EUROPEAN ACADEMIC RESEARCH
Vol. IV, Issue 2/ May 2016

Impact Factor: 3.4546 (UIF)
DRJI Value: 5.9 (B+)

ISSN 2286-4822
www.euacademic.org

The Effect of Handling of Laboratory Wastes on Liver Function Tests among Handlers in National Laboratory for Public Health in Khartoum State

RANIA MUKHTAR ELHASSAN
Department of chemical pathology
Medical Laboratory Science, National Laboratory for Public Health
Khartoum, Sudan
MARIAM ABBAS IBRAHIM
Clinical Chemistry Department
College of Medical Laboratory Science
Sudan University of Science and Technology, Khartoum, Sudan

Abstract:

Hepatitis B and C viruses are the causative agents of sever form of liver disease with high rate of mortality. This study aimed to determine the prevalence of hepatitis B and/or C viruses and associated liver function tests among laboratory waste handlers. This is a cross-sectional study was conducted in March 2015, in national laboratory for public health, Participant data were obtained through structured check list, and the level of antigens and antibodies were measured by enzyme-linked immunosorbent assay (ELISA) and automated machine (Hitachi) for measuring liver function tests. The 50 non vaccinated workers, an adequate awareness about type of waste among the group 48%,during work only 62%were wearing protective cloth and 84% were wearing gloves while handling laboratory waste, just about 24% had segregate the waste ,and 18% used sharp container while handling sharpening. Only 8% had got pricked accidentally by handle needle. Only one worker (2%) had infected with HBV during last ten years, and no one had infected with HCV. When measuring LFT (total bilirubin, total protein, albumin, alkaline phosphates, aspartate aminotransferase, and Alanine aminotransferase) for those

workers, we found a significant decrease in total bilirubin, total protein, albumin, alkaline phosphates, aspartate aminotransferase. P. value prospectively (0.007, 0.000, 0.0003, 0.000, 0.026) and insignificant decrease for Alanine aminotransferas. P. value (0.435). Overall, an inadequate awareness and a few risk perceptions about HBI were found among the study group with significant impairment in liver function test.

Key words: laboratory waste handlers, hepatitis B, hepatitis C, liver function test

INTRODUCTION:

Clinical laboratories are significant generators of infectious waste, including microbiological materials, contaminated sharps, and pathologic wastes such as blood specimens and blood products. Most waste produced in laboratories can be disposed of in the general solid waste stream. (1) Improper disposal of medical waste including mixing general wastes with infectious wastes and improper handling may include damage to humans by sharp instruments, diseases transmitted to humans by infectious agents, therefore, proper management of medical waste is a subject of major concerns for a healthy environment. (2) Health and safety in clinical laboratories is becoming an increasingly important subject as a result of emergence of highly infectious diseases such as Hepatitis. (3)

Hepatitis B infection (HBI) is one of the major public health problems globally and is the 10th leading cause of death. (4) Also HCV it can cause severe medical outcomes such as acute hepatitis, chronic liver diseases and hepatocellular carcinoma. (5) Prolong handling of laboratory waste may affect on liver function test .The liver is a large, complex organ that is well designed for its central role in carbohydrate, protein and fat metabolism. (6)

The study was conducted to study prevalence of hepatitis Bvirus among medical waste handlers in Addis Ababa, Ethiopia in only three hospitals among 126 MWHs The result show that From 126 Medical waste Handlers (MWHs), HBsAg was detected in 8 (6.3%) and, and Anti-HBcAg in 60 (47.6%). (5)

No data about the prevalence of HBV or effect on liver function test among laboratory waste handlers is available in Sudan. Therefore; this study was conducted to describe the prevalence of HBV infection and the effect on liver function test, among laboratory waste handlers in National laboratory for public health.

MATERIALS AND METHODS:

Study design: This is cross sectional study.

Study area: The study was conducted in laboratory waste handler in National laboratory for public health.

Study population: This study included 50 unvaccinated waste handlers in National laboratory for public health this is the Reference laboratory in Sudan. Since 2006 to March 2015.

Inclusion criteria: All laboratory waste handlers in National laboratory for public health since 2006 (who were examined for HBV, HCV) were included.

Exclusion criteria: All laboratory waste handlers in National laboratory for public health worked after 2006 were excluded.

Data collection: Data were collected by using pre-tested and well structured check list; I used this method because it's best method for collection of correct data, due to different levels of education for those workers.

Blood Samples: About 5ml of venous blood were collected from each worker. The samples collected under aseptic conditions and placed in sterile plane containers, and after clotting centrifuged for 3 minutes at 3000 RPM to obtain serum, then the obtained serum were kept at _20c till the time of analysis.

Ethical consideration: The study protocol was cleared by consent of the general manager and monitor of the National laboratory for public health, with consent of the head department of virology and clinical chemistry lab. Informed consent was obtained from all laboratory waste handlers.

Data analysis: All data is arranged and analyzed for making some good recommendation on safe handling of laboratory waste, further more data analyzing is important to achieve the objective that were set earlier. Data was analyzed by using the SPSS computer program version 19, by using one sample T test program for analyzed LFT,(the mean is significant at $p \leq 0.05$) and frequency per percentage of list variables.

Quality control: To insure the quality of laboratory results, the standard Operating procedures of the company was followed every time and all tests were performed by experienced medical laboratory technologist. Furthermore known positive and negative control sera provided by the manufacture of the kits were used for every panel of the test.

RESULTS:

Fifty non vaccinated workers in national laboratory for public health where who have been tested and found negative for HBsAg and HCV since 2006 and enrolled in this study, to study the effect of handling of waste on their liver functions. After collection of required data and suitable samples for tests,

the tests were done and the results were analyzed by using SPSS computer program and the results were as follow:

An adequate awareness about HBV and HCV infection over all workers were 48 % (Figure: 1), During work only 62% were wearing a protective cloth (Figure: 2) and 84 % were wearing gloves while handling laboratory waste (Figure: 3), Just about 24 % had segregate the waste (Figure: 4), 18 % using sharp container while handling sharpener (Figure: 5) and Only 8% had got pricked accidentally by handle needle (Figure: 6).

When measuring HBsAg and HCV by (ELISA) we found that only one worker (2 % of total) had infected with HBV during last ten years (Figure: 7) and no one had infected with HCV.

Liver Function Tests including: total protein, albumin, total bilirubin, ALP, AST and ALT were done for those workers, and one sample T test was used to compare the result mean with the mean value.

Table: 1 shows a significant decrease in total bilirubin, total protein, albumin, alkaline phosphates, aspartate aminotransferase, P. value prospectively (0.007, 0.000, 0.0003, 0.000, and 0.026) and insignificant decrease for Alanine aminotransferas, P. Value 0.435.

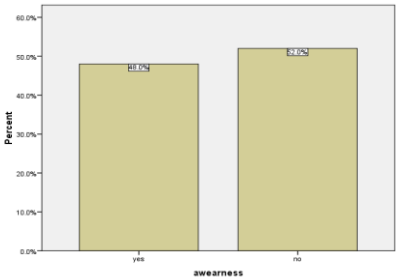

Figure3.1:
Awearness about HBV and HCV infection

Figure 1: Awareness about HBV and HCV infection

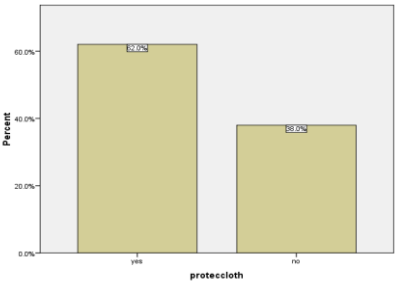

Figure 3.2:
wearing a protective cloth

Figure 2: wearing a protective cloth

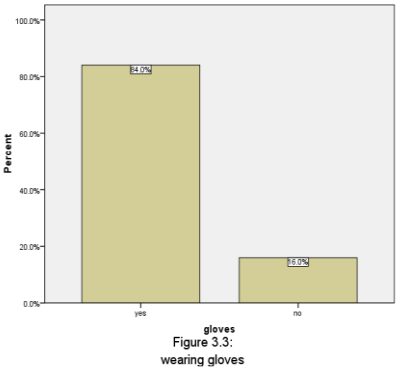

Figure 3: wearing gloves

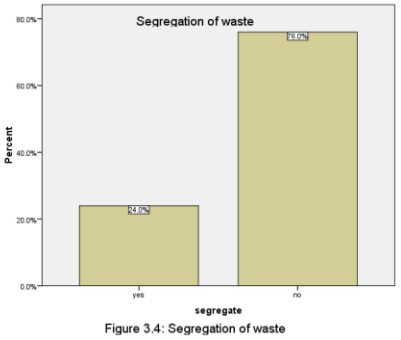

Figure 4: Segregate waste

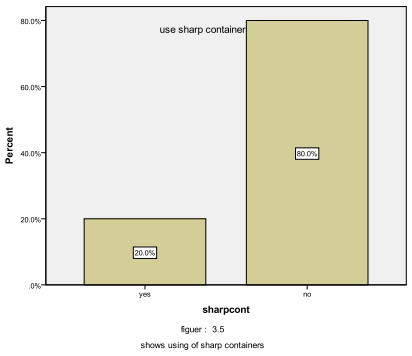

Figure 5: using of containers

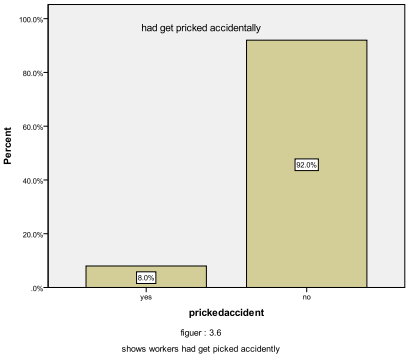

Figure 6: worker had get pricked accidentally

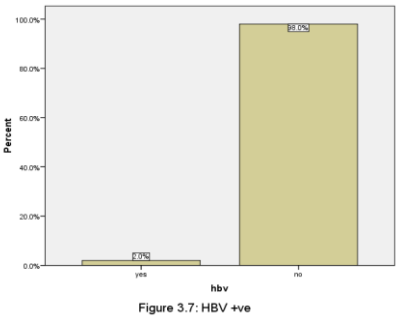

Figure 7: HBV +ve

Table 1: The result of liver function tests of the workers.

Variable	Normal Mean value	Mean±SD	P.value
S/ Total Protein (g/dl)	7.4	6.090 06028	0.000
S/ Albumin (g/dl)	4.3	4.676 0.8551	0.003
S/ ALP (U/l)	220	144.98 58.293	0.000
S/ AST (U/l)	30	24.20 12.943	0.000
S/ ALT (U/l)	20	18.54 13.114	0.435
S/Total bilirubin (mg/dl)	0.5	0.874 0.9417	0.007

One sample T test was used; P. value < 0.05 was considered statistical significance.

DISCUSSION:

Laboratory waste handlers are at greater risk at contacting blood borne disease due to their constant contact with infectious waste or sharps contaminated with blood (4). No data about the prevalence of HBV or effect on liver function test among laboratory waste handlers is available in Sudan.

In the present study we found that the group of workers (50 individuals) who enrolled in the study haven't incidence with HBV or HCV in 2006.

As the results of this study, during this period, only one of them had infected with HBV and no incidence with HCV. Although none of them was immunized against hepatitis B virus, and there was no adequate awareness among the group. This evident when compared with data obtained in Ethiopia at Gondar town in University of Gondar Teaching Hospital, Northwest Ethiopia (2011) about HBV and HCV among medical waste handlers HBV was detected in 6 (6.0%) and HCV in 1 (1.0%). Also similar study found in Tripoli, Libya with reported

rate of 2.3% HBV; whereas 2.7% HCV positivity which was slightly higher. (7)

Lower and higher prevalence rates were also detected as compared to similar study populations in different parts of the world.

For liver function tests the statistical analysis showed a significant decrease in serum levels of total bilirubin, total protein, albumin, alkaline phosphates and aspartate aminotransferase with P.value prospectively (0.007, 0.000, 0.0003, 0.000, and 0.026) and insignificant decrease for Alanine aminotransferas with P. value 0.435. when comparing the results with similar study conduct in solid waste disposal workers in Port Harocurt, Nigeria, the AST values increased significantly for solid waste workers with a mean AST concentration of (11.19±2.36 µ L-1) and 8.97±4.07 µL-1 for the control subjects, and mean total bilirubin increased progressively as the number of years of exposure increased (19.00 µmol L-1). The peak value was for workers exposed for about 7 year. Other liver function tests values did not show much difference. (8)

CONCLUSION:

1. Workers who enrolled in the study, shows a significant impairment in serum levels of total bilirubin, total protein, albumin, alkaline phosphates, aspartate aminotransferase, and insignificant impairment for Alanine aminotransferas.
2. Manual collection of medical wastes increased the observed accidents.

Acknowledgements:
We acknowledge each National laboratory for public health director and management for allowing us to undergo this study. We are also grateful to the leader of waste handlers, for data

collectors and laboratory technicians, and the study subjects who kindly volunteered to participate in this study. Last but not least we thank Sudan University of Science and Technology College of Graduate studies for financial and logistic support of the study.

REFERENCES:

(1) Mehrdad Askarian1,Nasrin Motazedian2 and Charles John Palenik3. (2012). Clinical laboratory waste management in Shiraz, Iran;Waste Manag Res vol. 30 no. 6 631-634.
(2) Manzurul M Hassan, Shafiul Azam Ahmed, Anisur Rahman K and Tarit Kanti Biswas, BMC Public Health. (2008), Pattern of medical waste management: existing scenario in Dhaka City, Bangladesh 8:36 doi: 10.1186/1471-2458-8-36.
(3) Ajaz Mustafa A. Jan Farooq GJ Qadri and Tabish S A. (2008). Jul; Safety in Laboratories 2(2): 112–117 Int J Health Sci (Qassim) 2(2); 2008 Jul PMC3068740.
(4) Shankargouda Patil, Roopa S. Rao, and Anveeta Agarwal J. (2013). Int Soc Prev Community Dent.Jul-Dec; 3(2): 67–71. doi: 10.4103/2231-0762.122434.
(5) Yitayal Shiferaw, Tamrat Abebe, and Adane Mihret.(2011). Hepatitis B virus infection among medical aste handlers in Addis Ababa, EthiopiaNovember 3. doi: 10.1186/1756-0500-4-479.
(6) Edoardo G, Giannini, Roberto Testa, and Vincenzo Savarino.(2005). Liver enzyme alteration: a guide for cliniciansCMAJ, Feb 1; 172(3): 367–379. doi: 10.1503/cmaj.1040752.
(7) Belay A, Yitayal S, Berhanu A, Yeshambel B, Woldearegay E, Fantahun B, Beyene M, Agersew A, Feleke M, Andargachew.(2012). M: Seroprevalence of hepatitis B and C viruses among medical waste handlers at Gondar town Health

institutions, Northwest Ethiopia. BMC Res Notes, doi: 10.1186/1756-0500- 5-55.

(8) Wachukwu K. Confidence and Eleanya EU. (2007). Health Impact Assessment of Solid Waste Disposal Workers in Port Harocurt, Nigeria. Journal of Applied Sciences, 7: 3562-3566.