

Awareness And Preventive Measures Against Hepatitis B Virus Infection Among Dental Surgeons In Lagos State

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Abstract

Objectives

The aim of this study was to assess the awareness of Hepatitis B Virus (HBV) infection among Dental Surgeons in Lagos state and to identify preventive measures adopted against HBV infection.

Materials and Methods

220 structured self-administered questionnaires about knowledge of HBV and infection control measures were distributed to Dentists in Lagos University Teaching Hospital; Lagos State University Teaching Hospital; Military Hospital, Yaba, Lagos; Military Hospital, Bonny Camp, Victoria Island, Lagos; Randle General Hospital, Surulere, Lagos; General Hospital Lagos and 12 Private Dental Clinics. The response rate was 85 percent.

Results

A high level of awareness and knowledge of HBV infection was demonstrated in this study compared to previous studies.^{22 15} This however did not translate into a commensurate increase in cross-infection control practices. 71 percent of Dentists usually took a detailed medical history of their patients. 66.3 percent had been vaccinated against Hepatitis B Virus; 94.5 percent wore and changed gloves during treatment and 100 percent in between patients; 36 percent wore and changed face masks during treatment and in between patients. 66.9 percent used autoclaves for sterilization, 62 percent had special containers for sharps disposal while 50% always used sterilization wrappers. Only 26 percent always disinfected working surfaces in between patients. Based on these responses, only a small percentage of Dentists in this sample were considered to be compliant with an inventory of standard infection control procedures.

Conclusions

There is a great need in Lagos, perhaps in Nigeria as a whole for the adoption and implementation of standard infection procedures and the provision of formal and obligatory infection control courses and guidelines for Dental Surgeons by the Ministry of Health and the Dental Association, in addition to distribution of standard infection control manuals that incorporate current infection control recommendations.

Keywords: Hepatitis B Virus (HBV), Occupational Hazard, Cross Infection, Post Exposure prophylaxis (PEP), Dental Surgeons.

Introduction

Hepatitis is an inflammation of the liver caused by viral or bacterial infections and aggravated by continuous exposure to alcohol, drugs or toxic chemicals. It can also result from an autoimmune disorder. Hepatitis reduces the liver's ability to perform life-preserving functions.¹

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Specifically, Hepatitis B Virus infection may cause an asymptomatic condition (with or without progression of the disease), acute hepatitis, fulminant hepatitis with massive hepatic necrosis or serve as a gateway to infection by the Hepatitis Delta Virus. Progressive liver damage may occur, leading to cirrhosis and hepatocellular carcinoma, thus increasing the risk of death.¹ About 2 billion people worldwide have been infected with the virus and an estimated 350 million are chronic carriers.² In Nigeria, HBV infection has reached hyper-endemic levels with the seroprevalence of HBsAg being estimated to range from 10-40%.^{3 4} The World Health Report 2002 estimates that 40% of Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) cases among health care providers worldwide are the result of occupational exposure.⁵ Occupational hazard is defined as a risk to a person, usually arising out of employment. The occupational hazards found among Dentists and other clinical dental workers are similar worldwide and include a wide range of risks and hazards. These hazards could be physical, chemical, biological, mechanical or social.⁶ Dentistry is unique, in that clinical staff are in direct or indirect contact with traumatized tissues, saliva, and blood daily. All members of the dental team are thus at risk of exposure to HBV and HIV infections, as well as other types of communicable infections. Transmission of infection within a dental surgery may occur by direct contact with infected tissue, secretions or blood; from droplets containing the infectious agent; or via contaminated sharps or instruments, resulting from inadequate sterilization.

The major route of cross-infection in Dental Surgery is via infection through intact skin or mucosa or direct inoculation onto cuts and abrasions in the skin⁷. Most of the exposures are caused by sharps injuries.⁸ In dentistry, sources of infection may be patients suffering from infectious diseases, those in the prodromal stage and healthy or convalescent carriers of pathogens.⁹

The transmission of HBV, HCV and HIV has been related to frequency of exposure and effectiveness of post exposure management. Most people at risk for occupational exposures are in developing countries where there is a paucity of standard reporting protocols.

Numerous surveys and studies have shown that the incidence of Hepatitis B developing following a needle stick injury from an HBsAg positive patient is 20% compared with an estimate of 0.4% following a similar exposure to the Human Immunodeficiency Virus (HIV).¹⁰ There is no doubt that Dentists, like other health workers, commonly suffer sharps injuries.¹¹ Many studies have shown that dental personnel have a five to ten-fold higher chance of acquiring the Hepatitis B Virus infection than the general population.¹² In Lagos, Nigeria, a study in 2000 found the prevalence of active infection by HBV to be 25.7% in Surgeons compared to 15% in Administrative staff (control group).¹³ Another Nigerian study revealed a prevalence of 39% among Doctors and Dentists compared to the national average of 20%.¹⁴ A previous study¹⁵ had shown an increased awareness among dental professionals regarding the implementation of effective cross-infection control measures such as sterilization, disinfection, immunization and the use of barrier techniques when contact occurs with blood and body fluids.

However, the actual implementation of these preventive measures was inadequate and not commensurate with the level of knowledge.¹⁵ Another study however demonstrated a poor understanding among health care professionals and Doctors with regards to Hepatitis B and C infections and the safety measures against them.¹⁶

Many Dental Practitioners are not aware of the Centre for Disease Control (CDC) guidelines on universal precautions against blood-borne pathogens. Most support a policy of routinely testing all surgical patients for HIV and HBV infections in centres where there are no policies on parenteral exposure to patients' blood and body fluids.¹⁵ Anonymous hospital surveys indicate that over one-third of exposed health care providers do not report needle stick injuries, thus the rate of injuries and the number of infected individuals may be much higher than reported.¹⁷ Only a few Dentists had undergone needle safety training and knew about the provision of post-exposure prophylaxis (PEP).¹⁵ In a survey of 185 Nigerian dentists, only 50.7% were found to have received Hepatitis B vaccination.¹⁸

The aim of this study was to determine if Dental Surgeons in Lagos state were aware of the special risks they and their patients are exposed to as a result of their profession and to know the prevailing infection control practices in this environment. This study also aims to determine how many practicing dentists have an active HBV immunization and to make appropriate recommendations based on the observed results to implement necessary changes.

Materials and Methods

This was a cross-sectional study conducted in the two Teaching Hospitals, and randomly selected Military Hospitals, General Hospitals and Private Dental Clinics in Lagos State.

Sample

The study population consisted of Dentists or Dental Surgeons who practice in Lagos State and are registered by the Medical and Dental Council of Nigeria.

Sample Size

The estimated sample size (n=185) was computed using results from a similar study in Jordan with a prevalence value of 14%.¹⁹

Sample Selection

The subjects for the study were recruited from the Lagos University Teaching Hospital and the Lagos State University Teaching Hospital; Military Hospitals in Yaba and Bonny Camp, Lagos; Randle General Hospital Lagos; General Hospital Lagos; as well as 12 Private Dental Clinics in Lagos State.

A simple random sampling technique (balloting) was employed to determine the General Hospitals and Private Dental Clinics used in the study. A convenience sampling method was utilized to recruit the participating Dentists in the study due to the relatively large sample size of respondents required.

Inclusion And Exclusion Criteria

All available and consenting respondents in each facility were recruited for the study. Qualified Dentists who were registered with the Medical and Dental Council of Nigeria were included in the study. Dentists who were unwilling to consent to the study, those on leave and who could not be contacted and dental students were excluded from the study.

Data Collection

A pre-structured self-administered questionnaire was distributed to the Dentists working in the selected dental clinics. 220 copies of the questionnaire were distributed and 187 were returned filled, giving a response rate of 85%. Data obtained through the questionnaire included socio-demographic characteristics of the respondents, awareness of occupational hazards and update seminar attendance. It also obtained data on any exposure to occupational hazards while treating patients and infection control procedures in their units (e.g. sterilization, wearing of gloves, face masks, vaccination against HBV, method of storing instruments, and disposal methods of contaminated material). The completed questionnaires were reviewed for completeness and consistency.

Data Analysis

Data were entered in Microsoft Excel Software and analyzed using SPSS software version 11. Frequency distribution tables were generated for all variables and a measure of central tendency was computed for numerical variables. The chi-square test was used to determine the level of association between the variables. A 95% confidence interval and a 5% level of significance were adopted.

Results

The response rate to the questionnaire in this study (85%) was comparable to that in previous studies.^{20,21} Majority (67%) of the respondents were males while 32.6% were females (See table 1). Most (68%) of the respondents were General Practitioners while majority of the respondents (103, 55.1%) work in Teaching Hospitals. Ninety two (49.1%) had been in practice for less than 5 years and Seventy two (38.5%) attended to 5-9 patients daily.

One hundred and eighty five (98.9%) of the respondents believed that HBV poses a serious risk to Dental Surgeons while 176 (94.1%) were aware that HBV can survive for some time outside a living host. Seventy six percent of the respondents always took a detailed medical history of their patients. Ninety seven (51.9%) of the respondents rarely attended medical updates and workshops while only 18 (9.6 %) regularly do. Fifty nine (31.6 %) of the respondents had experienced injury from a sharp instrument in the last 6 months, while only 34 (18.2%) took the appropriate antiviral prophylaxis after needle injuries.

Almost all the respondents (107, 94.7%) always wore gloves while attending to patients and 100% of them changed gloves between patients. Eighty respondents (42.8%) regularly wore facemasks and protective eye goggles and the same percentage always changed their facemasks in between patients or when moist. Most (79%) always wore clinical coats when treating patients and 63.1% promptly sent the coats for dry-cleaning. Only 3.7% always used antibacterial mouthwash for patients before treatment and only 6.4% always used high volume suction during treatment. Most of the respondents (63%) always sterilized their hand pieces in this study; 62% had special containers for sharps disposal, while 48.6% always used sterilization wrappers. Only 25.1% always disinfected working surfaces in between patients.

Female Dental Surgeons were more likely to take a detailed medical history than their male counterparts (85.2% to 71.4%, $P=0.027$). 71% of Dental Specialists had been vaccinated against HBV compared to 66.1% of General Practitioners. 28% of Specialists always attended updates compared with 5.5% of General Practitioners ($P=0.000$). 58% of Dental Surgeons in private hospitals always disinfected working surfaces in between patients compared to 21.2% in General Hospitals.

Dentists in General Hospitals had the highest daily load of patients (57.7%) while Private Hospitals had the least (5.9%). The dentists in General Hospitals (1.9%) also had the least attendance for seminars and updates while Teaching Hospitals (13.7%) had the highest score for regular attendance.

Respondents in Teaching Hospitals (71.6%) used autoclave and other means of sterilization most regularly while the respondents in Military Hospitals (41.2%) were the least compliant. The use of sterilization wrappers was most common in Teaching Hospitals (67.6%) and least common in the Military Hospitals (6.3%, $P = 0.00$).

FIGURE 1: Awareness of the risk of Hepatitis B Virus Infection among dental Surgeons in Lagos State

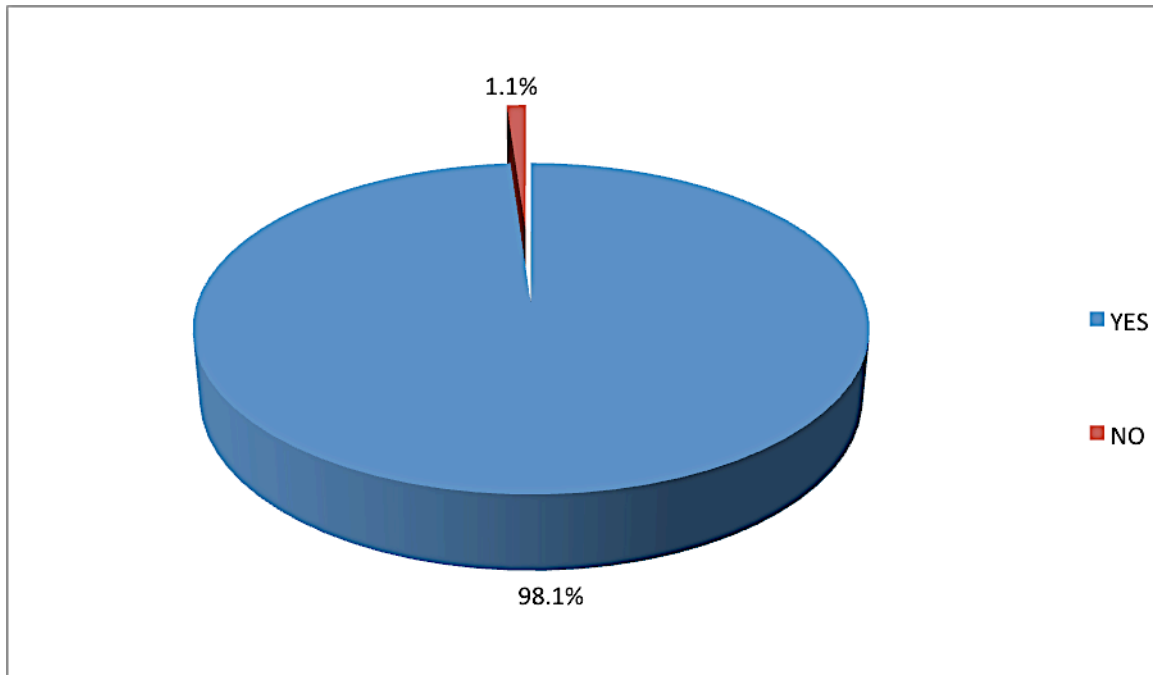


FIGURE 1 above shows the risk perception of dental surgeons in Lagos State to hepatitis b infection. One hundred and eighty five or 98.9% believe it poses a serious risk to them while only 2 or 1.1% do not believe so. The risk perception of dentists in Lagos State to hepatitis b infection is very high

FIGURE 2: Percentage of dentists in Lagos State that have been vaccinated against Hepatitis B virus

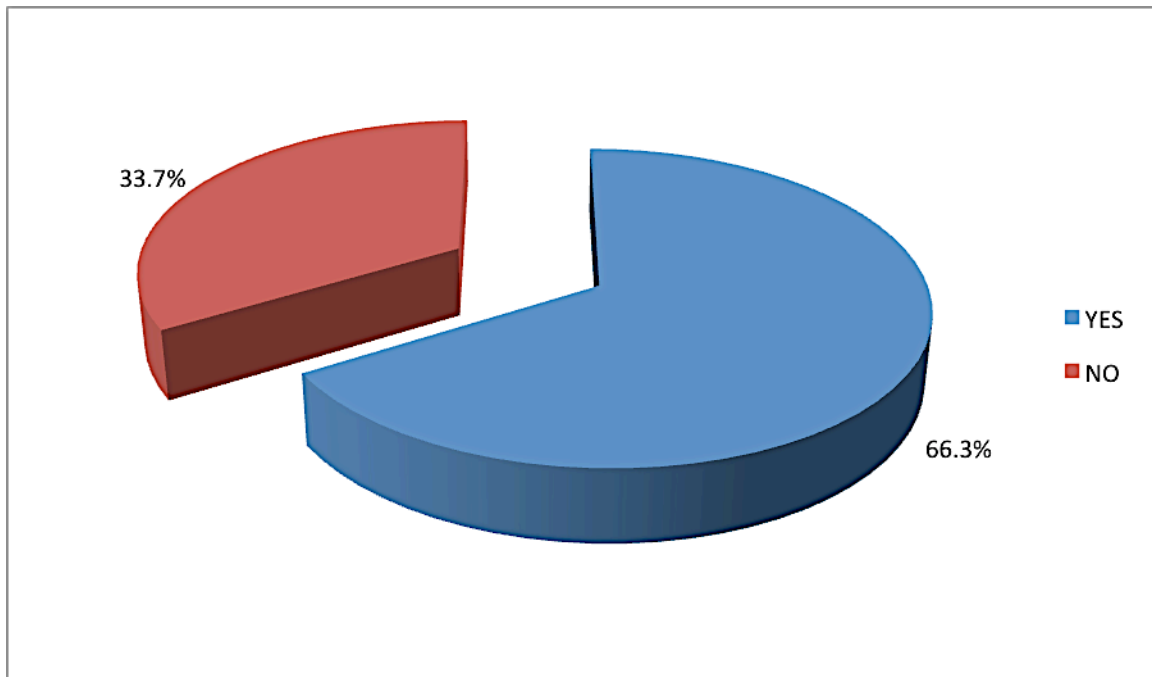


FIGURE 2 illustrates the number of dental surgeons who have you been vaccinated against the hepatitis b virus and those have not been vaccinated. One hundred and twenty four or 66.3% have been vaccinated while 63 or 33.7% have not been vaccinated. The majority of dental surgeons have been vaccinated.

FIGURE 3: Daily load of patients seen by dentists in Lagos State

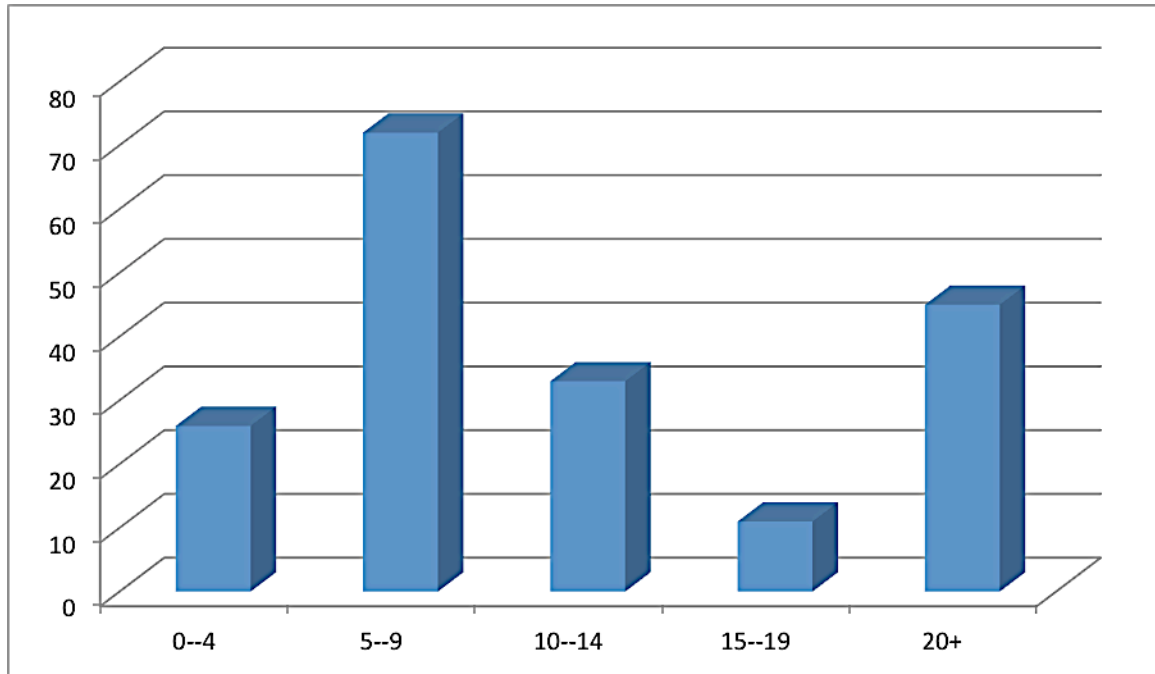


FIGURE 3 above shows the daily load of patients that dentists in Lagos State have. 26 or 13.9% attend to 0-4 patients daily while 45 or 24% to 20 patients and above. Majority of the dental surgeons attend to about 5-9 patients daily while the smallest percentage of dental surgeons attend to about 15-19 patients daily.

TABLE 1: The relationship between the daily load of patients seen by dentists and injury from sharp instruments in the past 6 months.

			Have you experienced an injury from a sharp instrument in the past 6 months.		Total
			Yes	No	
Number of patients seen daily.	0-4	No.	7	19	26
		Percentage	26.9%	73.1%	100.0%
	5-9	No.	20	52	72
		Percentage	27.8%	72.2%	100.0%
	10-14	No.	13	20	33
		Percentage	39.4%	60.6%	100.0%
	15-19	No.	3	8	11
		Percentage	27.3%	72.7%	100.0%
	20 and above	No.	16	29	45
		Percentage	35.6%	64.4%	100.0%
	Total	No.	59	128	187
		Percentage	31.6%	68.4%	100.0%

TABLE 1 shows the relationship between the daily load of patients and injury from sharp instruments in the past 6 months. Dental Surgeons who treated more patients were more likely to experience injury from sharp objects. There was no significant association. P = 0.717

TABLE 2: Relationship between injury from sharp instruments in the past 6 months and taking the appropriate antiviral prophylaxis after a needle prick injury.

			Do you take appropriate antiviral prophylaxis after a needle prick injury.				Total
			Rarely	Often	Always		
Have you experienced an injury from a sharp instrument in the past 6 months	yes	No.	40	10	9		59
		Percentage	67.8%	16.9%	15.3%		100.0%
	no	No.	69	25	25	9	128
		Percentage	53.9%	19.5%	19.5%	7.0%	100.0%
Total	No.		109	35	34	9	187
	Percentage		58.3%	18.7%	18.2%	4.8%	100.0%

TABLE 2 illustrates the relationship between injury from sharp instruments in the past 6 months and taking the appropriate antiviral prophylaxis after a needle prick injury. Forty (67.8%) of those that had sharp injuries rarely took appropriate prophylaxis. The Chi Square test shows no significant association. $P = 0.11$

Discussion

Dentists, patients and dental auxiliaries of all groups run risks every time they enter the Dental Clinic.¹⁹ Occupational exposure to blood and body fluids places Dental Surgeons at risk of infection with blood borne viruses, including HBV. This occupational potential for disease transmission becomes evident when one realizes that most human microbial pathogens have been isolated from oral secretions.⁸ A high level of awareness and knowledge of HBV infection was demonstrated in this study compared to previous studies.^{15,22} This did not however translate into a commensurate increase in cross-infection control practices. Dental Practitioners have not been wholly compliant with infection control measures, even when provided with all the appropriate equipment.²³

There was a high compliance with wearing of protective gloves while treating patients. Though this does not reduce the frequency of sharps injuries, it may confer some protection by virtue of the wiping action on the sharp object on penetration. There was no association between number of years in dental practice and sharp instruments injury.

The responses were similar irrespective of duration in practice. It is however disturbing to note that 33.3% of those that had not received Hepatitis B vaccine had sharps injury in the last 6 months and that 67.8 % of those that had sharps injury rarely took appropriate antiviral prophylaxis.

Dental surgeons with a high daily load of patients 35.6% (20 patients and above) were more likely to have sharps injury than those with a low load 26.9% (1-4 patients). Similarly, those who regularly attended seminars and updates (83.3%) were more likely to adhere to appropriate sterilization practices than those who did not (62.9%). The recent stipulation by the Medical and Dental Council of Nigeria on mandatory Continuing Medical Education programmes as a prerequisite for annual registration should result in improved knowledge and service delivery. A majority of the respondents (119, 63.6%) always use autoclave for sterilization of instruments. Recently, there has been several reports about the transmission of infection as a result of inadequate sterilization of hand pieces. Surface disinfection by wiping or soaking in liquid germicide is not an acceptable method of disinfecting hand pieces, as this method does not address internal contamination as retraction valves in dental unit waterlines may cause aspiration of the patient's secretions back into the hand piece and water lines.^{24,25}

In the present study, only 66.3% of Dental Surgeons were reported to have been vaccinated against HBV. This is higher than that reported for previous Nigerian studies^{18,26} but lower compared with the vaccination rates in other countries such as Scotland (88%)²⁷ and Canada (92.3%).²⁸ This low rate might be due to negligence and absence of legislation in Nigeria compelling HBV vaccination among clinical and other staff in dental clinics.

Training of health care providers is essential for injury reduction and that this should take into account the varying incidence of exposure across different occupation groups.²⁹ There is also a need for greater acceptability of the Hepatitis B vaccine by the dental health care workers.³⁰

Conclusion

A summary of these results shows that the infection control practices of Dental Surgeons in Lagos state are inadequate. This indicates a great need for formal and obligatory infection control courses and guidelines for Dental Surgeons.

There is little doubt that infection control has been improving in dentistry in many developed countries over the past decade.

A similar generalization cannot be made about developing countries. Constant education of Dental Surgeons is required, even though, this is no guarantee of effective clinical practice³¹. There is also an additional need for the development of a more rapid, uncomplicated, inexpensive and efficient method of sterilization and disinfection. Several Dentists have suffered disciplinary proceedings as a consequence of employing inadequate infection control in the United Kingdom. Increased legal awareness by patients in Nigeria should be a strong deterrent to poor infection control practices.

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