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ORIGINAL RESEARCH

Assessing Vaccination Coverage Among Healthcare Workers in Primary Healthcare Facility in Najran City, Saudi Arabia

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Background and Objective: Insufficient vaccination coverage among healthcare workers (HCWs) contributes to nosocomial outbreaks and avoidable deaths. This study assesses vaccine hesitancy among HCWs in primary healthcare facilities and identifies contributing factors in Najran City, Saudi Arabia.

Methods: A cross-sectional study was conducted in August 2023 among healthcare workers (HCWs) at various healthcare facilities providing primary care. The study utilized a questionnaire developed in accordance with World Health Organization` (WHO) and Centers for Disease Control and Prevention (CDC) guidelines, covering sociodemographic and medical characteristics, vaccination profiles (19 items), and evidence of vaccination status. A multistage sampling technique was employed to obtain a representative sample, involving random selection of HCWs from various categories (physicians, pharmacists, dentists, nurses, laboratory technicians, radiology technicians, and paramedics) and clustering willing participants from each facility type.

Results: Among the 591 healthcare workers (HCWs), 57.7% were male and 45.8% were aged 31–40 years. Vaccination compliance rates varied, with the highest rates observed for the third COVID-19 dose (86.3%), hepatitis B (81.2%), and influenza (78.3%), while the lowest rate was for Tdap during pregnancy (27.7%). Immunization documentation was primarily evidenced through vaccine records (67.5%), lab tests (51.8%), and disease confirmation (36.9%). In this study 70.9% partially, 19.1% fully vaccinated, and 10% unvaccinated. Regarding immunization documentation, 57% was partial, 15.7% complete, and 27.2% incomplete. Significant predictors of being unvaccinated included male sex (p=0.001), Saudi nationality (p=0.030), and technician/paramedic profession (p<0.001). Additionally, HCWs experiencing burnout were more likely to be unvaccinated (p=0.006). Multivariate analysis revealed that technicians/paramedics were 2.74 times more likely to be unvaccinated than physicians (AOR=2.743; 95% CI=1.140–6.600; p=0.024).

Conclusion: This study highlights significant gaps in vaccination coverage among HCWs, working at primary healthcare facilities with only 19.1% fully vaccinated. Factors such as male gender and burnout contribute to vaccine hesitancy. To address these gaps, future directions such as targeted educational interventions, burnout mitigation, mobile vaccination units, and awareness campaigns are recommended. Additionally, supportive measures to manage burnout are crucial for improving vaccination rates and protecting public health.

Keywords: vaccination status, healthcare workers, vaccination hesitancy, vaccination coverage, evidence of immunization status, primary health care

Introduction

According to the World Health Organization (WHO), approximately 60 million HCWs worldwide are exposed to hazardous biological agents daily.[1] Healthcare workers (HCWs) are vulnerable to infectious diseases due to occupational exposure, posing risks to themselves, their families, and patients.[2] Vaccination is a crucial strategy for reducing the incidence and severity of infectious diseases by lowering the risk of infection, alleviating symptoms, and decreasing disease-related morbidity and mortality.[3,4] Furthermore, even in Western countries, *influenza vaccine* uptake has been

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persistently insufficient in the European region over the past decade.[2,5] Although there has been commendable COVID-19 primary series vaccination coverage among healthcare professionals in the United States at 84.1%, the vaccination uptake for the bivalent booster remains comparatively low at 38.6%.[6]

The WHO recommends that HCWs receive either primary or booster doses for vaccines such as Bacillus Calmette–Guérin (BCG), Diphtheria, Hepatitis B, Influenza, Measles, Meningococcal, Pertussis, Polio, Rubella, Severe acute respiratory syndrome coronavirus 2(SARS-CoV-2), and Varicella. HCWs should be up to date on all recommended vaccines, with documented proof of immunity or immunization required for employment and training.[7] Low vaccination coverage among HCWs has become a pressing issue, particularly during the COVID-19 pandemic, as it poses risks to both healthcare providers and patients. Despite the availability of vaccines, many healthcare systems struggle with low vaccination rates, which can lead to increased transmission, nosocomial infections, and avoidable deaths.[8] A multicenter cross-sectional study indicated that vaccination coverage rates among HCWs were low, with many unable to recall their immunization status.[9] Other research has highlighted that even HCWs who administer vaccines can exhibit vaccine hesitancy, often driven by concerns about vaccine safety.[10]

Despite the Saudi Ministry of Health's commitment to promote vaccination among HCWs and provide free vaccinations at government health facilities, there is a significant prevalence of vaccine hesitancy among healthcare providers, leading to a low willingness to receive vaccines.[11,12] Consequently, understanding and addressing this hesitancy is essential for improving vaccination coverage and ensuring a safer healthcare environment. This study aimed to address the issue of vaccination coverage among HCWs at primary care facilities in Najran City, Saudi Arabia by measuring the prevalence of vaccine hesitancy within this crucial workforce and identifying the contributing factors. Understanding this issue is essential for establishing a safer healthcare environment, preventing disease transmission, improving overall public health, and further enhancing efforts to improve vaccination coverage.

Methodology

Study Design, Setting, and Duration

To assess vaccination coverage among HCWs in Healthcare facilities and identify factors contributing to vaccine hesitancy, a descriptive and analytical cross-sectional study was conducted throughout August 2023, encompassing over 50 healthcare facilities within both the public and private sectors in Najran City, a strategically situated city in southwestern Saudi Arabia near the Yemeni border, which poses a threat of communicable diseases.[11,13,14] Primary healthcare facilities were selected based on their provision of primary care services to patients. Furthermore, this study adhered to the Declaration of Helsinki guidelines for human research.

Sample Size

The sample size was calculated using the Raosoft sample size calculator, assuming a 95% confidence interval, 50% response distribution, and 5% margin of error, yielding a target sample size of 377 HCWs. Anticipating 10% attrition, we aimed for a minimum of 424 participants. However, to enhance statistical power and minimize bias, we collected 591 fully completed questionnaires, which were all included in the final analysis.

Study Sample and Sampling

The study targeted HCWs at Najran's Primary Healthcare facilities, (including primary healthcare centers (PHC), hospital outpatient clinics, hospital emergency departments, and polyclinics) specifically physicians, dentists, pharmacists, nurses, and technicians, who had worked there for at least six months. All eligible HCWs who agreed to participate were included, whereas those with less experience (<11 months) or those on leave during data collection were excluded. A multistage cluster sampling technique was used to obtain a representative sample of HCWs. This involved the random selection of HCWs from each category, and has an equal chance of being chosen for a sample. HCWs including physicians, pharmacists, dentists, nurses, laboratory technicians, radiology technicians and paramedics; subsequently, the willing HCWs within those facilities were clustered, ensuring proportional representation from each type of facility and category.

Data Collection and Tools

Data were collected by a self-administered questionnaire which was developed by the researcher following WHO and Centers for Disease Control and Prevention (CDC) guidelines.[15] It comprised three distinct sections: The first section: "socio-demographic variables, for example, healthcare workers" age, sex, family status, nationality, job title, position, qualifications, healthcare facility, workplace, and years of experience. The second section: medical characteristics, for example, use of immunosuppressant medications, caring for immunocompromised patients, current pregnancy, contraceptive method, feeling burned out, taking unhealthy food, physical inactivity, having abnormal body weight, having sleep problems, and tobacco smoking. The third section: vaccination profile was assessed using a checklist comprising nine items about the vaccination status of the most recommended vaccines for HCWs including annual influenza, third and seasonal booster doses against COVID-19, hepatitis B infection vaccination course, primary chickenpox (varicella) infection vaccination course, primary measles, mumps, and rubella (MMR) vaccination course, primary tetanus, diphtheria, pertussis (Tdap) vaccination course, either a Td or Tdap booster shot every ten years, and Tdap dose during each pregnancy in pregnancy cases. Additionally, four items evaluated the documentation of immunization, encompassing the recording of vaccines, laboratory evidence of immunization, laboratory confirmation of disease, and diagnosis or verification of disease history by a healthcare provider. Participants self-reported their vaccination status and documentation of immunization, selecting from response options of "Yes", "No", or "I do not know". After the initial draft of the questionnaires, three professionals including one researcher was evaluated the questionnaires and independently given their inputs on the suitability, content and flow. Later the questionnaires were subjected pilot study among randomly selected HCWs. The reliability was determined using Cronbach alpha value which was found to be 0.74, suggesting that questionnaires reliable to carry out the study.

Response Interpretation

The researcher analyzed survey responses from participants regarding their vaccination status (items 1–9), classifying participants into four categories:

- Fully vaccinated: those who answered "Yes" to all relevant vaccination questions.
- Partially vaccinated: those with a mix of "Yes" and "No" answers for different vaccinations.
- Unvaccinated: those who answered "No" to all or most vaccination questions.
- Unsure: those who marked "I don't know" for all or most vaccination questions.

Vaccination rates were calculated for each category, allowing examination of patterns or differences among various HCW groups. Additionally, responses to items 10–13 were analyzed to assess documentation of immunization, using similar criteria (complete, partially complete, incomplete, and unsure documentation). The researcher also considered potential discrepancies between participant reports regarding their immunization documentation. In this study, burnout was defined as a work-related stress syndrome characterized by chronic exposure to job stress.[16,17] Abnormal body weight was defined as a body mass index (BMI) outside the healthy range, including both underweight and overweight/obesity.[18–20]

Statistical Analysis

Descriptive statistics were presented as counts and percentages for categorical variables. The Chi-square test was used to analyse the relationship between vaccination profiles and socio-demographic/medical characteristics. Multivariate logistic regression model identified independent predictors of non-compliance to vaccination and incomplete immunization documentation, employing odds ratios and 95% confidence intervals, with significance set at $p<0.05$. Data analysis was conducted using SPSS version 26.[21]

Results

A total of 591 HCWs participated in the survey. Most (45.8%) were aged 31–40 years, with approximately 60% male. Married HCWs made up 66.9%, and Saudi nationals were 59.8%. Nurses (25.9%) and physicians (21.8%) were the most common types, with 60.9% holding bachelor's degrees, as shown in Table 1.

Table 1 Socio-Demographic Characteristics of Participants (n=591)

Study Data	N (%)
Age group†	
22 – 30 years	197 (34.1%)
31 – 40 years	264 (45.8%)
41 – 50 years	93 (16.1%)
>50 years	23 (04.0%)
Sex	
Male	341 (57.7%)
Female	250 (42.3%)
Marital status †	
Single	194 (33.1%)
Married	392 (66.9%)
Nationality †	
Saudi	344 (59.8%)
Non-Saudi	231 (40.2%)
Job title	
Physician	129 (21.8%)
Pharmacist	91 (15.4%)
Dentist	44 (7.4%)
Nurse	153 (25.9%)
Lab. Technician	66 (11.2%)
Rad. Technician	54 (9.1%)
Paramedics	54 (9.1%)
Position †	
Supervisor	60 (12.7%)
Practitioner	362 (76.7%)
Both	50 (10.6%)
Qualifications †	
Bachelor	351 (60.9%)
Diploma	90 (15.6%)
Master	55 (9.5%)
PhD	22 (3.9%)

(*Continued*)

Table 1 (Continued).

Study Data	N (%)
Board	58 (10.1%)
Healthcare facility	
PHC Center	73 (14.1%)
Hospital-Outpatient Clinic	220 (42.4%)
Hospital-Emergency Department	176 (33.9%)
Polyclinic	50 (9.6%)
Workplace	
MOH	263 (48.3%)
University Health Services	64 (11.8%)
Military Health Services	109 (20.0%)
National Guard Health Services	17 (3.1%)
Interior Ministry Health Services	07 (01.3%)
Private	84 (15.4%)
Years of experience	
≤1 year	52 (08.8%)
2 – 5 years	170 (28.8%)
6 – 10 years	173 (29.3%)
11 – 15 years	99 (16.8%)
>15 years	97 (16.4%)

Notes: † HCWs who did not mention their sociodemographic characteristics were excluded from the analysis.
Abbreviations: MOH, Ministry of health; N, Frequency.

Regarding the medical characteristics of participants, only three respondents used immunosuppressant medications, and seven participants reported currently carrying immunocompromised medications. Only 2.4% were currently pregnant, and 5.8% were using contraceptive methods. HCWs who ate unhealthy foods, had physical inactivity, abnormal body weight, sleep problems, tobacco smoking, and burnout constituted 13.2%, 34.9%, 24%, 16.4%, 10.8%, and 11.2%, respectively. The vaccination profile of HCWs showed the highest compliance for the third COVID dose (86.3%), followed by hepatitis B (81.2%) and influenza (78.3%). The lowest compliance was for Tdap during pregnancy (27.7%). Immunization documentation indicated evidence through vaccine records (67.5%), lab tests (51.8%), disease confirmation (36.9%), and historical verification (36.7%), as shown in Table 2.

In Figure 1, 70.9% of HCWs were considered partially vaccinated, 19.1% were fully vaccinated, and 10% were considered unvaccinated. As shown in Figure 2, 57% of HCWs had partial completion of immunization documentation, 15.7% had complete documentation, and 27.2% had incomplete documentation.

When determining the relationship between the vaccination status and sociodemographic characteristics of the HCWs (Table 3), it was observed that male (p=0.001), Saudi nationality (p=0.030), and technician/paramedic HCWs (p<0.001) were more likely to be unvaccinated compared to other HCWs.

Regarding the relationship between vaccination status and medical characteristics of HCWs, only feelings of burnout showed a significant relationship with vaccination status; HCWs who experienced burnout were more likely to be

Table 2 Vaccination Profile of Participants (n=591)

Statement	Yes, N (%)	No, N (%)	I don't Know, N (%)
Vaccination status of the recommended vaccines 1. I got vaccinated against the influenza virus this year.	463 (78.3%)	119 (20.1%)	09 (1.5%)
2. I received the third dose of the vaccine against the coronavirus.	510 (86.3%)	75 (12.7%)	06 (1.0%)
3. I received a seasonal booster dose of the vaccine against the coronavirus.	338 (57.2%)	241 (40.8%)	12 (2.0%)
4. I received a hepatitis B vaccination course.	480 (81.2%)	82 (13.9%)	29 (4.9%)
5. I received a primary vaccination course for chickenpox (varicella).	425 (71.9%)	131 (22.2%)	35 (5.9%)
6. I received the primary MMR (measles, mumps, and rubella) vaccination course.	421 (71.2%)	108 (18.3%)	62 (10.5%)
7. I received the primary Tdap (tetanus, diphtheria, and pertussis) vaccination course.	365 (61.8%)	117 (19.8%)	109 (18.4%)
8. I receive either a Td or Tdap booster shot every ten years.	211 (35.7%)	258 (43.7%)	122 (20.6%)
9. In case of pregnancy, I receive a dose of Tdap during each pregnancy.	164 (27.7%)	221 (37.4%)	206 (34.9%)
Documentation of immunization			
10. I have evidence of immunization through the recording of vaccines.	399 (67.5%)	116 (19.6%)	76 (12.9%)
11. I have evidence of immunization through laboratory tests.	306 (51.8%)	176 (29.8%)	109 (18.4%)
12. I have evidence of immunization through laboratory confirmation of the disease.	218 (36.9%)	250 (42.3%)	123 (20.8%)
13. I have evidence of immunization through diagnosis or verification of a history of disease by a healthcare provider.	217 (36.7%)	239 (40.4%)	135 (22.8%)

unvaccinated (p=0.006). However, there was no significant relationship between vaccination status and having a chronic disease, current pregnancy, contraceptive use, unhealthy eating, physical inactivity, abnormal body weight, sleep problems, or tobacco use. When conducting a multivariate regression analysis (Table 4), it was observed that only the

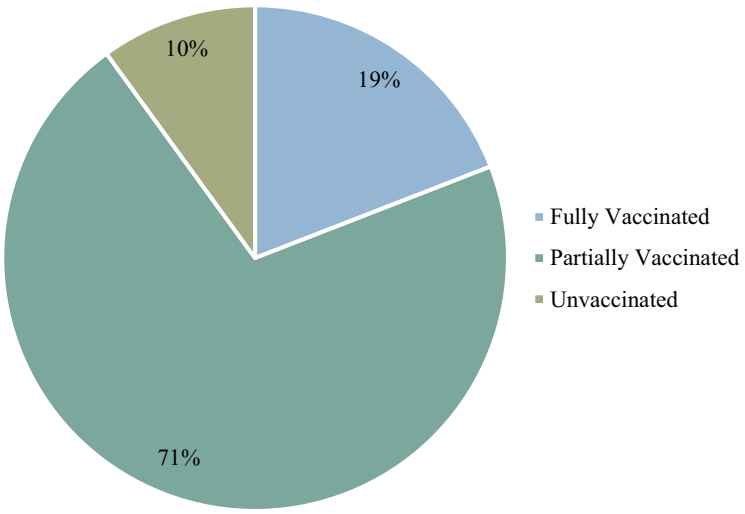

Figure 1 Vaccination status.

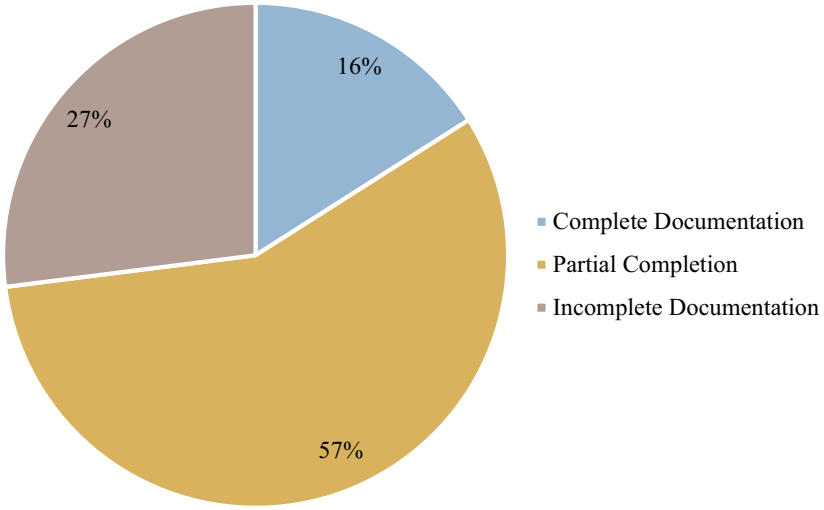

Figure 2 Documentation of immunization for HCWs in Najran's primary health care facilities, 2023.

job titles remained significant for the vaccination status, suggesting that compared to physicians, technicians/paramedics were predicted to have a higher chance of being unvaccinated by at least 2.74 times (AOR=2.743; 95% CI=1.140–6.600; p=0.024), whereas sex, nationality, and feeling burnout had no significant relationship with the vaccination status after adjustment to a regression model (p>0.05).

The analysis of the relationship between the immunization documentation and the sociodemographic and medical characteristics revealed that the older age group (p=0.037), pharmacists/dentists (p=0.001), and those working in hospital-outpatient clinics (p<0.001) were more likely to have incomplete documentation. Additionally, physically

Table 3 Relationship Between Vaccination Status and Sociodemographic Characteristics of Participants (n=591)

Factor	Vaccination Status			P-value[§]
	Unvaccinated N (%), (n=59)	Partially Vaccinated, (n=419)	Fully Vaccinated (n=113)	
Age group[†]				
• <35 years	29 (51.8%)	226 (55.1%)	64 (57.7%)	0.765
• ≥35 years	27 (48.2%)	184 (44.9%)	47 (42.3%)	
Sex				
• Male	35 (59.3%)	258 (61.6%)	65 (57.5%)	0.001 **
• Female	24 (40.7%)	161 (38.4%)	65 (57.5%)	
Marital status[†]				
• Single	19 (32.2%)	135 (32.5%)	40 (36.0%)	0.766
• Married	40 (67.8%)	281 (67.5%)	71 (64.0%)	
Nationality[†]				
• Saudi	42 (72.4%)	247 (60.2%)	55 (51.4%)	0.030 **
• Non-Saudi	16 (27.6%)	163 (39.8%)	52 (48.6%)	
Job title				
• Physician	08 (13.6%)	94 (22.4%)	27 (23.9%)	<0.001 **
• Pharmacist/Dentist	17 (28.8%)	97 (23.2%)	21 (18.6%)	
• Nurse	09 (15.3%)	93 (22.2%)	51 (45.1%)	
• Technician/Paramedic	25 (42.4%)	135 (32.2%)	14 (12.4%)	

(*Continued*)

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Table 3 (Continued).

Factor	Vaccination Status			P-value[§]
	Unvaccinated N (%), (n=59)	Partially Vaccinated, (n=419)	Fully Vaccinated (n=113)	
Position[†]				
• Supervisor	02 (5.3%)	49 (14.1%)	09 (10.3%)	0.068
• Practitioner	35 (92.1%)	263 (75.8%)	64 (73.6%)	
• Both	01 (02.6%)	35 (10.1%)	14 (16.1%)	
Qualifications[†]				
• Bachelor or diploma	51 (86.4%)	302 (74.2%)	88 (80.0%)	0.074
• Master or higher	08 (13.6%)	105 (25.8%)	22 (20.0%)	
Healthcare facility				
• PHC Center	10 (20.8%)	56 (15.0%)	07 (7.2%)	0.130
• Hospital-Outpatient Clinic	22 (45.8%)	157 (42.0%)	41 (42.3%)	
• Hospital-Emergency Department	14 (29.2%)	121 (32.4%)	41 (42.3%)	
• Polyclinic	02 (04.2%)	40 (10.7%)	08 (8.2%)	
Workplace				
• MOH	21 (44.7%)	185 (47.4%)	57 (53.3%)	0.491
• Non-MOH	26 (55.3%)	205 (52.6%)	50 (46.7%)	
Years of experience				
• <10 years	27 (45.8%)	243 (58.0%)	71 (62.8%)	0.096
• ≥10 years	32 (54.2%)	176 (42.0%)	42 (37.2%)	

Notes: [†] HCWs who did not mention their sociodemographic characteristics were excluded from the analysis. [§] P-value has been calculated using the Chi-square test. ** Significant at p<0.05 level.

Table 4 Multivariate Regression Analysis to Determine the Independent Significant Predictors of Non-Compliance to Vaccination (n=591)

Factor	AOR	95% CI	P-value
Sex			
Male	Ref		
Female	1.504	0.778–2.907	0.225
Nationality[†]			
Saudi	Ref		
Non-Saudi	0.752	0.376–1.506	0.422
Job title			
Physician	Ref		
Pharmacist/Dentist	2.512	0.988–6.386	0.053
Nurse	1.131	0.579–2.213	0.718
Technician/Paramedic	2.743	1.140–6.600	0.024 **

(*Continued*)

Table 4 (Continued).

Factor	AOR	95% CI	P-value
Feeling burnout			
No	Ref		
Yes	1.792	0.827–3.882	0.139

Notes: † HCWs who did not mention their nationality were excluded from the analysis. ** Significant at p<0.05 level.
Abbreviations: AOR; Adjusted Odds Ratio; CI, Confidence Interval.

inactive HCWs (p<0.001), those with abnormal body weight (p=0.005), and those experiencing burnout (p=0.001) also showed a higher likelihood of incomplete immunization documentation. A multivariate regression model (Table 5) revealed that, compared to physicians, nurses had decreased odds of having incomplete documentation for their immunization status by at least 55% (AOR=0.446; 95% CI=0.221–0.902; p=0.025). Compared to HCWs working in PHC centers, HCWs working in hospital emergency departments had decreased odds of having incomplete immunization documentation by at least 74% (AOR=0.256; 95% CI=0.074–0.887; p=0.032) and decreased odds of 79% among those who were working in polyclinics (AOR=0.212; 95% CI=0.059–0.756; p=0.017). In contrast, HCWs who experienced

Table 5 Multivariate Regression Analysis to Determine the Independent Significant Predictor of Incomplete Documentation of Immunization (n=591)

Factor	AOR	95% CI	P-value
Age group †			
<35 years	Ref		
≥35 years	1.401	0.843–2.328	0.193
Job title			
Physician	Ref		
Pharmacist/Dentist	1.412	0.634–3.146	0.399
Nurse	0.446	0.221–0.902	0.025 **
Technician/Paramedic	1.060	0.503–2.235	0.879
Healthcare facility			
PHC Center	Ref		
Hospital-Outpatient Clinic	0.465	0.113–1.920	0.290
Hospital-Emergency Department	0.256	0.074–0.887	0.032 **
Polyclinic	0.212	0.059–0.756	0.017 **
Physical inactivity			
No	Ref		
Yes	1.394	0.794–2.450	0.247
Having an abnormal body weight			
No	Ref		
Yes	1.260	0.668–2.307	0.454
Feeling burnout			
No	Ref		
Yes	2.696	1.336–5.441	0.006 **

Notes: † HCWs who did not mention their sociodemographic characteristics were excluded from the analysis.** Significant at p<0.05 level.
Abbreviation: AOR, Adjusted Odds Ratio; CI, Confidence Interval.

burnout were 2.69 times more likely to have incomplete immunization documentation than those who did not experience burnout (AOR=2.696; 95% CI=1.336–5.441; p=0.006).

Discussion

This study aimed to measure vaccine hesitancy among HCWs in Najran's primary healthcare facilities and identify influential factors. The study revealed significant gaps in vaccination coverage among respondents: a striking 70.9% were only partially vaccinated, while just 19.1% achieved full vaccination status, leaving 10% completely non-compliant. This aligns with a study from Tanzania, which reported an 18% full vaccination rate.[22] In contrast, a study in China noted higher vaccination rates in 2020–2021 (43.7%) compared to 2021–2022 (35.4%), highlighting low coverage among Chinese HCWs.[3] Similar trends increased during the post-COVID-19 era were observed in Tunisia,[4] Italy,[9] and Saudi Arabia.[11] Addressing vaccination compliance is crucial particularly in primary health care settings, as healthcare facility-acquired infections significantly impact health resources and service quality. This highlights a critical need for targeted interventions to improve vaccine uptake on the frontline.

The study's results indicate that male HCWs, Saudi nationality, technicians/paramedics, and perceived burnout influence non-compliance with vaccination coverage. However, in the predictive model, only technicians/paramedics emerged as significant independent predictors (p=0.024). This may result from a low perception of risk due to inadequate education about vaccination. A literature review in Italy found vaccine hesitancy linked to low-risk perception, lack of behavioural control, negative attitudes, insufficient knowledge, and limited access to vaccination.[2] Additionally, some HCWs believed natural immunity was superior to vaccination (p<0.001) and expressed concerns about the potential long-term effects of vaccines (p=0.044).[23]

Conversely, other studies highlight factors influencing vaccine uptake. Cherif et al noted that confidence in influenza vaccine efficacy significantly boosts uptake among HCWs.[4] Schumacher et al found that nurses had vaccination rates 2.7 times higher than other professions.[8] In this study, non-Saudis showed higher compliance with vaccination coverage, though not statistically significant (p=0.422). Additionally, no associations were found between vaccination status and medical characteristics such as chronic diseases, pregnancy, contraceptive use, unhealthy eating, physical inactivity, abnormal body weight, sleep problems, or smoking (p>0.05).

The assessment of the vaccination status of HCWs for the most recommended vaccines revealed the highest compliance for the third dose of the COVID-19 vaccine (86.3%), hepatitis B vaccine (81.2%), primary chickenpox vaccine (71.9%), and primary MMR vaccine (71.2%). Conversely, adherence to the Tdap booster (35.7%) and Tdap doses during pregnancy (27.7%) was low, potentially influenced by the inclusion of both male and female HCWs. This contrasts with Oygar et al, who reported higher Tdap rates (57.8%).[24] However, in a study conducted by Kumbul and Özgür, the prevalence was higher for the hepatitis B vaccine (67.5%), followed by tetanus (62.3%), MMR (39.5%), varicella (28.8%), hepatitis A (20.1%), and influenza (6.3%) in that order.[25] Variations in vaccination rates may reflect regional differences and the timing of studies, especially post-COVID-19.

The study highlights a troubling in the documentation of immunizations among HCWs, revealing that only 15.7% possess complete records, while 57% have partial documentation and 27.2% are inadequately documented. In Saudi Arabia, the Ministry of Health's (MOH) immunization programs and National Health Strategy (2019–2025) guide public health policy on vaccines for healthcare workers (HCWs).[26–28] The MOH mandates vaccinations against influenza, Hepatitis B, and measles, mumps, and rubella for HCWs.[29] To promote vaccination, the MOH implements initiatives that include educating HCWs on vaccine benefits and risks, organizing vaccination campaigns, tracking coverage, and evaluating program effectiveness. Additionally, the MOH provides guidelines for safe vaccine administration.[29,30]

This may be the first research of its kind in Saudi Arabia, underscoring an urgent need for further investigation into vaccination practices. The WHO advocates for HCWs to maintain up-to-date records of all recommended vaccinations, as the absence of such documentation poses a significant risk of infections not only to patients but also to the wider community.[7] Consequently, work restrictions for susceptible HCWs—ranging from limited patient contact to complete exclusion from duty—may be necessary to mitigate these risks, emphasizing the critical importance of compliance with vaccination protocols to safeguard both healthcare professionals and those they care for.[31]

The study highlights that nurse practitioners in emergency departments and polyclinics are more likely to have documented immunization statuses compared to other HCWs. However, burnout among HCWs adversely affects this documentation, as regression analysis reveals that those experiencing burnout often have incomplete records. Given the inverse relationship between stress and immune function, which underscores the need for preventive measures against infections, it is crucial to emphasize the importance of vaccinations and their proper documentation. This focus is essential not only for patient safety but also for managing the psychological stress faced by HCWs. This study has several limitations. Firstly, the findings are based on a single region in Saudi Arabia, limiting their generalizability to other regions and international contexts. Secondly, the reliance on self-reported data may introduce biases, such as social desirability and recollection bias, as healthcare workers may have provided answers they perceived as desirable. To mitigate these limitations, future studies could consider alternative data collection methods, such as focus groups, to enhance the accuracy and reliability of the findings.

Conclusion

This study highlights significant gaps in vaccination coverage among HCWs in Najran's primary healthcare facilities, with only 19.1% fully vaccinated. Factors influencing vaccine hesitancy included male gender, Saudi nationality, and perceived burnout, particularly among technicians and paramedics. The results underscore the critical need for enhanced vaccination compliance to mitigate the risk of healthcare facility-acquired infections. The findings also reveal a low level of immunization documentation, which poses risks to both HCWs and patients. Addressing these issues through targeted education, mobile vaccination units, and awareness campaigns is essential. In future studies, it is important to investigate the underlying causes of vaccine hesitancy among healthcare workers (HCWs) and design tailored interventions to address this issue. It is also essential to explore the relationship between burnout and vaccine hesitancy in more detail, including potential interventions to mitigate burnout and improve vaccine uptake. Additionally, conducting follow-up studies to assess the impact of vaccination programs on vaccine coverage and hesitancy among HCWs is necessary. Overall, improving vaccination rates and documentation is vital for safeguarding public health and ensuring the well-being of healthcare professionals.

Data Sharing Statement

All data generated and analyzed are included in this research article is available upon request to the corresponding author.

Ethical Approval

This study was approved by the Scientific Research and Conferences Committee at the Faculty of Medicine, Najran University (CSR/NU/2023/1041, dated February 12, 2023). Prior to data collection, participants were informed that their information would be kept confidential, used solely for research purposes, and that they had the right to withdraw from the study at any time.

Informed Consent

The participants provided verbal informed consent for participation in the study.

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