a mass vaccination program to reach the majority of its population and prevent the spread of the virus. However, the program continues to face a high hesitancy of 36.5% among citizens. To reduce these rates, the government implemented measures to slow the spread and increase vaccination uptake (Orangi et al., 2021).

Due to the widespread spread of the virus, there has been significant advocacy and information on the importance of vaccination to help control its spread. However, this has been met with resistance and rejection, raising serious concerns. This has led the

government to call for prioritizing actions as part of the vaccine roll-out plan to address vaccination hesitancy and boost vaccine confidence (Oyekale, 2021). As a result, the government has launched a vaccination initiative to distribute free vaccine doses (Orangi et al., 2022). Despite being a high-risk group, motorcycle cyclists, commonly referred to as "Boda-Boda" cyclists, have been slow to take up the Coronavirus Disease 2019 vaccination. Reasons include limited access to the vaccine, concerns about side effects, and a lack of trust in the vaccine. However, cyclists' perceptions also need to be understood to design effective interventions to increase uptake. It is based on this gap that the current paper aims to examine the influence of perception on the uptake of Coronavirus Disease 2019 vaccination among Boda-Boda cyclists in Mathare sub-county, Kenya. The Coronavirus Disease 2019 pandemic has affected various aspects of life, including transportation. In many countries, Boda-Boda cyclists have been identified as a high-risk group for contracting and transmitting the virus due to the nature of their work. Despite the availability of vaccines, uptake among Boda-Boda cyclists has been low. The current study aimed to identify factors influencing perceptions of the uptake of Coronavirus Disease 2019 vaccination among Boda-Boda cyclists, to identify potential barriers and opportunities to increase vaccination rates.

2.0 Materials and Methods

The research design used in this study was a cross-sectional survey because the study involved a large population and a large sample size. The study targeted Boda Boda riders within Mathare sub-county. Because the target population of all Boda Boda riders in Mathare was unknown, the study used a sample size formula for an infinite population Godden (2004) to determine a representative sample size. A sample of 138 cyclists was selected. A simple random sampling approach was used to select respondents. A semi-structured questionnaire with a 5-point Likert scale was used to collect data (Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), and Strongly Disagree (SD)). The scale helped the researcher determine the extent to which respondents agreed on various issues related to the research objectives. The data collection tool was pilot-tested with 15 respondents, and both forms of validity (content and face validity) were assessed. Data collection on vaccine uptake hesitancy factors was conducted in 2023.

"This study concludes that there is a statistically significant relationship between perception and COVID-19 vaccine uptake among Boda-Boda cyclists in Mathare Sub-County, Kenya."

The study adopted a Cronbach's alpha of 0.7 as the threshold for reliability. The collected data were checked for consistency and completeness, then coded and entered into

SPSS v26. To analyze the quantitative data collected using the structured questionnaire, descriptive and inferential statistics (chi-square and logistic regression) were used to assess the association between the risk factor and COVID-19 vaccine uptake. Ethical approval was sought from the KEMU SERC, and NACOSTI Permit No. NACOSTI/P/23/22848 was provided before data collection. Furthermore, informed consent was obtained from the study participants.

3.0 Results and Discussion

Demographic Characteristics

The study sought to investigate the demographic characteristics of the Boda-Boda cyclists, including gender, age, marital status, and educational level. The majority of respondents (95%) were male. (70.7%) were between 18 and 35, and (27.1%) were between 35 and 50. About half (56.3%) were married, and (43.0%) reported being single. Regarding educational background, (49.3%) of respondents had attained secondary school level of education. See Table 1.

Table 1

Respondents' Demographic Characteristics (n = 140)

Characteristics		Frequency	Percentage
	Male	133	95.0
Gender	Female	7	5.0
	Single	60	43.0
Marital Status	Married	79	56.3
	Others	1	0.8
	University	14	10.0
Education Level	College	54	38.6
	Form 4	69	49.3
	None	3	1.4
	> 45	3	2.1
Age Bracket	31-45	38	27.1
	18-30	99	70.7

Uptake of Coronavirus Disease 2019 vaccination among Boda-Boda cyclists

The respondents were asked whether they had received the Coronavirus Disease 2019 vaccine. A vast majority, 105 (75.0%), indicated no, while a quarter, 35 (25.0%), indicated yes. The study further examined the type of vaccine received among vaccinated individuals. Results show that the majority of respondents, 20 (57.14%), had received the Johnson & Johnson vaccine, 10 (28.57%) had received AstraZeneca, and 5 (14.29%) had received Moderna. This implies that Johnson & Johnson's vaccine was the most preferred. The study concluded that 20 (57.14%) of the respondents who received Johnson & Johnson were fully vaccinated in accordance with the World Health Organization's Coronavirus Disease 2019 vaccination guidelines.

Perception of Coronavirus Disease 2019 Vaccination

A third of respondents (71.4%) agreed that Coronavirus Disease 2019 vaccination was an effective way to control the Coronavirus Disease 2019 virus. However, 70.7% believed that Coronavirus Disease 2019 vaccines had been rapidly developed and approved too soon without proper testing, and 63.6% believed that the Coronavirus Disease 2019 vaccine could cause other health issues. See Table 2.

Table 2

Perception of Coronavirus Disease 2019 Vaccination

Statements	Agree		Disagree	
	n	%	n	%
I believe that the Coronavirus Disease 2019 vaccine might cause health complications in the future after uptake.	100	71.4	40	28.6
I believe that the Coronavirus Disease 2019 vaccines were rapidly developed and approved too soon, without proper testing.	99	70.7	41	29.3
I believe that the Coronavirus Disease 2019 vaccines produced in Europe or America may contain chemical substances that are unsafe for our use.	64	45.7	76	54.3
I believe that the Coronavirus Disease 2019 vaccine messes with one's genetics.	104	73.7	37	26.2
I believe that pharmaceutical companies are producing an unsafe and ineffective Coronavirus Disease 2019 vaccine that causes other health issues.	89	63.6	51	36.5

Individual Factors and Uptake of Coronavirus Disease 2019 Vaccine

Table 3 presents the responses of the various individual actors that influenced the uptake of the Coronavirus Disease 2019 vaccine among Boda-Boda cyclists in Mathare. See Table 3.

Table 3

Individual Factors and Uptake of Coronavirus Disease 2019 Vaccine

Statements	Agree		Disagree	
	n	%	n	%
I am old enough to decide against Coronavirus Disease 2019.	137	97.7	3	2.1
I am grouped as a vulnerable individual.	31	22.3	109	77.7
Vaccines boost one's immunity against Coronavirus Disease 2019.	112	79.7	28	20.3
I need at least two doses of the AstraZeneca vaccine being offered in my local hospital	48	34.1	92	66.2
As an adult, I am allowed to take the *Coronavirus Disease* 2019 vaccines	126	90.5	13	9.5

The study findings revealed that most (97.7%) respondents were old enough to make decisions about whether to take the vaccine. Most respondents (66.2%) were unaware that they needed at least two doses of the AstraZeneca vaccine. The study further examined the influence of religion on the uptake of Coronavirus Disease 2019 among Boda-Boda cyclists. Most (71.1%) respondents thought that churches did not help mobilize members to get vaccinated. However, the majority (85.5%) of respondents indicated that churches in Mathare observed preventive measures against Coronavirus Disease 2019. Most (71.4%) of the Boda-Boda cyclists agreed that the Coronavirus Disease 2019 vaccine may cause health complications in the future. (45.7%) agreed that Coronavirus Disease 2019 vaccines manufactured in America or Europe were safer compared to those manufactured in other countries. (73.7%) agreed that the Coronavirus Disease 2019 vaccine messes with one's genetics. However, (75%) agreed that vaccination could control the virus.

Multivariate logistic regression

Multivariate logistic regression aimed to assess the influence of each predictor variable on the response variable. The procedure involved performing iterations using multivariate logistic regression. All five predictors were regressed against the response variable. See Table 3.

Table 4

Multivariate logistic regression results

Variable		B	S.E.	df	P-Value	OR
Perception	Negative (RC)					1.000
	Positive	0.19	0.589	1	0.001	1.210
Information About CORONAVIRUS DISEASE 2019	Incorrect (RC)					1.000
	Correct	0.022	0.568	1	0.003	1.022
Disease Severity	Not Severe (RC)					1.000
	Severe	0.364	0.727	1	0.006	1.439
Income	Income Never Reduced (RC)					1.000
	Income Reduced	0.175	0.775	1	0.029	1.191
Awareness	Not Aware (RC)					1.000
	Aware	0.158	1.146	1	0.012	1.171
Policy Enforcement	Fully Enforced (RC)					1.000
	Not Fully Enforced	-0.231	0.534	1	0.036	0.794
Religion	Others (RC)					1.000
	Christians	0.663	0.662	1	0.317	1.940
	Muslims	0.148	0.915	1	0.871	1.160
Knowledge	Aware (RC)					1.000
	Not Aware	-0.351	0.717	1	0.024	0.704
Accessibility	Not Accessible (RC)					1.000
	Accessible	0.609	0.092	1	0.998	1.839

The results indicated that Boda-Boda operators' perceptions of the Coronavirus Disease 2019 vaccination were associated with vaccine uptake in Mathare sub-county. Boda-Boda operators who held a positive view of the vaccine were 1.21 times more likely to be vaccinated than those who held a negative perception of the vaccine (P=0.001). Those who had correct information about the vaccine were 1.022 times more likely to be vaccinated than their counterparts who had incorrect information about the vaccine's efficacy (P=0.003).

Individual factors included knowledge of the severity of Coronavirus Disease 2019 and one's religious affiliation. Cyclists who did not know the seriousness of Coronavirus Disease 2019 infection were 0.704 times less likely to receive the vaccine than their counterparts. To determine whether prior coronavirus exposure influenced the uptake of Coronavirus Disease 2019 vaccination among Boda-Boda cyclists, results showed a significant relationship (OR = 1.439, P>0.05), indicating that those with prior exposure were 1.439 times more likely to go for COVID-19 vaccination than their counterparts who had once experienced mild Coronavirus Disease 2019 symptoms. In terms of income from the Boda-Boda business, operators with reduced income were 1.191 times more likely to receive the Coronavirus Disease 2019 vaccination. The results were statistically significant (P <). This means that many cyclists were likely to go for subsequent vaccination jabs recommended by the MOH after being infected with Coronavirus Disease 2019.

Boda-Boda cyclists who were aware of the existing policy framework for Coronavirus Disease 2019 vaccination were 1.171 times more likely to be vaccinated than their counterparts who were unaware of the existing policies on Coronavirus Disease 2019 vaccination. Where the vaccination policy was not fully enforced, Boda-Boda cyclists were 0.794 times less likely to be vaccinated. The results were statistically significant at P< 0.05. Most of the Boda-Boda cyclists had not been vaccinated. This finding aligns with the article by Salai et al. (2019), which found that a large proportion of people were not willing to participate in the COVID-19 vaccination exercise despite spirited efforts by governments, including making the vaccine free, a mystery this study seeks to unravel.

The majority (127, 90.5%) of respondents indicated that, as adults, they were allowed to take the COVID-19 vaccine. These findings are similar to a 2021 study of general adult patients across six healthcare institutions in Kenya, which found that most participants agreed that vaccination was necessary to protect themselves and others against Coronavirus Disease 2019, while 57 (40.5%) reported reluctance to take the vaccine due to perceived negative effects. In the same vein, a study by Elhaida et al. (2021) sought to provide the Malaysian government with data and vital information on strategies to increase public understanding and uptake of the Coronavirus Disease 2019 vaccine. The findings align with this study, indicating that limited knowledge hindered the uptake of the HPV vaccine in Malaysia.

Only 9 riders (6.6%) believed that the churches did not take precautions against COVID-19. This research supports a study by Sambo (2020) that claimed religious fanaticism was a significant determinant of the likelihood that Coronavirus Disease 2019 would be accepted in African nations. He said that recent years have seen a significant increase in the influence of religious leaders on their adherents. They have regularly offered support to their adherents in their pursuit of wellness. Their words thus have the power to dramatically raise or decrease the chance that people will accept and use

vaccines. The respondents believed that the Coronavirus Disease 2019 vaccine had been produced in a hurry and could cause other health issues. Osur et al. (2021) conducted a study to assess perceptions and attitudes toward Coronavirus Disease 2019 vaccines among Kenyan youth and to identify determinants of health-seeking attitudes toward Coronavirus Disease 2019 vaccination. According to the study, vaccine fear was reported to be 58% among youth. The major reason for apprehension about Coronavirus Disease 2019 vaccination among youth was a lack of knowledge and concerns 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 finding aligns with a study by Shah et al. (2022) examining how perceptions and knowledge influenced adult fear of the Coronavirus Disease 2019 vaccine in Kenya. This study's findings disagreed with those of Pogue (2020), who used questionnaires in a survey across the USA. The study revealed that those who were aware of many people with the disease were less likely to intend to get vaccinated than those who did not know anyone with the disease. The findings of the study also indicated that individuals who had a previous Coronavirus Disease 2019 diagnosis or for whom it was unclear whether they had a previous diagnosis had a lower likelihood of being vaccinated or of having a strong desire to be vaccinated, compared with people who had never had Coronavirus Disease 2019 before. This study aligns with findings from Schmelz and Bowles (2022), who examined resistance to voluntary Coronavirus Disease 2019 vaccination as a dynamic process.

4.0 Conclusion

This study concludes that there is a statistically significant relationship between perception and COVID-19 vaccine uptake among Boda-Boda cyclists in Mathare Sub-County, Kenya. The role of perception in vaccine uptake is critical not only for COVID-19 vaccination but also for vaccination in general and the introduction of new vaccines. Individual perceptions play a significant role in the uptake of the Coronavirus Disease 2019 vaccine, not only among Boda-Boda cyclists but also across the entire population. Addressing their concerns through education, access, and engagement with cultural beliefs and practices could improve vaccine uptake and promote a safer, healthier transportation sector. To increase vaccine acceptance, it is essential to address concerns and provide accurate information about the vaccine's safety and efficacy while countering misinformation and conspiracy theories. To address vaccine hesitancy, it is crucial to provide accurate, accessible information on the vaccine's safety and efficacy. Healthcare providers, public health officials, and trusted community leaders can play a critical role in providing education and addressing concerns. Additionally, efforts should be made to combat the spread of misinformation and conspiracy theories through targeted messaging and fact-checking.

5.0 Recommendations

The study recommends the following:

i. The Ministry of Health should organize more educational campaigns involving Boda-Boda cyclists as active participants through public road campaigns and Barraza's, and also organize training activities for the cyclists through various groups/Saccos in order to reduce the negative perception.

ii. The Ministry of Health should actively involve all stakeholders in health systems, including local politicians and religious and community leaders, to

champion the uptake of Coronavirus Disease 2019 vaccination among community members.

iii. The Ministry of Health should continue educational communication on Coronavirus Disease 2019 vaccination uptake through print media such as newspapers, radio, and television to counter misleading information about vaccinations.

iv. The government should develop leadership strategies that persuade citizens to participate in vaccination campaigns, increase citizen engagement on the importance of vaccination against Coronavirus Disease 2019, and assure the public of its safety.

Limitations of the Study

The study used self-reported questionnaires to assess COVID-19 vaccine uptake among a small sample of Boda-Boda riders in Mathare, Kenya. Thus, the results cannot be generalized to other vaccine uptake. Furthermore, the study included only Boda-Boda riders, and the results cannot be generalized to the general population, as cyclists were at higher risk of contracting COVID-19 at the time.

REFERENCES

Afolabi, A. A., & Ilesanmi, O. S. (2021). Dealing with vaccine hesitancy in Africa: the prospective COVID-19 vaccine context. *The Pan African Medical Journal*, 38(3) 67–77. doi: 10.11604/pamj.2021.38.3.27401

Burki, T. K. (2022). Omicron variant and booster COVID-19 vaccines. The Lancet Respiratory Medicine, 10(2), e17. doi: 10.1016/S2213-2600(21)00559-2

Cascini, F., Pantovic, A., Al-Ajlouni, Y., Failla, G., & Ricciardi, W. (2021). Attitudes, acceptance, and hesitancy among the general population worldwide to receive the CORONAVIRUS DISEASE 2019 vaccines and their contributing factors: A systematic review. *EClinicalMedicine, 40(1)*, 101–113. doi: 10.1016/j.eclinm.2021.101113.

Jørgensen, F., Bor, A., Lindholt, M. F., & Petersen, M. B. (2021). Public support for government responses against COVID-19: assessing levels and predictors in eight Western democracies during 2020. *West European Politics*, 44(5-6), 1129–1158. https://doi.org/10.1080/01402382.2021.1925821

Khatiwada, A. P., Maskey, S., Shrestha, N., Shrestha, S., Khanal, S., Kc, B., &Paudyal, V. (2021). Impact of the first phase of the Coronavirus Disease 2019 pandemic on childhood routine immunisation services in Nepal: a qualitative study on the perspectives of service providers and users. *Journal of pharmaceutical policy and practice*, *14*(1), 1–10. https://doi.org/10.1186/s40545-021-00366-z

Orangi, S., Kairu, A., Ngatia, A., Ojal, J., & Barasa, E. (2022). Examining the unit costs of COVID-19 vaccine delivery in Kenya. *BMC Health Services Research*, 22(1), 1-12. OIhttps://doi.org/10.1186/s12913-022-07864-z

Orangi, S., Pinchoff, J., Mwanga, D., Abuya, T., Hamaluba, M., Warimwe, G., & Barasa, E. (2021). Assessing the level and determinants of COVID-19 vaccine confidence in Kenya. *Vaccines*,

9(8), 936–947.
doi: 10.3390/vaccines9080936

Osur, J. O., Chengo, R., Muinga, E., Kemboi, J., Sidibe, M., & Rarieya, M. (2021). Determinants of COVID-19 Vaccine Behavior Intentions among the Youth in Kenya: A Vaccine Pre-Introduction Study. *Archives of Public Health* 80(159)67-78

Osur, J., Muinga, E., Carter, J., Kuria, S., Hussein, S., &Ireri, E. M. (2022). COVID-19 vaccine hesitancy: Vaccination intention and attitudes of community health volunteers in Kenya. *PLOS Global Public Health*, *2*(3), e0000233.

Oyekale, A. S. (2021). Compliance Indicators of COVID-19 Prevention and Vaccines Hesitancy in Kenya: A Random-Effects Endogenous Probit Model. *Vaccines*, 9(11), 1359.
DOI: 10.3390/vaccines9111359

Sallam, M. (2021). COVID-19 vaccine hesitancy worldwide: a concise systematic review of vaccine acceptance rates. *Vaccines*, *9*(2), 160.

Schmelz, K., & Bowles, S. (2022). Opposition to voluntary and mandated COVID-19 vaccination as a dynamic process: Evidence and policy implications of changing beliefs. *Proceedings of the National Academy of Sciences*, 119(13), e2118721119.

Shah, J., Abeid, A., Sharma, K., Manji, S., Nambafu, J., Korom, R., & Ali, S. K. (2022). Perceptions and Knowledge towards COVID-19 Vaccine Hesitancy among a Subpopulation of Adults in Kenya: An English Survey at Six Healthcare Facilities. *Vaccines*, 10(5), 705-715.
Doi: 10.3390/vaccines10050705

Shrestha, R., Shrestha, S., Khanal, P., & Kc, B. (2020). Nepal's first case of CORONAVIRUS DISEASE 2019 and public health response. *Journal of Travel Medicine*, *27*(3),0–24. 27(6): taaa105. doi: 10.1093/jtm/taaa105.

Tashakkori, A., &Teddlie, C. (2009). Integrating qualitative and quantitative approaches to research. *The SAGE handbook of applied social research methods*, *2*, 283–317. https://doi.org/10.4135/9781483348858