

Establishment of the Influence of Individual Factors on COVID-19 Vaccine Uptake Among Healthcare Providers in Yatta Sub-County, Machakos County

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Abstract: **Introduction:** Globally, approximately 70.5% of people have received at least one COVID-19 vaccination, with a total of 13.52 billion doses administered and an average of 35,159 doses given daily. Countries with notably low acceptance rates include Jordan, Russia, Ghana, Syria, and Lebanon. Vulnerable groups, such as pregnant women, Black individuals, and those with lower socioeconomic status, tend to have lower vaccine acceptance rates. **Methodology:** The researcher utilized a cross-sectional descriptive design and employed simple random sampling for data collection. The study employed a census of the 370 CHPs and the 26 vaccinators. The structured questionnaire and key informant interviews were utilized to gather data. Before data collection began, informed consent was obtained from all participants, who were also provided with an explanation of the study's objectives and potential benefits. **Results and Findings:** The study found that individual factors including; age, gender, marital status, and education significantly influence the uptake of the COVID-19 vaccine. This is evidenced by Chi-square values of 27.9, 23.4, 21.2, and 33.5, with corresponding p-values of 0.000, 0.013, 0.015, and 0.021. The analysis of individual factors affecting the uptake of the COVID-19 vaccine in Yatta Sub-county, Machakos County, highlights that age, gender, education level, and marital status significantly affect the uptake of the vaccine. **Conclusion:** The study found that individual factors such as marital status, education level, gender, and age substantially influenced the decision to take the COVID-19 vaccine. For instance, younger individuals may have been more hesitant than elderly people, though people with higher education levels were more inclined to get vaccinated. Similarly, gender and marital status were discovered to influence vaccine uptake, with some tendencies being more prevalent in specific groups.

Keywords: Vaccine Uptake, Individual Factors, COVID-19 Vaccination and Demographic Influence.

1. Introduction

A. Background of the Study

The virus responsible for Coronavirus Disease (COVID-19) is Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). This lungs infection first appeared in Wuhan, China, in December 2019 and quickly spread across the globe. The first

case of this disease in Saudi Arabia was identified on March 2, 2020 [1]. On March 11, 2020, the World Health Organization (WHO) officially declared COVID-19 a global pandemic.

The emergency phase of COVID-19 has come to an end, but the virus is still active and changing. The WHO (2023) states that individuals with pre-existing health conditions and older adults are more vulnerable to contracting the virus. Vaccines aid in preserving the health of those affected by COVID-19 and decrease the chances of it developing new variants.

Vaccines are widely regarded as one of the greatest medical advancements of all time, yet there has been a lingering hesitation about them since the beginning. As the availability of COVID-19 vaccines spreads, so too may vaccine hesitancy, becoming a major factor in the ongoing progression of the pandemic [2].

As governments strive to accelerate the distribution of vaccines, the issue of vaccine hesitancy poses a potential obstacle to achieving widespread COVID-19 immunization. Recognized by the WHO as a significant global health concern, vaccine hesitancy encompasses various attitudes towards vaccination, ranging from deep skepticism regarding its effectiveness, safety, and suitability to relatively minor reservations [3].

B. Statement of the Problem

As new vaccines continue to emerge to respond to the spreading COVID-19 pandemic and the new cases of infection of the disease continue to decrease, experts posit that there still is a low acceptance of Covid 19 vaccines. Most parts of the country remain unvaccinated. As of October 2022, the Ministry of Health in Kenya indicated that just 36.2% of the adult population had completed their vaccination [4]. Machakos County received a total of 630,169 doses of various vaccines between March 2021 and October 2022, according to the Office of the Auditor General Report 2022. Out of this total, 594,209 doses were administered, leaving 12,596 doses in stock as of October 31, 2022. The remaining 23,364 doses were either

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expired, damaged, wasted, or unaccounted for [5].

2. Methodology

The research used a descriptive cross-sectional design. The design also enables the researcher to collect data quickly and accurately on a wide range of variables that are of interest in the study. The study was carried out in Yatta Sub County. The 370 Community health promoters (CHPs) who mobilize individuals to seek prophylactic and curative healthcare services including COVID 19 vaccination forms this research target population. It also included 26 nurses who carry out the COVID 19 vaccination. 16 key informants who were; SCHRIO, SCPHN, SCHPO and the 13 facility in-charges representing the selected facilities as they are knowledgeable about the uptake of COVID 19 vaccine and its determinants.

Health facilities were selected using simple random sampling of the health facilities in the wards so that all facilities have a chance of being selected. The researcher adopted primary data that was gathered using designed questionnaires and Key informant interviews. SPSS software system utilized for data analysis due to its ability to generate mathematical computations and graphical analysis in a structured manner.

The researcher received approval to conduct this study from the Ethics and Research Committee of Mount Kenya University, as well as the MKU Postgraduate School. In addition, approval was obtained from the Machakos County Research and Ethics Committee. The National Commission for Science, Technology, and Innovation (NACOSTI) was also consulted to secure a clearance permit for the study. To uphold respondent anonymity, respondents' names were redacted from all research documents and replaced with assigned numbers for survey questionnaires.

3. Results and Discussion

The researcher set to ascertain whether respondent individual factors affected the uptake of COVID-19 vaccines. The participants were to reveal their agreement to the provided statements using a Likert Scale, 1=No Extent, 2= Little Extent, 3=Moderate Extent, 4=Great Extent, and 5=Very Great Extent.

The outcomes revealed that 47.4% of the respondents thought that the uptake of COVID-19 vaccines is affected by age. The p-value of 0.000 and Chi-square of 27.9 further show that age significantly influences COVID-19 vaccines uptake. The results are affirmed by [6] and [7] who established that age significantly influences the uptake of COVID-19 vaccines in different contexts. This result suggests that older individuals are more likely to get vaccinated, aligning with findings from [8]

which show that older age groups are generally more receptive to vaccination. The heightened vaccine uptake among older adults may be attributed to their higher perceived risk of severe illness from COVID-19.

A significant association exists between gender and the uptake of COVID-19 vaccines was also noted with a p-value of 0.013 and Chi-square value of 23.4. The outcomes are alike to those of [6] and [7] who investigated factors influencing uptake of COVID-19 vaccine in various contexts and found that gender significantly affects vaccine uptake which found that higher education is linked to greater health literacy and a higher likelihood of engaging in preventive health behaviors, including vaccination.

The level of education affects the COVID-19 vaccines uptake significantly as shown by a p-value of 0.015 and Chi-square value of 21.2. The findings align with those of [9] who found that education level significantly affects vaccine hesitancy. Similarly, Mose et al. (2022) demonstrated that completing secondary education or higher was a significant factor in the COVID-19 vaccines in Ethiopia. Viswanath et al. (2021) also found that individuals with limited education were less likely to receive vaccines for themselves or their dependents, indicating that education level significantly influences COVID-19 vaccine uptake.

A significant association exists between marital status and the uptake of COVID-19 vaccines as revealed by a Chi-square value of 33.5 and a p-value of 0.021. The outcomes are alike with those of [10] who established that the unmarried were expressively more likely to take COVID-19 vaccination in Malaysia. Similarly, [11], found that individual factors such as being married was a significant contributor to higher levels of vaccine hesitancy.

In summary, the researcher's outcomes are in line with the literature that exist, emphasizing the important of individual factors such as marital status, gender, age and education level on the uptake of COVID-19 vaccines. These outcomes collectively underscore the importance of considering these individual factors to promote higher vaccine uptake.

A. Thematic analysis on the individual Factors and the Uptake of COVID-19 Vaccines

1) Perceptions of Vaccine Safety and Efficacy

"The perception of how safe and effective the vaccine is important in a person's decision to get vaccinated. People need to believe that the vaccine has been tested properly and is safe."

Positive perceptions can lead to higher vaccination rates, while negative perceptions can cause hesitancy, leading to a prolonged pandemic.

Table 1
Individual factors and the uptake of COVID-19 vaccines

Test Item	NE	LE	M	GE	VGE	Chi-square value (df, n, χ^2)	P-value
	F (%)	F (%)	F (%)	F (%)	F (%)		
Age influences the uptake of COVID-19 vaccines	59 (17.2%)	163 (47.4%)	55 (16.0%)	45 (13.1%)	22 (6.4%)	(4, 344, 27.9)	P = 0.000
Gender influences the uptake of COVID-19 vaccines	109 (31.7%)	169 (49.1%)	30 (8.7%)	14 (4.1%)	22 (6.4%)	(4, 344, 23.4)	P = 0.013
The level of education influences the uptake of COVID-19 vaccines	89 (25.9%)	146 (42.4%)	25 (7.3%)	52 (15.1%)	32 (9.3%)	(4, 344, 21.2)	P = 0.015
Marital status influences the uptake of COVID-19 vaccines	96 (27.9%)	148 (43.0%)	52 (15.1%)	22 (6.4%)	26 (7.6%)	(4, 344, 33.5)	P = 0.021

2) Individual Risk vs. Vaccine Side Effects

"People often think about their own risk of getting COVID-19 compared to the potential side effects of the vaccine. If they think the risk is high, they're more likely to get vaccinated."

Balancing individual risk with concerns about side effects is essential to achieving widespread vaccine uptake.

3) Social Norms and Endorsements

"What others in the community are doing and what leaders are saying really impacts people's decisions. If vaccination is seen as a normal thing, more people will do it. When our local chief got vaccinated and talked about it, many others followed. But where there's silence or doubt among leaders, it spreads quickly and people hold back."

Strong social norms in favor of vaccination can lead to higher acceptance rates, helping to control the pandemic and reduce the burden on healthcare systems.

4) Past Vaccine Experiences

"If someone has had a good experience with vaccines before, they're more likely to be vaccinated. Bad experiences make them hesitant. For instance, a man mentioned that his child had a bad reaction to a vaccine year ago, and now he's very cautious about this one. Past experiences, whether good or bad, stick with people and affect their decisions now."

Positive past experiences with vaccines can boost confidence in the COVID-19 vaccine, while negative experiences may create significant barriers to acceptance and uptake.

5) Cultural Beliefs

"Cultural attitudes towards medicine and healthcare, including trust in modern medicine, really affect whether people will accept the vaccine. In some families, traditional beliefs are very strong, and they're skeptical of anything new or 'foreign.' Others might see getting vaccinated as going against their cultural practices. However, in communities where modern medicine is trusted, vaccine uptake is higher."

Aligning vaccine efforts with cultural beliefs can enhance community protection, while cultural resistance may require targeted outreach, education, and engagement to overcome hesitancy.

B. Receptive Groups to COVID-19 Vaccine

1) Older Adults

"Older people understand their higher risk and are more willing to get vaccinated. They've lived through other epidemics and know the importance of protection. One elderly man told me, 'I've seen what COVID can do to people my age; I want to be safe.' Their experiences with other illnesses make them more open to taking the vaccine."

High uptake among older adults can significantly reduce severe cases and strain on healthcare, making it a priority to focus on this group in vaccination efforts.

Sub-theme: Healthcare Workers

"Front lines Healthcare workers know the importance of getting vaccinated. They've seen the worst of COVID-19 and don't want to become patients themselves. A nurse mentioned, 'I've seen what happens when people aren't protected. I got vaccinated to protect myself and my family.'"

Vaccination among healthcare workers not only protects

them but also boosts public confidence in the vaccine, as they are trusted sources of information and role models in the community.

2) Individuals with Underlying Health Conditions

"People with chronic illnesses see the vaccine as crucial because they know they're at higher risk. One woman with diabetes said, 'I can't afford to get sick with COVID. The vaccine gives me some peace of mind.' They understand the severity of the risk, making them more likely to seek vaccination."

Protecting this vulnerable group helps reduce severe outcomes from COVID-19 and supports the broader public health goal of reducing morbidity and mortality.

The individual factors influencing vaccine uptake in Yatta Sub-county are multifaceted. Key elements include perceptions of vaccine safety and efficacy, which are shaped by credible information and trust in healthcare authorities. Individual risk versus vaccine side effects, social norms, past vaccine experiences, and cultural beliefs also significantly impact vaccine acceptance. Groups such as older adults, healthcare workers, and individuals with underlying health conditions exhibit higher receptivity. Gender-based concerns and culturally influenced attitudes further affect decision-making processes regarding vaccination. Understanding and addressing these individual factors can lead to more targeted and effective vaccination strategies, improving overall uptake.

4. Summary, Conclusion and Recommendations

A. Summary

The assessment of the factors determining the uptake of COVID-19 vaccine among healthcare providers in Yatta Sub-county Machakos County revealed that individual factors, social-economic factors, psychological factors and vaccine-related factors significantly influence the uptake of COVID-19 vaccine in Yatta Sub-county Machakos County. The analysis of individual factors affecting the uptake of the COVID-19 vaccine in Yatta Sub-county, Machakos County, highlights that age, gender, education level, and marital status significantly affect the uptake of the vaccine. Age and gender play a crucial role, with evidence suggesting that older individuals and different genders exhibit varying vaccine uptake levels. Education level is also a key factor, as higher education correlates with greater vaccine uptake. Additionally, marital status impacts vaccine willingness, with unmarried individuals showing higher uptake rates.

B. Conclusion

The study found that individual factors such as marital status, education level, gender, and age substantially influenced the decision to take the COVID-19 vaccine. For instance, younger individuals may have been more hesitant than elderly people, though people with higher education levels were more inclined to get vaccinated. Similarly, gender and marital status were discovered to influence vaccine uptake, with some tendencies being more prevalent in specific groups. As a result, the study concluded that these individual qualities have a significant impact on vaccine acceptability, emphasizing the importance of

focused public health policies that take these aspects into account to increase vaccination rates.

C. Recommendations

The study recommended that individual factors significantly influence the COVID-19 vaccine, therefore the researcher recommends that the government should implement programs to enhance vaccine education and awareness, especially in areas with lower educational attainment through workshops and seminars on the benefits and safety of the COVID-19 vaccine.

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Declaration

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Ethical approval: MKU Approval and NACOSTI approval.

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