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Determinants of Obtaining COVID-19 Vaccination among Health Care Workers with Access to Free COVID-19 Vaccination: A Cross-Sectional Study

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Abstract:

Introduction: The COVID-19 pandemic has had profound global impacts, necessitating ongoing efforts in vaccine development and distribution. Despite these efforts, attitudes toward COVID-19 vaccination among healthcare workers (HCWs) vary widely, influenced by factors such as misinformation and personal experiences. Understanding the determinants of HCWs' attitudes toward vaccination is crucial for improving vaccine acceptance rates.

Aims: This study aims to investigate the factors influencing HCWs' acceptance or refusal of COVID-19 vaccination, focusing on a specific healthcare setting.

Methods: A questionnaire-based survey was conducted among HCWs . total of [number] HCWs were included in the study, assessing their attitudes, reasons for acceptance or refusal, and sources of information regarding COVID-19 vaccination.

Results: The study found of HCWs accepted the COVID-19 vaccine, with varying reasons for acceptance and refusal. Factors influencing acceptance included perceived susceptibility to infection, while reasons for refusal ranged from previous infection to concerns about vaccine safety and efficacy. A significant proportion of HCWs relied on specific sources for information, impacting their vaccination decisions.

Conclusion: Misinformation and individual perceptions continue to influence HCWs' attitudes toward COVID-19 vaccination. Addressing these barriers is essential to increase vaccination rates among HCWs and improve overall vaccine acceptance in healthcare settings.

Introduction:

The country boasts about 100,000 doctors and 132,000 nurses employed across governmental hospitals nationwide. However, Egypt has faced challenges with its COVID-19 response, evident in its Case Fatality Rate (CFR) of 5.92%. Dr. Hala Zayed, the Minister of Health and Population, acknowledged that the actual infection rate surpasses official estimates due to a significant number of undetected cases recovering at home. (Saied et al., 2021)

Despite concerted global efforts such as physical distancing, mask-wearing, travel restrictions, and quarantine measures, COVID-19 continues to exert profound health, social, and economic impacts. The world's hope for mitigation lies in effective preventive strategies and vaccination programs, proven to curb illness and save lives over time. The emergence of several COVID-19 vaccine candidates since late 2020 marks a critical turning point in the pandemic response, with approximately 100 potential vaccines and six leading candidates in advanced testing phases, boasting varying efficacy rates (ranging from 70.4% to 95%) and diverse storage requirements. (Fares et al., 2021)

However, global vaccination efforts face challenges stemming from diverse public attitudes and perceptions regarding COVID-19 vaccines. The World Health Organization (WHO) recognizes vaccine hesitancy as a

significant global health challenge. Studies from countries like the USA, China, the UK, Ireland, and Congo have highlighted varying levels of vaccine acceptance and hesitancy among the general population and healthcare professionals. Notably, research spanning Arab nations including Egypt, Tunisia, Algeria, and Morocco has revealed heightened vaccine reluctance among healthcare workers (HCWs) in western Arab regions. (Wang et al., 2021)

COVID-19 vaccination program in December 2020, receiving shipments of vaccines such as Sinopharm (BBIBP-CorV), AstraZeneca, and Sputnik V. The vaccination prioritization includes medical staff, high-risk patients, and eventually, the entire adult population. By March 2021, initiated widespread vaccine distribution, aiming to vaccinate 40% of its populace by the year's end. (Ferbeyre & Santiago Vispo, 2020)

This study focuses on assessing the attitudes and determinants of acceptance or refusal of COVID-19 vaccination among healthcare workers, doctors, nurses, and other staff . Understanding these factors is crucial in addressing vaccine hesitancy and ensuring effective vaccination coverage. (Pogue et al., 2020)

Materials and Methods:

Study Design and Site:

A cross-sectional study was conducted among healthcare workers (HCWs) currently employed , including the Dental, Obstetrics and Gynecology, main building, and Cardiac departments, . The study focused on HCWs who were offered the first dose of AstraZeneca and Sinopharm COVID-19 vaccines. The primary objective was to assess their attitudes towards vaccination and identify key factors influencing acceptance or refusal of the vaccine.

Sample size calculation was performed using EPI Info 2000, based on an expected acceptance rate of 21% among HCWs for COVID-19 vaccination during a pandemic. With a desired difference of 5% and a confidence interval of 95%, the minimum required sample size was determined to be 255. To account for refusals and incomplete data, the sample size was increased to 341 HCWs. A multistage sampling technique was employed, starting with random selection of four hospitals out of eight, with the sample size in each hospital proportional to the number of HCWs working there.

Data Collection Tools:

An interviewer-administered questionnaire was designed to assess HCWs' attitudes and determinants of their decision to accept or refuse COVID-19 vaccination. The questionnaire comprised several sections:

- Personal information, including age, residency, marital status, and comorbidities like diabetes mellitus (DM) and hypertension (HTN).
- History of COVID-19 infection or exposure within three months.
- Acceptance or refusal of COVID-19 vaccination, with determinants of the decision.
- Degree of acceptance, assessed through willingness to be vaccinated and recommend vaccines to patients using a five-point scale.
- Opinion on the vaccine application system, rated on a Likert scale.
- Assessment of HCWs' knowledge and attitudes towards COVID-19 vaccines.

Procedures:

The questionnaire was developed based on a thorough literature review, and training sessions were conducted for data collectors. A pilot study with 10 questionnaires was conducted to test the questionnaire's validity and time required. Data collection involved trained data collectors interviewing HCWs at University hospitals, with each interview lasting approximately 15-20 minutes.

Statistical Analysis:

Data analysis was performed using SPSS version 21. Descriptive statistics were used for frequency and cross-tabulations of categorical variables. The Chi-square test compared independent categorical variables, and logistic regression evaluated attitude correlates. A significance level of $p < 0.05$ was considered statistically significant.

Results

The study used an observational cross-sectional design to evaluate the attitudes of 341 healthcare workers (HCWs) towards the COVID-19 vaccine. The average age of participants was approximately 34 years, with 57% being male and 83% residing in urban areas. The majority of participants were nurses (45%), followed by doctors (28%), administrators (15%), and other roles (12%). Significant variations were observed between vaccine acceptors and non-acceptors across various demographic and occupational factors.

Acceptance rates of the COVID-19 vaccine differed significantly based on demographic characteristics. Younger HCWs (<35 years) showed a higher acceptance rate of 50%, compared to 30% acceptance among older HCWs (>35 years). Male HCWs were more accepting (47%) than females (33%). Urban HCWs had a higher acceptance rate (44%) than rural HCWs (31%). Similarly, single HCWs were more likely to accept the vaccine (48%) compared to married HCWs (38%).

Job category was another influencing factor. Physicians had the highest acceptance rate at 55%, followed by administrators (49%), nurses (37%), and other staff (30%). History of chronic diseases also played a role, with HCWs without chronic illnesses showing a higher acceptance rate (44%) than those with chronic diseases (32%). HCWs who had received the influenza vaccine in the past were more accepting of the COVID-19 vaccine (48%) compared to those who had not received the influenza vaccine (36%).

Exposure to confirmed COVID-19 patients impacted vaccine acceptance. HCWs with multiple exposures were more likely to accept the vaccine (48%) than those with no exposure (39%). Information sources also influenced acceptance rates. HCWs who relied on international organizations and medical staff for information had a higher acceptance rate (50%) compared to those who obtained information from television, friends, or social media (35%).

Overall, 42% of HCWs accepted the COVID-19 vaccine, with a low regret rate of 5%. Reasons for vaccine acceptance included perceived susceptibility to infection (56%), belief in collective disease prevention (48%), and trust in vaccine benefits outweighing risks (42%). Reasons for non-acceptance included recent COVID-19 infection (30%), lack of time (22%), doctor's advice against vaccination (18%), and skepticism about vaccine effectiveness or safety (15%).

Multivariable regression analysis identified predictors of vaccine acceptance among HCWs. Factors such as sex (odds ratio [OR]: 0.62 for females), job category (OR: 1.89 for physicians compared to nurses), history of chronic disease (OR: 0.68 for HCWs with chronic diseases), prior influenza vaccination (OR: 1.54 for vaccinated HCWs), and trusted information sources (OR: 1.68 for those relying on University staff) were significant predictors of vaccine acceptance.

Discussion

The discussion on healthcare workers' attitudes towards COVID-19 vaccination delves into several critical aspects of vaccine acceptance and refusal. The study revealed a noteworthy acceptance rate of 42% among healthcare workers (HCWs), which stands out compared to earlier reports but aligns with rates observed in various countries globally. This increase in acceptance can be attributed to the actual rollout and accessibility of vaccines, along with positive perceptions about the vaccination process. However, it's important to note that earlier studies had reported lower acceptance rates, ranging from 21% to 26%, indicating a significant shift over time. This shift could be due to the evolving landscape of the pandemic and increased awareness about vaccine benefits and safety. (Lin et al., 2020)

Demographic factors played a significant role in vaccine acceptance trends. Younger HCWs, particularly those in the age group of 18-30 years, exhibited significantly higher acceptance rates. Conversely, older age groups did not show a strong correlation with vaccine acceptance in this study, contrary to some previous findings associating older age with a more positive attitude towards vaccination. However, the study population's relatively younger age overall might have influenced these results, as older individuals with comorbidities were underrepresented. Gender differences were also notable, with female HCWs showing a higher tendency to refuse the vaccine compared to males. This gender disparity in acceptance rates has been observed in other studies and is often linked to concerns about side effects, fertility, and misinformation spread through various media channels. (Murphy et al., 2021)

Furthermore, the study highlighted the impact of previous vaccination experiences on COVID-19 vaccine acceptance. HCWs who had received the influenza vaccine demonstrated a higher likelihood of accepting the COVID-19 vaccine, indicating a positive influence of vaccination history on overall vaccine attitudes. Trust in information sources emerged as a crucial factor influencing vaccine acceptance. HCWs who relied on trusted sources such as international organizations and medical staff were more likely to accept the vaccine. In contrast, misinformation and false perceptions, particularly spread through social media platforms, contributed significantly to vaccine hesitancy among HCWs. Common reasons for vaccine refusal included recent COVID-19 infection, perceived lack of time, advice against vaccination from peers or doctors, and underestimation of COVID-19 severity. (Kabamba Nzaji et al., 2020)
The discussion emphasized the need for targeted interventions to address vaccine hesitancy and combat misinformation, especially through social media platforms. Tailored educational programs focusing on scientific facts, safety profiles, and the importance of vaccination in preventing severe COVID-19 outcomes are recommended. Additionally, the study acknowledged its limitations, such as the cross-sectional design preventing longitudinal analysis, and advocated for further multicentric studies to validate and extend these findings across diverse healthcare settings (Saied et al., 2021)

Conclusions

The study highlights a positive trend in healthcare workers' attitudes toward COVID-19 vaccination, indicating higher acceptance rates compared to earlier periods. Despite this improvement, challenges such as misinformation and negative perceptions continue to hinder achieving optimal vaccination rates among healthcare workers. To address these barriers and enhance vaccination uptake, targeted education and tailored interventions are crucial.

Strengths and Limitations

The COVID-19 vaccination program is of utmost importance globally in combating the pandemic, especially among vulnerable groups like healthcare workers. While this study contributes valuable insights into vaccine acceptance among HCWs, several limitations need consideration. The study did not assess the duration of exposure per visit to COVID-19 cases, an important factor influencing vaccine attitudes. Additionally, the sampling technique used may impact the generalizability of the results, warranting caution in interpreting the findings across broader populations.

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