Prevalence and risk factors of Hepatitis B infection in patients attended at the S. D. A. Cooper Hospital, Sinkor, Liberia

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Abstract: Infection with hepatitis B virus causes both significant morbidity and mortality accounting for an estimated 400 million chronic liver infections and diseases. This study aims at determining the prevalence and risk factors of HBV infections among adults in Sinkor, Greater Monrovia. This retrospective study used information recorded in the database of the SDA Cooper Hospital. Records of one hundred and thirty-four (134) adult patients (≥18) who attended the hospital from January – December, 2016 and were tested for HBV. the overall prevalence of HBV infection was 57 (45.24%). The prevalence was higher in males 43/87 (49.4%) than females 14/39 (35.9%). In terms of age group, the prevalence of HBV was highest, 27/39 (69.2%) in the age group of 30–39 years and lowest, 1/12 (8.3%) age group 70-79 years. Sexual contact and intravenous drug use were the main possible sources of infection as 43.9 % and 28.1 % of the patients were probably infected through these routes. The least possible sources of infection were surgical operations (1.8%) and blood transfusions (10.5%). Findings from this study revealed a high prevalence of HBV infections among adult patients, especially through intravenous drug use and sexual contact. The risk of HBV infection was also found to decrease with age.
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1. Introduction

Hepatitis B virus is highly infectious and transmitted mainly via blood, body-fluid contact, and vertical transmission (Lok and McMahon, 2007). The World Health Organization (WHO) has estimated that there are 360 million chronically HBV infected people and 5.7 million HBV-related cases worldwide (WHO, 2009) and 1 million people die annually from these chronic HBV and associated complications and pathologies (W.H.O, 2008; WHO, 2009). The world has been broadly classified into regions of high, intermediate and low HBV endemicity. A major part of Africa especially the Sub-Saharan region has been classified as having high endemicity and parts of North Africa has been classified as having intermediate endemicity (WHO, 2011).

However, the scarcity of country-specific data on Liberia and the extent to which existing ones are outdated obviated the need to conduct a survey aimed at determining the prevalence and risk factors of HBV infections among adults in Sinkor, Greater Monrovia, with specific reference to the SDA Cooper Hospital. This will provide useful information for HBV disease burden estimation and surveillance, and aid in informing national vaccine intervention programs.

2. Literature Review

Generally, a high prevalence of chronic HBV is categorized as ≥8%, intermediate (2-8%) and low (<2%) (W.H.O, 2011). The prevalence of HBV and its modes of transmission vary geographically, and it can be classified into three endemic patterns (Knipe and Howley, 2013; Goldstein et al., 2005; Kowdley, 2004). Around 45% of the world's population live in regions of high endemicity, defined as areas where 8% or more of the population are positive for HBsAg such as Southeast Asia and Sub-Saharan Africa. The moderately endemic areas, such as in Mediterranean countries and Japan, are defined as those areas where 2–7% of the population are HBsAg positive, and around 43% of the world's population live in regions of moderate endemicity. Western Europe and North America are considered as areas with low endemicity (<2% of the population is HBsAg positive) and it constitutes 12% of the world's population (Knipe and Howley, 2013; Nicoletta and Daniel, 2002). In Western Europe and the United States of America, HBV is usually transmitted horizontally by blood products or mucosal contact. In highly endemic areas like Southeast Asia or Equatorial Africa, the most common mode of transmission is vertical transmission perinatally from an HBV-infected mother to the newborn child (Knipe and Howley, 2013; Nicoletta and Daniel, 2002; Thomas et al., 2005).

HBV is hyper-endemic (i.e. >8% of the population infected) in Sub-Sahara Africa (SSA) and

a major cause of chronic liver disease (Ola et al., 2007; Lesi et al., 2004; Ndububa et al., 2005). Perz et al. estimated that 44% of cirrhotic liver disease and 47% of heptocellular carcinoma cases in SSA are attributed to HBV.

Certain types of behaviours increase the risk for contracting HBV such as: use of contaminated needle during acupuncture, intravenous drug abuse, ear piercing and tattooing, sexually active heterosexuals or homosexuals (having more than one sexual partner in the last 6 months), infants/children in highly endemic areas, infants born to infected mothers, health care workers, haemodialysis patients, blood receivers prior to 1975 (blood transfusion), haemophiliacs, prisoners with long term sentences as well as visitors to highly endemic regions (Nicoletta and Daniel, 2002). Several socio-demographic variables have also significantly been associated with the prevalence of hepatitis B virus infection. In a study by Janahi (2014), it was observed that among children 0–15 years of age, the prevalence was low (1.8%), while it significantly increased among the age groups 25–34 & 35–44 ($p<0.0001$, and it dropped again in older ages (7.9%). Sixty-one percent of all HBV–positive persons were 25 to 44 years old. Most notable was the difference in prevalence when it came to gender, the prevalence was significantly higher among males (62.3%; $P<0.01$).

However, the scarcity of data on Liberia and the extent to which existing ones are outdated obviated the need to conduct a survey aimed at determining the prevalence and risk factors of HBV infections among adults in Sinkor, Greater Monrovia, with specific reference to the SDA Cooper Hospital. This will provide useful information for estimation, surveillance and intervention.

3. Methodology

Study Setting

Sinkor is a section of the Monrovia metropolitan area in Liberia where many embassies, health facilities, educational institutions, and non-governmental organizations are located. Tubman Boulevard is the main route in Sinkor, which connects the neighbourhood to central Monrovia. Seventh-day Adventist Cooper Hospital, located in Sinkor, Monrovia, Liberia, is a fully operational hospital which has been managed by Adventist Health International since 2008, and is very active in the community. This hospital approximately 90 staff members and has a regular flow of 150 patients showing up for emergency care every day.

Data Collection

This study used information recorded in the database of the SDA Cooper Hospital. The records of one hundred and thirty-four (134) adult patients (18 and above) who attended the hospital from January – December, 2016 and were tested for HBV, were eligible to participate in this study. One hundred and twenty-six (94%) were included in this study while 8 (6%) were not included in this study because there was insufficient information about the patient in the medical records.

Information extracted from medical records included demographic data (gender, age, marital status, occupation and area of residence), HBV status, risk-behavior patterns (number of sexual partners, history of STI, blood transfusion, alcohol and/or drug use).

Data Analysis

Standard descriptive statistical analysis was performed, for qualitative data analysis. Prevalence rate was calculated to determine the relative frequency of HBV infection. Regression analysis will be carried out to estimate the strength of the association between each infection and potential risk factors with a probability value of $p < 0.05$, considered to be statistically significant.

4. Results

Demographic Characteristics

The records of one hundred and twenty-six (126) adult patients were reviewed in this study. Of the total, 87 (69%) were males and 39 (31.1%) females. Majority, 69.2% were below the age of 50 years and 103 (81.75%) were married with 23 (18.25%) single. Most, 62 (49.2%) of the patients were employed with private institutions, 38 (30.2%) were employed with government, 9 (7.1%) traders, 6 (4.8%) students and 11 (8.7%) unemployed. In terms of area of residence, 119 (94.4%) of the patients lived in urban centres while 7 (5.6%). residence, 119 (94.4%) of the patients lived in urban centres while 7 (5.6%).

Prevalence of HBV Infection

As shown in Table 2, the overall prevalence of HBV infection was 57 (45.24%). The prevalence was higher in males 43/87 (49.4%) than females 14/39 (35.9%). In terms of age group, the prevalence of HBV was highest, 27/39 (69.2%) in the age group of 30–39 years and lowest, 1/12 (8.3%) age group 70-79 years. Prevalence among married patients was 41/103 (39.8%) while single were 16/23 (69.6%). Patients employed with government showed a prevalence of 20/38 (52.6%), private institution employees 25/62 (40.3%), traders 7/9 (77.8%), unemployed 3/11 (27.3%) and students 2/6 (33.3%).

Table 1: Prevalence of hepatitis B in relation to socio-demographic characteristics of patients

Socio-demographic characteristics	HBV Positive No. (%)	HBV Negative No. (%)	Total (%)
Gender			
Males	43 (49.4)	44 (50.6)	87 (100)
Female	14 (35.9)	25 (64.1)	39 (100)
Marital Status			
Married	41 (39.8)	62 (60.2)	103 (100)
Single	16 (69.6)	7 (30.4)	23 (100)
Residence			
Urban	52 (43.2)	67 (56.3)	119 (100)
Rural	5 (71.4)	2 (28.6)	7 (100)
Occupation			
Trader	7 (77.8)	2 (22.2)	9 (100)
Gov. Employed	20 (52.6)	18 (47.4)	38 (100)
Private Employed	25 (40.3)	37 (60.1)	62 (100)
Student	2 (33.3)	4 (66.6)	6 (100)
Unemployed	3 (27.3)	8 (72.7)	11 (100)

Table 2: Prevalence of hepatitis B in relation age group

Age	HBV Positive No. (%)	HBV Negative No. (%)	Total (%)
17-29	2 (13.3)	13 (86.7)	15 (100)
30-39	27 (69.2)	12 (30.8)	39 (100)
40-49	14 (43.8)	18 (56.3)	32 (100)
50-59	8 (47.1)	9 (53)	17 (100)
60-69	5 (33.3)	10 (66.7)	15 (100)
70-79	1 (12.5)	7 (88)	8 (100)

Possible risk Factors among HBV Patients

Sexual contact and intravenous drug use were the main possible sources of infection as 43.9 % and 28.1 % of the patients were probably infected through these routes respectively (Figure 1). History of STI was considered to be the source of infection for about 15.8% of the infected patients. The least possible sources of infection were surgical operations (1.8%) and blood transfusions (10.5%).

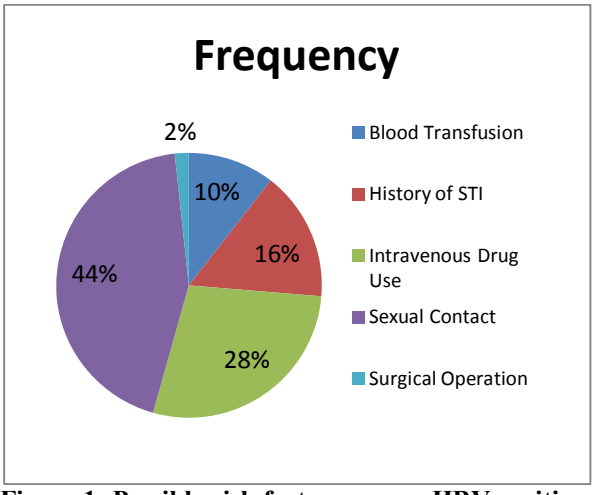

Figure 1: Possible risk factors among HBV positive patients

3. Discussion

As reported by Brumfitt *et al*., (1961) an important host factor that predisposes to catheter associated UTI is advanced age. In this work, patients of the age range 61-80 accounted for the largest group (31.7%). This is also in ageement with what was reported by Porush and Faubert (1997), that the prevalence of urinary tract infection (UTI) increases with age. Males were also predominantly affected in this study which is similar to results obtained in previous works done within the country from different states (Nwankwo *et al*., 2014; Taiwo and Aderoumu, 2006).

From the results of this study, *P. aeruginosa* was the predominant aetiological agent (35.1%) as the causative agents of UTI. This finding is similar to what was reported in previous studies (Nwankwo *et al*., 2014; Selden, 2004; Oni *et al*., 2003). According to Koshariya *et al*., (2015), in a study done on children in Delhi, India, nosocomial UTI was found to be more due to organisms like *pseudomonas* and gram positive cocci while *E. coli* infection showed a decrease in incidence. This was not entirely the case in this study as only 15% incidence was observed in *S. aureus* and *S. epidermidis*, as against 30.7% for *E. coli* which was the second most predominant organism. Many of these pathogens are commensal organisms of the bowel but may have also been

acquired by cross-contamination from other patients or hospital personnel or through exposure to contaminated solutions or equipment. A study by Taiwo and Aderoumu (2006) in another institution within the same country, reported the presence of similar organisms in the hospital environment.

Catheter associated UTI is reported in most previous studies to be polymicrobial (Koshariya *et al*., 2015; Nwankwo *et al*., 2014; Oni *et al*, 2003). This study showed similar results as 62.6% of samples obtained were polymicrobial and 19.4% monomicrobial.

Most of the gram negative isolates exhibited high resistance to tetracycline, gentamicin, ampicillin, cotrimoxazole, nitrofurantoin, penicillin, chloramphenicol and erythromycin. A similar pattern has been reported in several previous studies both within the country and internationally (Nerurkar *et al*., 2012; Smith and Almond, 2007; Taiwo and Aderoumu, 2006; Oni *et al*., 2001). Gram positive cocci were also resistant to these conventional antibiotics with the exception of ampicillin. However, Koshariya *et al*. (2015) reported 50%, 75% and 66.6% sensitivity of *E. coli, Proteus* and *Klebsiella* respectively to nitrofurantoin while, Magalit *et al.,* (2004) have reported the susceptibility of *E. coli* to Ciprofloxacin 55% in CAUTI. Hauser (2013) also reported ampicillin to have strong activity against *S. aureus* and *S. pneumoniae*. Various changes have been observed in the susceptibility pattern of uropathogens in recent studies. It is important to note that these variations in antimicrobial susceptibility in different settings may depend upon the easy availability of antimicrobial drugs over the counter resulting in frequent misuse. The increased resistance of uropathogens to conventional antibiotics can however largely be attributed plasmid mediated by lactamase producing bacteria (Patel *et al*., 2009; Ullah *et al*., 2009; Acharya, 1992).

4. Conclusion

This study was able to identify the bacterial profile of patients with indwelling urinary catheter. *P. aeruginosa*, *E. coli*, *K. pneumoniae* and *P. mirabilis* and *S. aureus* remain some of the commonest pathogens associated in patients having CAUTI. As drug resistance among these bacterial pathogens continues on the increase, treatment of catheterassociated UTI in this instiution should be guided by the results of susceptibility test of isolated organisms. Moreover, limiting chronic indwelling catheter use, proper catheter management and reinforcing infection control programs are vital in minimizing infections associated with in-dwelling urinary catheters. Urinary catheter should be inserted only when necessary and removed immediately when necessary.

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References

1. Acharya VN. Urinary tract infection: A dangerous and unrecognized forerunner of systemic sepsis. *Journal Postgraduate Medicine* 1992;38(2):52-4.
2. Akinkugbe FM, Familusi FB, Akinkugbe OO. Urinary tract infection in infancy and early childhood. *East African Medical Journal* 1973;50(9):514-520.
3. Bauer AW, Kirby WMM, Sherris JC, Turck M. Antibiotic susceptibility testing by a standardized single disk method. *American Journal of Clinical Pathology* 1966;45:493-496.
4. Brumfitt W, Davies BL, Rosser E. The urethral catheter as a cause of urinary tract infection in pregnancy and peuperium. *Lancet* 1961;2: 1059-1061.
5. Ekweozor CC, Onyemenem TN. Urinary tract infections in Ibadan; causative organism and antimicrobial sensitivity patterns. *African Journal Medicine and medical Sciences* 1996;25:125-169.
6. Foxman B. Epidemiology of urinary tract infection: Incidence, Morbidity and economic costs. *American Journal of Medicine* 2002;113: 5-13.
7. Hartstein AI, Garber SB, Ward TT, Jones SR, Morthland VH. Nosocomial urinary tract infection: A prospective evaluation of 108 catheterized patients. *American Journal of Infection and Control* 1981;2(5):380-386.
8. Hauser AR. Antibiotic Basics for Clinicians, 2nd ed. Lippincott Williams and Wikins, Philadelphia, 2013; pp25-28.
9. Koshariya M, Songra MC, Namdeo R, Chaudhary A, Agarwal S, Rai A. Prevalence of pathogens and their antimicrobial susceptibility in catheter associated urinary tract infection. *Integrated Archives of Integrated Medicine* 2015; (4): 96-113.
10. Kunin CM, Chin QF, Chambers S. Morbidity

and mortality associated with indwelling urinary catheters in elderly patients in a nursing home – confounding due to the presence of associated diseases. *Journal of American Geriatrics Society* 1987;35:1001–100.
11. Kunin CM. Detection, prevention and management of urinary tract infections, 3rd ed. Lea and Febiger, Philadelphia, 1979.
12. Magalit SL, Gler MTS, Tupasi TE. Increasing antimicrobial resistance patterns of community and nosocomial uropathogens in Makati Medical Center. *Philippine Journal of Microbiology Infectious Diseases* 2004;33(4): 143-148.
13. Magill SS, Hellinger W, Cohen J, Kay R, Bailey C, Boland B, Carey D, de Guzman J, Dominguez K, Edwards J, Goraczewski L, Horan T, Miller M, Phelps M, Saltford R, Seibert J, Smith B, Starling P, Viergutz B, Walsh K, Rathore M, Guzman N, Fridkin S. Prevalence of healthcare-associated infections in acute care facilities. *Infect Control Hosp Epidemiol* 2012;33(33):283-91.
14. Performance standards for antimicrobial susceptibility testing; M100-S22. Clinical and Laboratory Standards Institute, Wayne, PA. 2011. 22nd informational supplement.
15. Nerurkar A, Solanky P, Naik SS. Bacterial pathogens in urinary tract infection and antibiotic susceptibility pattern. *Journal of Pharmaceutical and Biomedical Sciences* 2012;21 (12).
16. Nwankwo IU, Godwin CT, Nwankwo EO. Bacterial profile in patients with indwelling urinary catheters in Federal Medical Center, Umuahia, Abia State, Nigeria. *Sky Journal of Microbiology Research* 2014;2(5):28 – 31.
17. Odutola TA, Ogunsola FT, Odugbemi T, Mabadeje AFB. A study on prevalence of urinary tract infection in hypertensive patients attending an urban hospital in Lagos, Nigeria. *Nig Qt J Hosp Med*. 1998;8(3): 190-192.
18. Oni AA, Mbah GA, Ogunkunle MO, Shittu OB Bakare RA. Nosocomial infection: Urinary tract infection in patients with indwelling urinary catheter. *Afr J Clin Exper Microbiol*. 2003;4: 63-71.
19. Oni AA, Bakare RA, Arowojolu OA, Kehinde OA, Toki RA, Fashina NA. Comparative activities of commercially available quinolones and other antibiotics on bacterial isolates in Ibadan, Nigeria. *Afr J Med Sci* 2001;30: 35-37.
20. Patel J, Bhatt J, Javiya V, Patel K. Anti-microbial susceptibility patterns of *Enterobacteriaceae* isolated from a tertiary care unit in Gujarat. *The Internet J Microbiol* 2009;6(1):1-27.
21. Porush JG, Faubert PF. Renal disease in elderly patients. *Rev Clin Gerontol* 1997;7:299-307.
22. Robert AW. Strategies to prevent catheter-Associated urinary tract infection in acute care hospitals. *Inf Con and hosp epidemol* 2008;29:51-550.
23. Saint S, Chenoweth CE. Biofilms and catheter-associated urinary tract infections. *Infect Dis Clin North Amer* 2003;17:411-432.
24. Saint S. Clinical and economic consequences of nosocomial catheter related bacteriuria. *Am J Infect Control* 2000;28(1):68-75.
25. Selden EI. Timing of post-operative voiding trial after anti-incontinence procedure. *J of Pel Med and Surg* 2004;10(1)37-38.
26. Selden R, Lee S, Wang WLL, Benet JV, Eikhoff TC. Nosocomial Klebsiella infection; intestinal colonization as a reservoir. *Ann Intern Med* 1971;74;657-664.
27. Smith, AC, Almond M. Management of urinary tract infections in the elderly. *Trends Urology, Gynecol Sexual Health* 2007;12:31-34.
28. Stamm WE, Hooton TM. Management of urinary tract infections in adults. *N Engl J Med* 1993;329:1328–34.
29. Stamm WE. Catheter associated Urinary tract infection: epidemiology, pathogenesis and prevention. *Am J Med* 1991;91(3):65-71.
30. Taiwo SS, Aderounmu AOA. Catheter Associated Urinary Tract Infection: Aetiologic Agents and Antimicrobial Susceptibility Pattern in Ladoke Akintola University Teaching Hospital, Osogbo. *Nigeria African Journal of Biomedical Research* 2006;9:141-148.
31. Ullah F, Malik SA, Ahmed J. Antibiotic susceptibility pattern and ESBL prevalence in nosocomial Escherichia coli from urinary tract infections in Pakistan. *African J Biotech* 2009; 8(16):3921-3926.
32. Warren JW. Catheter-associated urinary tract infection. *Infect. Dis Clin North Am* 1997;11:609-622.