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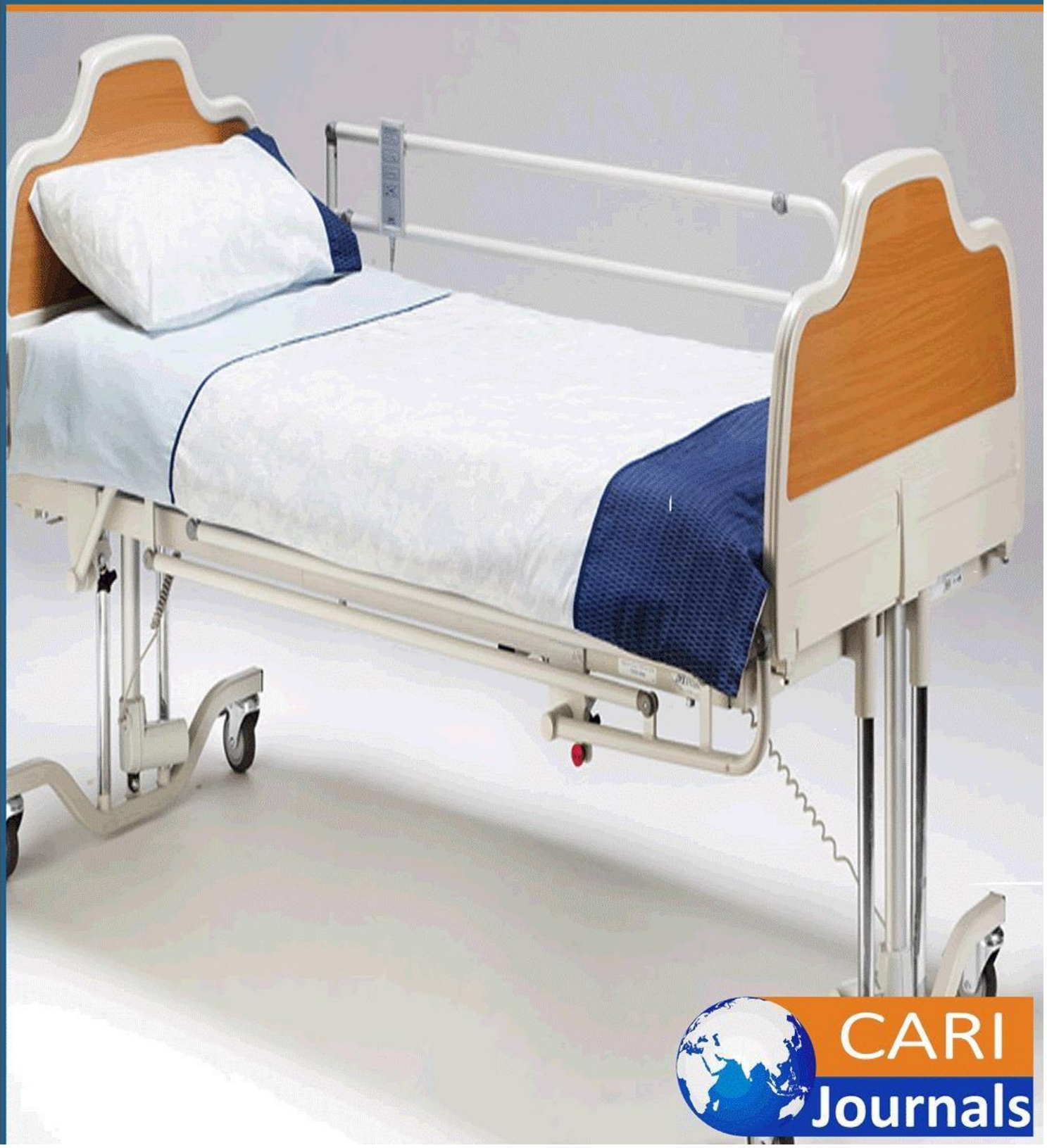

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Individual Factors Influencing Hepatitis B Vaccination Uptake among Nurses Working at Mbagathi County Hospital

Felistus N. Karanja[1*], Dr. Nkoroi Beatrice[2], Dr. Kirimi Kinoti[3]
https://orcid.org/0009-0008-1354-6738
[2]School of Nursing
Mount Kenya University
[3]School of Nursing
Medway Maritime Hospital, England

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Abstract

Purpose: This study aimed to investigate the hepatitis B vaccination coverage and barriers to its uptake among nurses at Mbagathi County Hospital. Rooted in health behavior theories, it sought to assess the social demographic factors, individual factors, and facility-related factors influencing Hepatitis B vaccination coverage among nurses working at Mbagathi County Hospital.

Methodology: The study employed a descriptive cross-sectional research design. The target population encompassed all nurses working at the hospital, totaling 168. Through a proportionate simple random sampling technique, a sample size of 118 nurses was identified for the study. The inclusion criteria focused on qualified nurses actively working in high-exposure areas, while those on leave, in administrative roles, or under training were excluded. Data collection was achieved using a self-administered semi-structured questionnaire, which was pretested for reliability and validity. Data management involved the utilization of Microsoft Excel for initial entry, followed by advanced statistical analysis using SPSS software version 25.

Findings: The results indicate that knowledge and awareness of Hepatitis B and its vaccination vary among nurses, with 60.5% reporting moderate knowledge and 34.2% indicating a high level of awareness. Only 5.3% reported low knowledge, suggesting that most nurses have an adequate understanding of Hepatitis B. The Chi-Square test results in Table 2 provide statistical evidence on the relationship between individual factors and Hepatitis B vaccination uptake among nurses at Mbagathi County Hospital. The test assesses whether there is a significant association between categorical variables, such as knowledge levels, risk perception, susceptibility, attitudes, and past vaccination experiences, with the likelihood of receiving the Hepatitis B vaccine. The Pearson Chi-Square value of 65.457 with 4 degrees of freedom (df) and a p-value of 0.000 indicates a highly significant relationship between individual factors and vaccine uptake.

Unique Contribution to Theory, Policy and Practice: This suggests that factors such as nurses' knowledge about Hepatitis B, perceived susceptibility, and attitudes toward vaccination play a critical role in determining their immunization status.

Keywords: *Individual Factors, Hepatitis B Vaccination, Uptake and Nurses*

1.0 Introduction

1.1 Background of the Study

Hepatitis B, a global health concern, was one of the most widespread and infectious blood-borne ailments (WHO, 2022). This illness originated from the Hepatitis B Virus (HBV), primarily targeting the liver and leading to significant and sometimes permanent damage. The disease manifested in various forms, ranging from acute to chronic or even asymptomatic states. Fatal consequences were possible, with approximately 15–20% of those with chronic HBV succumbing to liver-related complications, totaling nearly a million deaths annually. Globally, it stood as the primary cause of chronic liver ailments, including cirrhosis and hepatocellular carcinoma (HCC) (WHO, 2019).

HBV's infectious nature surpassed even that of HIV, being 50 to 100 times more infectious (WHO, 2019). In the Kenyan context, Ellin and Ellinor (2019) underscored the vulnerability of healthcare workers, especially nurses, stating that they were 2–4 times more at risk than the broader population. Guvenir and Arikan (2020) further expounded on this, revealing that nurses faced the highest exposure risks during or post-procedures. Kenyan nurses faced augmented risks compared to their global peers, attributed to a multitude of factors, including higher local HBV carrier rates, inadequate waste management, insufficient exposure response training, and weak enforcement of vaccination policies (Silla et al., 2022).

There was a critical gap in understanding the determinants of Hepatitis B vaccine adoption among Mbagathi County Hospital's nursing staff. Unpacking these determinants was vital for enhancing HBV prevention strategies within the institution.

1.2 Problem Statement

Hepatitis B remains a major occupational hazard for healthcare workers, especially nurses, due to their routine exposure to blood and bodily fluids during clinical procedures such as wound care, childbirth assistance, and surgical operations (Githanga, 2019). Despite the global availability of an effective and safe vaccine, uptake among healthcare workers in resource-constrained settings like Kenya remains alarmingly low.

However, despite the known risks and the availability of the vaccine, there is limited data on the actual vaccination coverage among nurses at Mbagathi and the specific factors influencing their decision to accept or decline the vaccine. This gap in local evidence hinders targeted intervention strategies and policy formulation to improve vaccine uptake.

Therefore, this study seeks to address this critical knowledge gap by examining the factors influencing the uptake of Hepatitis B vaccination among nurses at Mbagathi County Hospital. The findings will inform institutional and policy-level efforts to improve vaccination rates and enhance occupational safety for nurses.

2.0 Literature review

Soomar et al. (2021) undertook a study to evaluate the status of Hepatitis B vaccination among healthcare workers (HCWs) in two secondary care hospitals in Sindh, Pakistan, aiming to

discern the determinants affecting their vaccination levels. Utilizing a cross-sectional approach, the study applied multivariable ordinal logistic regression to explore how characteristics of participants, their knowledge about vaccination, and vaccination coverage were interrelated. Findings indicated varying vaccination rates among different healthcare professions, with 64.9% of doctors, 75.18% of nurses, 58.3% of allied healthcare personnel, 40.0% of laboratory staff, and 70.8% of housekeeping employees having completed the HBV vaccination series. The necessity for vaccination as a prerequisite for employment emerged as a significant factor influencing complete vaccination, showcasing the impact of job requirements on immunization decisions. Additionally, HCWs associated with Aga Khan Hospital in Karachi, particularly those vaccinated prior to their employment there, demonstrated a quadrupled likelihood of being vaccinated against Hepatitis B.

In a related vein, Ndunguru et al. (2023) investigated HBV vaccination uptake among healthcare workers in primary health facilities across the Mwanza region, North-Western Tanzania, through a cross-sectional analytical study. This research, carried out between June and July 2022 among workers in the Misungwi and Ilemela districts, involved 402 participants with an average age of 34.9 years. It was found that a mere 18% reported full vaccination against HBV. A higher vaccination uptake was observed in Ilemela than in Misungwi, with urban location and employment duration of over two years being associated with increased vaccination odds. Furthermore, perceived risk of HBV infection and history of needle-stick injuries were significantly correlated with higher vaccination rates.

Machmud et al. (2023) explored the determinants of Hepatitis B vaccine acceptance among Indonesian adults. The investigation highlighted factors such as residence in Yogyakarta versus Aceh, employment in healthcare, and possession of health insurance covering HBV vaccination as influencing vaccine uptake.

Mbori (2018) examined the factors affecting HBV vaccine uptake among healthcare workers at Kenyatta National Hospital using a cross-sectional descriptive design. The study, employing both structured questionnaires and in-depth interviews, revealed that 87% of participants were vaccinated, albeit only 10% completed the full three-dose regimen. Forgetfulness and various challenges were cited by those not fully immunized. Significant demographic characteristics were noted, with higher immunization numbers among doctors, nurses, lab personnel, and clinical officers, alongside a significant correlation between vaccine awareness and uptake.

Sikakulya et al. (2022) assessed HBV serological status and vaccination coverage among healthcare workers in the Butembo Antenna, Eastern Democratic Republic of Congo, through a cross-sectional study. Among the 373 participants, 47.7% had been screened for HBV, with full vaccination rates at a low 6.7%. Screening for HBV, awareness of post-exposure prophylaxis, understanding of the vaccine's benefits, and prior exposure to HBV were all positively associated with full vaccination.

Mhina (2022) assessed HBV vaccine prevalence and associated uptake factors among healthcare workers in Mtwara municipality, Tanzania. The descriptive cross-sectional study involved 149 HCWs, showing higher vaccination rates among clinical staff compared to non-

clinical staff and a notable difference in vaccine uptake based on education level. Awareness of HBV transmission and prevention was lower among non-clinical HCWs.

Jepkios (2019) targeted high-risk healthcare workers in a study that found 78.6% of respondents had a good knowledge of Hepatitis B, with the majority (90.6%) displaying positive attitudes towards HBV infection and vaccination. While knowledge levels did not directly correlate with vaccine uptake, a significant association was identified between positive attitudes and vaccination rates, highlighting the role of attitudes in vaccination decisions.

3.0 Methodology

This study adopted a descriptive analytical cross-sectional design to investigate the factors influencing the uptake of Hepatitis B vaccination among nurses at Mbagathi County Hospital. The research took place at Mbagathi County Hospital, located near the Kenyatta Golf Course in the Dagoretti District of Nairobi County, along Mbagathi Road, close to Kenyatta Market. The target population included all nurses working at Mbagathi District Hospital. There were five general wards gynecology, pediatrics, female medical, male medical, and the isolation ward along with the theatre unit and maternity department, which were purposively selected as the primary sampling units. By including a range of units that varied in patient age, condition, and required nursing care, the study aimed to ensure that the findings were representative of the broader nursing workforce at the hospital. Given that the sample size was under 10,000, the Yamane formula was utilized to determine the appropriate sample size for the study. Therefore 118 respondents was sampled.

The study included all qualified nurses working in the wards and emergency department who were available during the study period and who gave their consent to participate. The questionnaire underwent a pretest by the researcher at Kiambu County Hospital, specifically in the medical and surgical wards, with 10% of the sample size. The gathered data was assigned codes and input into Microsoft Excel 2013 for initial organization. All numerical statistical evaluations were executed using SPSS software, version 25. Descriptive statistics were used in the analysis, where means, standard deviations, and frequency distributions were calculated to provide an overview of the sample characteristics. Chi-square tests were used to explore associations between categorical variables. Approval for ethical considerations was pursued from both the MKU Ethical and Review Committee and the Mbagathi Research Ethics Committee. Additionally, a research permit was acquired from the National Council for Science and Technology.

4.0 Results and Findings

The identification of individual factors influencing Hepatitis B vaccination uptake among nurses is crucial in understanding the behavioral, psychological, and knowledge-based determinants that affect immunization rates. Individual perceptions of disease severity, susceptibility, and attitudes toward vaccination play a significant role in shaping healthcare workers' compliance with recommended immunization protocols. Understanding these factors

helps in designing targeted interventions to enhance vaccine uptake and reduce occupational risks among nurses.

4.1 Descriptive Analysis

Table 1 presents the nurses' responses regarding their knowledge, risk perception, susceptibility, attitudes, and past vaccination experiences, which are key determinants of vaccine uptake.

Table 1: Nurses response on the Identification of the individual factors influencing Hepatitis B vaccination uptake among Nurses

Individual Factor		f	%
How would you rate your knowledge and awareness regarding Hepatitis B and its vaccination?	Low	6	5.3%
	Moderate	69	60.5%
	High	39	34.2%
To what extent do you understand the risks associated with Hepatitis B infection for healthcare workers?	Low	3	2.6%
	Moderate	36	31.6%
	High	75	65.8%
How susceptible do you feel to getting a hepatitis B infection due to your work?	Very susceptible	75	65.8%
	Somewhat susceptible	39	34.2%
	Not susceptible at all	0	0.0%
	Unsure	0	0.0%
What is your attitude towards getting vaccinated for hepatitis B?	Positive	108	94.7%
	Neutral	6	5.3%
	Negative	0	0.0%
Have you had any negative experiences with vaccinations in the past?	Yes	15	13.2%
	No	99	86.8%

Source, Field Data (2025)

The results indicate that knowledge and awareness of Hepatitis B and its vaccination vary among nurses, with 60.5% reporting moderate knowledge and 34.2% indicating a high level of awareness. Only 5.3% reported low knowledge, suggesting that most nurses have an adequate understanding of Hepatitis B. Previous studies have shown that healthcare workers with higher awareness levels are more likely to get vaccinated (Alqahtani et al., 2021). However, despite relatively high knowledge levels in the current study, there remains a need for continuous education to ensure complete vaccine coverage.

Regarding understanding the risks associated with Hepatitis B infection for healthcare workers, 65.8% of respondents rated their understanding as high, while 31.6% reported moderate understanding. Only 2.6% had low awareness of the risks. These findings align with research indicating that healthcare professionals are generally aware of the occupational hazards associated with Hepatitis B but may still exhibit vaccine hesitancy due to misconceptions about vaccine safety (Adjei et al., 2022). The high risk perception reported in this study suggests that

nurses recognize the dangers of exposure to HBV, which is essential for promoting preventive behaviors, including vaccination.

When assessing perceived susceptibility to Hepatitis B infection due to work-related exposure, 65.8% of nurses felt very susceptible, while 34.2% reported feeling somewhat susceptible. None of the respondents indicated that they were not susceptible or unsure. These findings are in line with studies showing that perceived susceptibility is a major determinant of vaccine uptake among healthcare workers (Ochu et al., 2020). The high levels of susceptibility reported by nurses in this study could serve as a motivating factor for higher vaccination rates, as individuals who perceive themselves at greater risk are more likely to seek preventive measures.

Attitudes toward Hepatitis B vaccination were overwhelmingly positive, with 94.7% of respondents expressing a positive attitude and only 5.3% remaining neutral. No respondents reported a negative attitude. This high level of positivity towards vaccination supports findings from similar studies that emphasize the role of positive attitudes in increasing vaccine compliance among healthcare workers (Taru et al., 2021). However, while attitude is a crucial factor, vaccine uptake can still be hindered by logistical barriers such as accessibility, cost, and institutional support.

A small proportion (13.2%) of nurses reported having negative past experiences with vaccinations, while 86.8% indicated no such experiences. Negative vaccination experiences, such as side effects or pain at the injection site, have been identified as contributing factors to vaccine hesitancy (Eke et al., 2019). However, in this study, the relatively low proportion of nurses reporting negative experiences suggests that past adverse events may not be a significant barrier to Hepatitis B vaccination uptake.

Overall, the findings highlight that knowledge, risk perception, susceptibility, and attitudes play significant roles in Hepatitis B vaccine uptake among nurses. While high levels of awareness and positive attitudes are promising, addressing remaining concerns, including potential hesitancy due to past vaccination experiences, is essential. Future interventions should focus on reinforcing vaccine confidence through targeted education, institutional policies promoting vaccination, and addressing any lingering misconceptions that may affect vaccine uptake.

4.2 Inferential Analysis

Table 2: Chi Square Test on the Identification of the individual factors influencing Hepatitis B vaccination uptake among Nurses

Chi-Square Tests	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	65.457[a]	4	.000
Likelihood Ratio	31.343	4	.000
Linear-by-Linear Association	14.487	1	.000
N of Valid Cases	114		

Source Field Data (2025)

The Chi-Square test results in Table 2 provide statistical evidence on the relationship between individual factors and Hepatitis B vaccination uptake among nurses at Mbagathi County Hospital. The test assesses whether there is a significant association between categorical variables, such as knowledge levels, risk perception, susceptibility, attitudes, and past vaccination experiences, with the likelihood of receiving the Hepatitis B vaccine.

The Pearson Chi-Square value of 65.457 with 4 degrees of freedom (df) and a p-value of 0.000 indicates a highly significant relationship between individual factors and vaccine uptake. This suggests that factors such as nurses' knowledge about Hepatitis B, perceived susceptibility, and attitudes toward vaccination play a critical role in determining their immunization status. The Likelihood Ratio Chi-Square value of 31.343 further supports this finding, reinforcing the strength of the association. The Linear-by-Linear Association value of 14.487 with a p-value of 0.000 also demonstrates a strong linear relationship, meaning that as knowledge, awareness, and perceived susceptibility increase, vaccine uptake also improves.

The Chi-Square test assumes that the expected frequencies in each cell are sufficiently large (≥5) to ensure the validity of the results. A review of the data confirmed that this assumption was met, meaning the statistical findings are reliable and accurately reflect the relationship between individual factors and vaccine uptake.

These results align with findings from previous studies, such as those by Alqahtani et al. (2021), which demonstrated that healthcare workers with higher knowledge and risk perception were significantly more likely to receive the Hepatitis B vaccine. Similarly, a study by Adjei et al. (2022) found that positive attitudes toward vaccination and high perceived susceptibility were strong predictors of vaccine compliance among nurses.

The strong statistical significance observed in this study highlights the importance of educational interventions and awareness programs to further improve vaccine uptake.

While the results indicate a clear association between individual factors and vaccination, other external elements, such as institutional policies and accessibility of the vaccine, may also influence uptake and should be examined further. Overall, the Chi-Square test results confirm that enhancing knowledge, addressing concerns, and reinforcing positive attitudes among nurses can significantly boost Hepatitis B vaccination rates.

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5.0 Summary, Conclusion and Recommendations

5.1 Summary

The study identifies individual factors influencing Hepatitis B vaccination uptake among nurses, highlighting the roles of knowledge, risk perception, susceptibility, attitudes, and past

vaccination experiences. Findings indicate that most nurses have moderate to high knowledge of Hepatitis B, with 65.8% having a strong understanding of associated risks. Perceived susceptibility is also high, with 65.8% of nurses feeling very susceptible to infection. Attitudes toward vaccination are overwhelmingly positive (94.7%), though a small proportion (13.2%) reported negative past experiences. Statistical analysis using the Chi-Square test confirms a significant relationship between these individual factors and vaccination uptake, emphasizing the importance of targeted educational and policy interventions.

5.2 Conclusion

The study confirms that individual factors, particularly knowledge, perceived susceptibility, and positive attitudes, significantly influence Hepatitis B vaccination uptake among nurses. While awareness and willingness to vaccinate are generally high, remaining barriers such as past negative experiences and potential misconceptions must be addressed. Strengthening education and institutional policies can further improve vaccine uptake and reduce occupational risks for nurses.

5.3 Recommendations

i. Nursing Services Department (Mbagathi County Hospital)

Should organize continuous professional development sessions focused on occupational health and Hepatitis B prevention, to reinforce knowledge and correct misconceptions among nurses.

ii. Ministry of Health – Directorate of Preventive and Promotive Health

Should develop and implement national policies making Hepatitis B vaccination mandatory for all healthcare workers, while also improving vaccine accessibility and promoting compliance.

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