



RESEARCH ARTICLE

HIV, HBS and HCV in Dump Site Workers of Erbil Governorate

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ABSTRACT

This research targeted eighty-nine males working in Kany Qrzhala, dumpsite. Age and gender comparable apparently healthy subjects were selected as healthy controls, and both of the groups were obliged to fill the study's questionnaire. Further, venous blood samples were collected from each individual for serum collection. The accumulated sera reserved for the seroprevalence for antibodies tests of Human Immunodeficiency Virus, Hepatitis B Surface (HBS) Antigen and Hepatitis C Virus (HCV), (human immunodeficiency [HIV]), (HBS), (HCV), respectively. The automated immunoassay analyzer Cobas E411 facilitated the conducting of the mentioned tests. The serum concentration of HIV and HBS antibodies of dumpsite workers revealed a significant increase when compared to the healthy group, while the HCV antibody serum concentration presented no significant alteration when comparing dumpsite workers to the healthy controls. The antibodies present in the sera that belonged to workers is an indicator of exposure to the viruses due to unsanitary health conditions. This may pose a public health risk to the workers themselves, in addition to the people they are in contact with, including their families.

Keywords: Dumpsite workers, HIV, HBS, HCV

INTRODUCTION

The increase in the population of any city will result in increasing production of waste materials. In addition, the poor management systems of domestic wastes and lack of modern technology in the management of wastes, all play a major role in increasing the waste materials.^[1]

Studies have shown that dumpsites do not only affect the dumpsite workers but the surrounding areas and the people living there.^[2] It has been shown, that cities in many countries face many health issues owing to inadequate municipal management of solid waste.^[3] Other studies have shown the link between health and environmental effects due to insanitary dumpsites.^[4-6] Because dumpsite workers handle solid waste directly, this has been shown to be a consequence to various of diseases; infectious and chronic.^[5,7]

Many of the dumpsites are usually located distant on urban areas borders. They represent a major health problem and many diseases, including infectious diseases, i.e., malaria and cholera, have been recorded in these areas and urban cities around them.^[8,9]

Because of the lack of accurate data on the health status of dumpsite workers in Erbil City, this research aimed to discover possible exposure of these workers to specific viral diseases.

METHODOLOGY

Population Selection

A dumpsite in Erbil governorate named as Kany Qrzhala. Eighty-nine males were chosen for the study in hand. Age and gender comparable apparently healthy subjects were selected as healthy controls. The entire dumpsite-working group and the healthy group were asked to respond to the study questionnaire and submit the tests explained in the following sections.

Samples of the Blood Collection

After applying the tourniquet, disinfecting with 70% Ethanol anti-cubital fossa, administering with a 23-gauge needle

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attached to a disposable five ml syringe. A 5 ml venous blood samples were accumulated from all the participants. Later, the collected blood was retained in plain tubes and was set aside for 60 min at room temperature to clot. Then, to collect the serum, tubes for whole 10 min were centrifuged at 4°C at $\times 450$ g, afterwards, by a Pasteur pipette the separated serum was aspirated then dispensing it into previously sterilized five ml glass tubes. Finally, cooling and storing them at -20° .

Antibody Detection

Restoring the glass tubes with sera to room temperature seroprevalence tests can be achieved. Hence, the research employed the automated Cobas E411 immunoassay analyzer for the deduction of human immunodeficiency (HIV), Hepatitis B Surface (HBS), and Hepatitis C Virus (HCV) antibodies.

RESULTS

Workers' Statistics

Table 1, illustrates the study's investigated dumpsite group data, where eighty-nine male workers with age ranging from 12 to 65 years. Second, rural areas were the location of 92.13%, while urban areas were the location of 7.87%. Third, the table recorded 58.43% smokers and 41.57% non-smokers. Fourth, it demonstrated there were 61.80% married and 38.20% single workers. Last of all, it has been reported that 37.08% of the workers were not formally educated, 40.45% acquired the education of primary school, and 17.97% earned secondary school certificate, and 2.25% diploma and 2.25% B.Sc. degree holders.

Anti HIV Antibody

The serum concentration of HIV antibody of investigated dumpsite workers revealed a significant increase when compared to the healthy group (Table 2, Figure 1).

Anti HBS Antibody

The serum concentration of HBS antibody of dumpsite workers showed a significant rise when compared with the healthy controls (Table 3, Figure 1).

Anti HCV Antibody

The serum concentration of HCV antibody presented no significant difference when comparing study's dumpsite workers to the healthy group (Table 4, Figure 1).

DISCUSSION

The unsanitary disposal of wastes creates a flourishing habitat for diseases to be defused via insects and rodents. This concurs with the occurrence of the Black Death in the 14th century epidemic. Where closely half of the Europe population perished.^[10] Procedures followed by developing countries for waste management are correlated to employment safety and health issues. It was recorded that, and in many countries, diseases and infections of respiratory, skin, gastro-intestinal, muscular-skeletal complications, along with cutting injuries

Table 1: Kany Qrzhala, Erbil governorate dumpsite workers information

Variable	No. (n=89)	Percent
Workers live in rural areas	82	92.13
Workers live in urban areas	7	7.87
Smoker workers	52	58.43
Non-smoker workers	37	41.57
Single workers	34	38.20
Married workers	55	61.80
Education/Illiterate workers	33	37.08
Education/Primary school	36	40.45
Education/Secondary school	16	17.97
Education/Diploma	2	2.25
Education/Bachelor	2	2.25

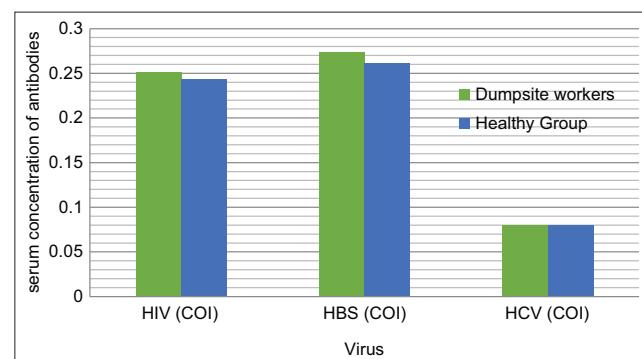


Figure 1: HIV, HSB and HCV antibody concentrations in the sera of the workers in comparison to the healthy controls

are commonly health ramifications for those who are working in dumpsites.^[11]

Studies have identified the poor working conditions of the dumpsite workers and inadequate sanitation practices making them susceptible to diseases, in addition to their lack of anti-pollution equipment.^[12] These studies have identified that these workers are always exposed to injuries with broken glass, for example, exposing these workers to many infectious agents like the viruses in the current study, HIV, and hepatitis viruses. Moreover, other studies have found that the landfill sites workers' respiratory health was poor because of exposure to bioaerosols containing bacteria and fungi.^[13] Another previous study in Africa has indicated that health care waste is dumped with other wastes, hence exposing the dumpsite workers to HIV, being considered as occupational exposure.^[14] It has been shown that because health care wastes are also disposed in the dumpsites. As such, the likelihood, workers have to be infected by Hepatitis B, HIV, or any other diseases is high.^[15,16] In the current study, the significant increase in the antibody levels of HIV and HBS is just another proof that these workers have been exposed to these antigens.

Cholera, Diarrhea, Hepatitis A and B, besides typhoid had been recorded among dumpsite workers. Besides, disease particularly HBV, HCV, and HIV are to cause infection to healthy people via dumping blood-contaminated tools with

Table 2: HIV antibody concentration in the sera of the workers when contrasted to the healthy group

Immunological variable	Gender	Dumpsite workers		Healthy Group		T-test P value	P
		No.	Mean±SE	No.	Mean±SE		
HIV (COI)	M	89	0.251±0.002	40	0.244±0.001	0.000	H.S.**

P≥0.05: Non significant; *P<0.05: Significant; **P<0.01: Highly Significant, COI=Cut-off index, HIV: Human immunodeficiency

Table 3: Comparison of HBS antibody concentration in the sera between dumpsite workers and the healthy group

Immunological variable	Gender	Dumpsite workers		Healthy Group		T-test P value	P
		No.	Mean±SE	No.	Mean±SE		
HBS (COI)	M	89	0.274±0.001	40	0.261±0.001	0.012	S.*

*P<0.05: Significant; **P < 0.01: Highly Significant. COI: Cut-off index

Table 4: Comparison of HCV antibody concentration in the sera between dumpsite workers and the healthy group

Immunological variable	Gender	Dumpsite workers		Healthy group		T-test P value	P
		No.	Mean±SE	No.	Mean±SE		
HCV (COI)	M	89	0.080±0.001	40	0.080±0.001	0.325	N.S.

P≥0.05: Non significant; *P<0.05: Significant; **P<0.01: Highly Significant. COI: Cut-off index, HCV: Hepatitis C virus

infected blood and/or other biomedical waste, i.e., syringes, dressings, needles, body parts, etc. These workers pose a danger to the public because of their possibility of transmitting communicable diseases.^[17-19] Using bare hands by the workers enrolled in the current study to handle waste could be a risk for injury. It is known that even a small injury carries the risk of HBV, HIV, brucellosis transfers, and other blood-borne diseases.^[20,21]

HBV has been found to be prevalent among in scavengers rather than those who work at municipals as waste collectors.^[22,23] Injury with sharp objects might be a source of such infections. In fact, the study in hand showed that workers used their bare hands to handle the wastes, with an evident lack of personal hygiene and safety precautions while handling wastes. It has been shown that most dumpsite workers face health hazards.^[24,25] Other studies have also documented the high risk of waste scavengers of acquiring HBV infection.^[26,27]

In Pakistan, the same health issues regarding dumpsite workers were recorded. Hepatitis was among the infections to be highly prevalent among these workers. This was attributed to, their occupation, insufficient living conditions, absence of sanitation and safety measures, and illiteracy. Therefore, training regarding waste handling is required.^[28]

Brazil, despite following safety and health regulations, has been found to face many health problems in what they call recyclable collectors. They were constantly exposed to biological, physical, and more extreme hazards. This was because these workers were not aware of the hazards they will face if not using proper protective materials, hence certainly they will be injured. Such injuries are comprised head, hands, arms legs, and feet burns and cuts, lesions of eyes and skin, and even hand amputations.^[29] Another study in Egypt also indicated the prevalence of HBV among dumpsite workers, emphasizing on the necessity for vaccination as a prophylactic measure.^[30]

Studies are still conducted in Nigeria, where workers were exposed to hazardous substances, which might cause a

variety of diseases. Occupational hazards in these individuals might be due to the absence or the lack of appropriate tools and equipment of protection, along with their illiteracy. In conclusion, the authors recommended as a vital response to raise the workers awareness, besides enlightenment training, to survive the health hazards and its risks.^[31,32]

A periodic, objective and documented assessment and auditing of the dumpsites and their workers is a necessary concern to minimize the health issues that these workers face. Vaccination against HBV is an effective measure to control such an infection. In addition, personal hygiene practices and regular training (more than 75% of the individuals enrolled in the current study are either illiterate or had only primary school education) on occupational safety could be a good measure to control risks of viral infections among dumpsite workers. Lastly, providing protective clothing and proper equipment as a vital issue to prevent injuries.

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