HIV, Hepatitis B and Hepatitis C in garbage scavengers of Karachi

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Abstract

Objectives: To determine the seroprevalence of human immunodeficiency virus, hepatitis B and C, and to study the associated risk factors in garbage scavengers of Karachi.

Methods: The cross-sectional study was performed in a colony inhabited by low socioeconomic garbage-collecting people. Data was collected from April to December 2011. After informed consent and pre-test counselling, a set of questions were asked from a questionnaire, and 5cc of blood was drawn for pathological testing. SPSS 18 was used for statistical analysis.

Results: A total of 141 males agreed to participate in the study with a mean age of 21.33±9.28 years. Most of the respondents (n=67; 47.5%) were in the age group 11-20 years; 86 (61%) were single; 89 (63%) were illiterate and 127 (90%) had a monthly income less than Rs.10,000. Prevalence of hepatitis B was 18.8% (n=22), followed by 8.5% (n=10) and 0.85% (n=1) of hepatitis C and HIV respectively. Besides, 108 (77%) collected needles/syringes and 76 (54%) got pricked more than once. Only 23 (16%) wore gloves while collecting garbage. Overall, 79 (56%) had a history of sexual contact; 18 (23%) had three or more partners.

Conclusion: The important factors contributing to the high prevalence of hepatitis B and C were needle prick injuries, bare-handed/bare-footed collection of garbage, poor vaccination status, improper garbage disposal system and the site of waste collection.

Keywords: Hepatitis B virus, Hepatitis C virus, HIV, Needlestick injuries. (JPMA 63: 798; 2013)

Introduction

Collection of waste by garbage scavengers is a common sight in a country like Pakistan. Currently there are more than 35,000 recorded garbage scavengers in the country[1] and the majority of them are children and adolescents.[2] Karachi, the largest metropolis of Pakistan, caters to the biggest work force of these garbage scavengers and, without doubt, the greater percentage of these are young children. Reports show that the majority of them are of Afghan ethnicity.[3] However, in the face of ever increasing poverty, hunger and joblessness, more and more people are compelled to join the trade.[1]

Garbage scavengers pick up junk from dumps, garbage bins, road sides, homes, drains, hospitals and clinics. They search for materials or things that can be sold, like papers, magazines, empty soft drink bottles, plastic or metal pieces and other consumed stuff.[4] They have a plastic or jute bag hanging on their shoulder which they carry from place to place to collect such material.[1]

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Garbage collection is rated as one of the most dangerous jobs in the world even in countries like the United States.[5] However, the situation is more severe in developing nations like Pakistan and India[6] where garbage scavengers are not provided with proper safety equipment or governed by a proper authority to implement safety measures. Hence, they are exposed to many on-the-job hazards,[6] such as biological hazards, chemical burns, disposable needles, broken glass, falling objects from overloaded containers, diseases and infections, dog-attacks, pests, dust, traffic and foul odours.

The proper disposal of disposable syringes by burning or burying does not take place in most of the developing countries due to lack of infrastructure.[7] This further poses a grave threat of blood-borne infections to these garbage scavengers. Due to this, they are at a higher risk to acquire diseases like acquired immunodeficiency syndrome (AIDS),[8] hepatitis B Virus (HBV)[9] and hepatitis C Virus (HCV).

Recent data shows that Pakistan has a significant distribution of hepatitis B and C,[10] with the latter being more prevalent in the general population.[11] Pakistan Medical and Research Council (PMRC) conducted a community-based study showing prevalence rates of hepatitis B and C to be 2.5% and 4.9% respectively in the

general population.[12]

As far as human immunodeficiency virus (HIV) is concerned, Pakistan is a low-prevalence country. The Joint United Nations Programme on HIV/AIDS (UNAIDS) estimated that about 96,000 people were living with HIV infection in 2007; an adult HIV prevalence rate of less than 0.1 per cent.[13] However, there is still a notable finding among some key populations. Several socio-economic conditions are related to the spread of both hepatitis and HIV, including poverty, low levels of education, and high unemployment rates as well as certain sexual and behavioural practices prevalent in some particular groups or communities.[14] The epidemic has also recently expanded from urban centres to more rural towns and communities.[13]

The aim of this study was to find out the seroprevalence and to study the associated risk factors leading to HIV, hepatitis B and C infections in garbage scavengers. At the same time, it tried to explore their behaviour and practices and the methods employed for garbage collection.

Subjects and Methods

The cross-sectional study was conducted in low socio-economic locality inhabited by garbage scavengers in Karachi. The colony comprised huts and compounds illegally occupied by families and groups of garbage scavengers where they lived and dumped their collection before it was sold. The study involved targeting these garbage scavengers during a series of visits to the colony between April and December 2011.

A total of 180 garbage scavengers were approached through non-probability convenience sampling. The participants were approached at their homes in the colony usually during the afternoons and evenings, when they would have returned from their day's scavenging. This timing was pre-decided after consultation and permission from the colony's elders.

Written consent was obtained from each respondent for participation in the study. A proper consent form was designed in Urdu, the national language, and those who agreed to participate were asked to put their signature or a thumb print. Consent for children below 14 years was first obtained from their father, elder brother or clan leader, and then it was also taken from them. Pre-test counselling was done in order to fully explain the purpose and benefits of the study, after which each participant was asked a set of pre-determined questions from the questionnaire. After the question-answer session, the respondents were asked to give 5cc blood via venipuncture for HIV, HBV and HCV test.

HIV tests were performed at HIV/AIDS Referral Laboratory at Civil Hospital Karachi (CHK), and tests were performed according to UNAIDS and Government of Pakistan testing strategies, using three different test principles or test antigen,[15] while HBV and HCV tests were performed by immunochromatographic technique (ICT) method and those found positive were run on enzyme-linked immunosorbent assay (ELISA). Individuals giving positive results for HBV and HCV were referred to the CHK Hepatitis Clinic, while those found positive for HIV were referred to the Sindh Aids Control Programme referral centre for treatment and counselling.

All interviews were conducted by under-graduate medical students of Dow Medical College, Karachi. A meeting of the investigators was held prior to the administration of the questionnaire in order to maintain uniformity in its administration, hence reducing chances of interviewer's bias in the study. Strict confidentiality was maintained throughout the process of data collection, entry and analysis. The subjects were free to withdraw at any time without giving any reason.

The sample size was calculated through WHO sample size calculator by making following assumptions: as prevalence data was not found for the frequency and associated factors of HIV, hepatitis B and C in garbage scavengers in Karachi, a prevalence of 50% was assumed to observe a difference, with bound of error of 5% and level of significance of 5%. The estimated sample size was 126. After addition of 22% for non-response, the final sample size was 153.

The questionnaire was designed based on the prior experience of investigators and was then expanded by incorporating new aspects encountered found relevant during an extensive literature search. The draft prepared was then pre-tested on 25 respondents and no changes were deemed necessary. The results of the pre-testing were not included in the final data analysis.

The questionnaire was initially prepared in English; then translated into Urdu for the convenience of the respondents. The questionnaire was also back-translated into English by two non-medical personnel to check for any paraphrasing errors.

The questionnaire was divided into three sections. The first section included questions related to socio-demographic factors like marital status, nationality, ethnicity, age, gender and educational status. The second section included behaviour and practices of the garbage scavengers, such as addictions and sexual pattern. Risk factors contributing to hepatitis and AIDS such as needle prick injuries, bare-handed collection of garbage, vaccination, and site of waste collection were analysed. The third section comprised serological analysis.

Data was entered and analysed using SPSS version 18. Chi-square tests were applied and a p value <0.05 was taken as significant.

All efforts were made in the study to fulfil the ethical considerations in accordance with the 'Ethical principles for medical research involving human subjects' of Helsinki Declaration.[16] The procedures were reviewed and approved by the Ethics Committee of the Dow University of Health Sciences (DUHS).

Results

Of the 180 people approached, 141 (78%) agreed to participate in the study. All of them were male with a mean age of 21.33±9.289 years; 67 (47.5%) were in the age group 11-20 years followed by 37 (26.2%) in the 21-30 age group; 89 (63%) were illiterate; and 86 (61%) were single. Of those who were married, 19 (34.5%) had more than one wife. 101(71.6%) participants were of Pathan ethnicity; 80 (79%) were immigrants of Afghan nationality while the rest were Pakistanis. Punjabis (n=29; 20.6%) and Sindhis (n=8; 5.7%) were found as the other major ethnic groups involved in the profession. About one-third (n=49; 34.8%) had been born in Karachi slums whereas the remaining were seasonal workers mainly from the Mohajir camps of Peshawar and Afghanistan.

All the respondents were from poor socio-economic status as 127 (90%) of them had a monthly income of less than Rs.10,000 (US$ 111.11; 2012). Of the total, 41 (29%) lived in groups, which on average comprised 8-12 members, while 100 (71%) lived with their families. Almost half of the participants (n=70) had at least one family member also involved in the profession.

From among the 141 participants, 117 (83%) agreed to give blood. Hepatitis B was found to be the most widely prevalent infection as 22 (18.8%) were found to be positive, followed by hepatitis C and HIV which accounted for 10 (8.5%) and 1 (0.85%) respectively (Table-1). The remaining 24 (17%) participants refused to give blood, but were still interviewed.

About 16% (n=23) of the participants wore gloves while collecting garbage, which varied from polythene to latex and were reused in spite of being torn and dirty. About one-third of the participants (n=42; 30%) had no footwear at all. It was reported that 34(24%) of them collected garbage from hospitals and clinics; 108 (77%) accepted that they collected needles and syringes; and 76 (54%) reported that they had been pricked more than once during garbage collection. A p value of 0.069 was obtained for the association of hepatitis B with the incidence of pricking (Table-2). None of the participants reported to have been vaccinated for hepatitis B.

Table-1: Prevalence of HIV, hepatitis B and C.

S No.		HIV	Hepatitis B	Hepatitis C
1	Performed	117	117	117
2	Positive Test	1	22	10
3	Positive %	0.85	18.8	8.5

HIV: Human Immunodeficiency Virus.

Table-2: Relation of getting pricked with other variables.

S. No.	Variable	Respondents who got pricked	Respondents who did not get pricked	p-value
1	**Age:**			
	≤10	9(12%)	4(6%)	
	11-20	26(34%)	41(63%)	0.004
	21-30	23(30%)	15(23%)	
	Above 30	18(24%)	5(8%)	
2	**Educational status:**			
	Illiterate	52(68.5%)	37(57%)	0.019
	Can read and write	14(18.5%)	7(11%)	
	Primary and above	10(13%)	21(32%)	
3	**Garbage collection by:**			
	Bare handed	70(92%)	48(74%)	0.003
	Wearing gloves	6(8%)	17(26%)	
4	**Do you collect garbage from hospitals/clinics:**			
	Yes	21(28%)	13(20%)	0.196
	No	55(72%)	52(80%)	
5	**Hepatitis B status:**			
	Positive	16(24%)	6(12%)	0.069
	Negative	50(76%)	45(88%)	
6	**Hepatitis C status:**			
	Positive	5(8%)	5(10%)	0.458
	Negative	61(92%)	46(90%)	

As for addictions and sexual history, 44 (31%) participants were smokers of whom 19 (43%) smoked more than 10 cigarettes per day; 18 (13%) were regular alcohol users; 62 (44%) were addicted to various drugs; and, in general, chewable addictives such as 'naswar' was widely prevalent as 50 (81%) participants were addicted to it; 4 (6.5%) were intravenous drug users and used heroin. More than half of the respondents, (n=79; 56%) had a history of sexual contact; 24 (30%) of them were unmarried; 65 (82%) were heterosexual, while 11 (14%) and 3 (4%) were bisexual and homosexual respectively. Two (1.4%) persons reported that they had been raped and 4 (2.8%) engaged in passive form of coitus. Almost one fourth (n=18; 23%) had 3 or more sexual partners.

Discussion

The study focused on a colony of garbage scavengers in Karachi to understand the prevalence of HIV, HBV and HCV and risk factors associated with them. The younger age group and male dominance matches with numerous other studies conducted in the refugee camps in Peshawar.[14]

Table-3: Addictions and Sexual history of garbage scavengers.

Respondents	Frequency (n=141)	%	Hepatitis B Positive (n=22)	Hepatitis C Positive (n=10)
Do you Smoke				
Yes	44	31.2	11	7
No of cigarettes/day (N=44)				
< 5/day	15	34.1	6	5
6-10 /day	10	22.7	1	0
>10 /day	19	43.2	4	2
Do you regularly use Alcohol				
Yes	18	12.8	1	3
Do you use Addictive drugs				
Yes	62	44	9	7
Most preferred route of drug addiction (n=62)				
Inhalation	8	12.9	3	0
Injectable	4	6.5	1	1
Chewable	50	80.6	5	6
Sexual contact				
Yes	79	56	14	10
No	62	44	8	0
Sexual orientation (n=79)				
Heterosexual	65	82.3	7	7
Homosexual	3	3.8	1	0
Bisexual	11	13.9	6	3
No of partners (n=79)				
One	56	70.9	11	3
Two	5	6.3	0	0
Three or more	18	22.8	3	7

Footnote: Only one participant was diagnosed positively for HIV. He smokes >10 cigarettes /day, uses alcohol regularly and uses addictive drugs (injectable), has a positive history of sexual contact, heterosexual orientation. with three or more partners.

As majority of the participants were immigrants from Afghanistan, they dispersed across Pakistan, especially concentrating on the urban centres like Karachi. They take whatever job is available. Unfortunately, garbage scavenging is one of the most prevalent professions adopted.[3] Our study reported that about one-third of the garbage scavengers had been born in Karachi slums, and they were generally younger and illiterate as compared to their counterparts from Peshawar and Afghanistan. Other than these adverse socio-economic impacts, there are numerous health implications as majority are settled around garbage dumps or are living in slums. Hence, they are exposed to numerous communicable diseases,[17] and hepatitis B has been reported as a prevalent finding.[14]

Hepatitis B was the most prevalent infection in our study followed by hepatitis C. These findings are similar to the high prevalence found in other high-risk groups of Pakistan, such as female sexual workers (hepatitis B, 11.6%),[18] and prisoners (hepatitis B, 5.9% and hepatitis C, 15.2%).[19] The high prevalence of hepatitis B in our study population (18.8%) is also similar to the prevalence of hepatitis B (23%) in municipal waste collectors in central Greece[9] and among informal recyclable waste collectors (34.4%) in Santos, South-eastern Brazil.[8]

Our results show that sexual practices maybe an important mode of transmission of virus as one-fourth of all those who had a history of sexual contact had three or more partners. This is in contrast to a study done in Brazil, among informal recyclable waste collectors where 157 respondents had more than 3 sexual partners and 17 of them were HIV-positive.[8] Hence, the number of sexual partners in lifetime were significantly associated with HIV infection.[8] But the main contributory factors in our study are blood-borne routes like needlestick injuries and bare-handed collection of garbage, since almost three-fourths of the study population collected needles/syringes as part of their garbage collection and more than half of them had been pricked more than once. This finding is similar to a study done in Greece where occupational injury with sharp instruments was recorded as the main cause of HBV transmission among municipal waste collectors.[9]

Improper waste disposal system in Pakistan[20] where there is no segregation policy and practice, favours blood-borne transmission of viral infections in our study. Due to this, hospital/clinic's waste mixes with the household waste. Hence, our study showed an association between garbage collection from hospital waste and hepatitis B. This finding is similar to a study done in Addis Ababa, Ethiopia, in which medical waste handlers showed a high prevalence of HBV infection compared to non-medical waste handlers.[21] Moreover, none of the respondents were vaccinated for hepatitis B in our study which further aggravated the risk of acquiring it. In addition, majority of those interviewed were illiterate and had no idea of proper handling of hospital waste and the hazards associated with it.

Poverty is the driving force,[22] followed by domestic, physical and mental abuse, along with peer pressure and drug abuse, that together push them to begin life on the streets as scavengers.[2,22] The unhygienic living and eating patterns of these garbage scavengers lead them towards a variety of health problems, like malnutrition, bacterial and parasitic infections and skin ailments due to exposure to the extreme conditions of weather.[5,6]

They do not get balanced wages in order to fulfil their basic necessities of life, health and education. This rejection from society has a negative effect on their minds. They develop anti-social behaviour and consequently become criminals, abusers, addicts, molesters or robbers.[23] In order to escape from the mental suffering and emotional overload, they often use alcohol

which further leads to severe alcohol-dependence and they also use cigarettes and different drugs that are easily available, such as heroin, marijuana, crack and glue.[6,23,24]

Developed countries like those in Europe are a good example for developing nations in Asia like Pakistan as far as governance and waste management policies are concerned. Almost 250,000 tonnes of hospital waste is produced annually in Pakistan from all sorts of healthcare facilities[25] and since no segregation policy is practised, this poses a serious threat to the garbage scavengers. A common practice in Pakistan is the re-use of disposable syringes. People pick up used syringes from the hospital waste and sell them. Hospital staff should dispose of the syringes properly by cutting the needles or syringes with the help of a cutter, so that they cannot be reused. The government should enforce strict laws for proper disposal of hospital waste in Pakistan according to the guidelines for 'Hospital Waste Management' prepared by the Environmental Health Unit of the Federal Ministry of Health.[25] Educating the garbage collectors is a powerful tool which can lead to improvement in their lifestyles. Discouraging child labour and providing them with safety equipment could save them and their generations from harmful health hazards.[23]

The current study had a few limitations. First of all, the respondents were all males since we could not find any female garbage scavenger during data collection. Secondly, the sample is under-reported due to very low compliance amongst the population. Thirdly, the reliability of the questionnaire was found to be negative.

Conclusion

The prevalence of hepatitis B is considerably higher than hepatitis C. The presence of a single case of HIV is an eye-opener. Needlestick injuries, bare-handed collection of garbage, poor vaccination status, improper garbage disposal system and site of waste collection are associated with high prevalence of hepatitis B and C in this group.

Financial Disclosure

The cost of the testing kits was funded by Roche Pakistan Limited and Sindh AIDS Control Programme. The authors covered all the other costs of the study including transportation of the sero positive participants to the hospital.

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