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Hepatitis B vaccination coverage in healthcare workers in Gauteng Province, South Africa

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ABSTRACT

Hepatitis B (HB) virus (HBV) is highly endemic and HBV infection is a major public health problem in sub-Saharan Africa. Percutaneous/parenteral transmission is an important mode of spread of HBV in the healthcare setting, thus healthcare workers (HCWs) and their patients are at risk for acquiring HBV infections. This study was conducted on three HCW populations in Gauteng Province during 2009, in order to (1) determine HB vaccination coverage of HCWs, and (2) investigate demographic predictors of vaccination uptake. Being a doctor was a statistically significant predictor of vaccination uptake (odds ratio [OR]: 3.2; 95% confidence interval [CI]: 1.48–6.72; *p*-value: 0.003), while working in the private sector was also statistically significantly associated with vaccination uptake (OR: 1.73; 95% CI: 1.01–2.98; chi-square *p*-value: 0.035). The majority (67.9% [491/723]) of HCWs had received at least 1 dose of vaccine, but where data on number of doses was available, only 19.9% (94/472) were fully vaccinated. In conclusion, there is a need to increase HB vaccination uptake in Gauteng HCWs through a policy that is properly implemented and routinely monitored and evaluated, and this policy must ensure that all three doses of vaccine are administered.

1. Introduction

Epidemiological studies conducted in sub-Saharan Africa in the last three decades have clearly shown that hepatitis B virus (HBV) is highly endemic (≥8% HBV carriage, with carriage being defined as hepatitis B (HB) surface antigen [HBsAg] positivity for more than 6 months) and is a major public health problem [1–5]. It has been estimated that HBsAg chronic carriage in black South Africans is 9.6% [3], with a much lower prevalence in whites and Indians (0.2%), and those of mixed descent (0.4–3.0%) [2]. Also, rural black populations have a much higher HBsAg chronic carriage (e.g.: 15.5% in the rural Eastern Cape) than urban black populations (e.g.: 1.3% in Soweto) [2]. The outcomes for chronic carriers in sub-Saharan Africa are often severe, with 25% being expected to die from liver disease [3]. In the region 20% of cirrhosis cases and 70% of hepatocellular cancers are thought to be caused by HBV infection [2].

The major route of HBV transmission in this region is horizontal (i.e. transmission unrelated to recognised sexual, perinatal, or parenteral exposure [6]) in children under 5 years of age. However, percutaneous/parenteral transmission is also an important mode of spread, especially in the healthcare setting [7], thus healthcare workers (HCWs) and their patients are at risk for acquiring HBV infections.

Human immunodeficiency virus (HIV) positivity is a risk factor for acquiring HBV infection; for reactivating HBV infections that were previously cleared; and also for re-infection with HBV in individuals who were previously immune through clearance of natural infection [5]. HBV is supposedly about 100 times more infectious than HIV, yet HCWs are generally more worried about HIV, and seldom test for HBV infection after needle-stick injuries or other occupational exposures [8]. In South Africa (SA), it has been estimated that 46% of hospital beds are occupied by patients with HIV-related illnesses [9]. Of concern is that 63% (121/192) of acquired immunodeficiency syndrome (AIDS) patients in a North West Province hospital in SA had serological markers of past or present HBV infection, and 40.6% (78/192) had active HBV infec-

Abbreviations: AIDS, acquired immunodeficiency syndrome; DNA, deoxyribonucleic acid; HBV, hepatitis B virus; HCW, healthcare worker; HIV, human immunodeficiency virus; SA, South Africa; SANDoH, SA National Department of Health.

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Table 1
Questionnaire: Demographics by HB vaccination status ($n = 723$) of Gauteng healthcare workers.

Variable	Vaccinated[a] $n = 491$ (67.9%)	Not vaccinated $n = 232$ (32.1%)	Total $n = 723$ (100%)
Age			
20–30 years	182 (65.7%)	95 (34.3%)	277 (38.3%)
31–40	138 (70.1%)	59 (29.9%)	197 (27.2%)
41–50	139 (67.8%)	66 (32.2%)	205 (28.4%)
>50	17 (63.0%)	10 (37.0%)	27 (3.7%)
Unknown[b]	15 (88.2%)	2 (11.8%)	17 (2.4%)
Total			723 (100%)
Gender			
Male	57 (65.5%)	30 (34.5%)	87 (12.0%)
Female	262 (68.2%)	122 (31.8%)	384 (53.1%)
Unknown[b]	172 (68.3%)	80 (31.7%)	252 (34.9%)
Total			723 (100%)
Worked as a HCW			
≤10 years	352 (67.7%)	168 (32.3%)	520 (71.9%)
11–20 years	64 (78.0%)	18 (22.0%)	82 (11.3%)
>20 years	72 (63.2%)	42 (36.8%)	114 (15.8%)
Unknown[b]	3 (42.9%)	4 (57.1%)	7 (1.0%)
Total			723 (100%)
Profession			
Doctor	56 (81.2%)	13 (18.8%)	69 (9.5%)
Employed nurse	232 (67.6%)	111 (32.4%)	343 (47.4%)
Student nurse	203 (65.3%)	108 (34.7%)	311 (43.0%)
Total			723 (100%)
Sector			
Public	419 (66.5%)	211 (33.5%)	630 (87.1%)
Private	72 (77.4%)	21 (22.6%)	93 (12.9%)
Total			723 (100%)

[a] Vaccinated = received at least 1 dose.
[b] Data on gender were not collected for Tshwane nurses ($n = 253$, one of whom did not answer question on vaccination status, thus $n = 252$ for unknown gender); all other unknowns are because questions were not answered.

tions (were HBV DNA positive), and were thus highly infectious [10].

Thus South African HCWs are at high risk for occupational exposure to HBV, yet in 2002 a study conducted in Johannesburg Hospital in Gauteng Province found that only 30.6% were protected (either from natural infection or vaccination), and only 21.2% could recall being vaccinated [11]. Although the SA National Department of Health (SANDoH) recommends vaccinating all HCWs against HBV, this is not mandatory and there is no national policy in place for HB vaccination of HCWs [11].

In May 2010, the 63rd World Health Assembly adopted a resolution prioritising the global prevention and control of viral hepatitis, and recommended increasing the HB vaccination coverage of HCWs [12]. Studies on vaccination status of HCWs are limited in SA. The current study was thus conducted on three HCW populations in Gauteng Province during 2009, in order to (1) determine HB vaccination coverage of HCWs, and (2) investigate demographic predictors of vaccination uptake.

2. Materials and methods

2.1. Study design

This study used data from three cross-sectional sub-studies: (a) Knowledge and practices regarding the prevention of hepatitis B virus infections, in final year college student nurses in Gauteng; (b) Hepatitis B vaccination policies and coverage for nurses working at public and private hospitals in Tshwane, SA; and (c) Knowledge, attitudes and practices of healthcare workers regarding hepatitis B vaccination, in the Ekurhuleni Metro, Gauteng Province. Data common to all three that were used for this study included demographic data (age, profession, sector/institution, years as a HCW) and vac-

Table 2
Logistic regression analysis for HB vaccination uptake among Gauteng healthcare workers.

Variable	Vaccinated	Unvaccinated	Odds ratio	95% CI	*p*-Value
Age ($n = 706$)					
≤30 years	182	95	0.65	0.42–1.03	0.0652
>30 years	294	135			
Gender ($n = 471$)					
Male	57	30	0.62	0.36–1.08	0.0917
Female	262	122			
Worked as HCW ($n = 716$)					
≤10 years	352	168	1.20	0.66–2.18	0.5583
>10 years	136	60			
Profession ($n = 723$)					
Doctor	56	13	3.15	1.48–6.72	0.0030[a]
Nurse	435	219			
Sector ($n = 723$)					
Public	419	211	1.45	0.54–3.87	0.4626
Private	72	21			

[a] *p*-Value is statistically significant.