International Journal of Community Medicine and Public Health
Palve NN et al. Int J Community Med Public Health. 2014 Nov;1(1):24-30
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: 10.5455/2394-6040.ijcmph20141106

Research Article

Study of morbidity pattern and occupational hazards in sweepers working at a municipal teaching hospital in Mumbai

Nilesh N. Palve[1], Pallavi R. Shidhaye[2]*, Ramesh M. Chaturvedi[3], Daksha D. Pandit[4], Purushottam A. Giri[5]

[1]Assistant Medical Officer, Epid Cell, Municipal Corporation of Greater Mumbai, Mumbai, Maharashtra, India
[2]Department of Community Medicine (PSM), LNMC & RC, Bhopal, Madhya Pradesh, India
[3]Department of Community Medicine (PSM), Lokmanya Tilak Municipal Medical College & General Hospital, Mumbai, India
[4]Department of Community Medicine (PSM), Terna Medical College & Hospital, Navi Mumbai, Maharashtra, India
[5]Department of Community Medicine (PSM), Rural Medical College, Loni, Maharashtra, India

Received: 16 October 2014
Accepted: 3 November 2014

***Correspondence:**
Dr. Pallavi R. Shidhaye,
E-mail: drpallavikanade@gmail.com

ABSTRACT

Background: The International Labour Organization (ILO) estimates that more than 125 million workers are victims of occupational accidents and diseases in a single year. The important morbid conditions detected in the workers include the diseases of the respiratory system and eye, accidents, injuries, cuts and wounds, skin infections, animal bites, etc. Health Care Workers (HCWs) are attributed to the group at highest risk of occupationally acquired blood borne diseases as the result of contact with blood and body fluids. The present study was conducted to assess the morbidity pattern and occupational hazards in the sweepers working at the tertiary care teaching hospital in Mumbai.
Methods: A cross-sectional epidemiological study was carried out in the various wards of Lokmanya Tilak municipal medical college & general hospital, Mumbai during the period of January 2008 to May 2009. Total 267 sweepers were interviewed. A pre-designed and pre-tested questionnaire was used to get information regarding the morbidity pattern and occupational hazards in the sweepers.
Results: Out of 267, history of acute illness was elicited from 64 (23.97%) employees. 52 (19.47%) sweepers had history of chronic illness. Among the sweepers, 160 (59.9%) had some sort of morbidity present. The morbid conditions found in the sweepers were musculoskeletal disorders 55 (20.6%), hypertension 46 (17.2%), gastrointestinal problem 26 (9.7%), eye disorders 23 (8.6%) and respiratory system diseases 21 (7.9%). The present study showed that, 226 (84.6%) sweepers used some form of personal protective devices regularly and 41 (15.4%) didn't use regularly. 113 (42.3%) sweepers had needle prick or sharp injury. 74 (65.5%) sweepers had single needle prick or sharp injury & 39 (34.5%) sweepers had repeated needle prick or sharp injury.
Conclusions: Periodic examination should be done annually & immediate corrective measures should be taken to protect the health of employees at risk. Stress management principles must be implemented in the sweepers to enhance physical and mental health. There is need for safety training programme for all health workers including sweepers in the hospitals.

Keywords: Sweepers, Morbidity, Occupational hazards, Municipal teaching hospital

INTRODUCTION

About seventy five percent of the global workforce lives and works in the third world countries. The International Labour Organization (ILO) estimates that more than 125 million workers are victims of occupational accidents and diseases in a single year.[1] Each year an estimated 2.2 million men and women die from work related injuries and diseases and 160 million cases of new diseases arise.[2] Hospital is an institution meant to ensure community health and does not work in isolation. Health team means not only doctors, nurse but also paraprofessional, paramedical & workers. Sweepers play an important role in maintaining the health and hygiene in the hospitals. This job exposes sweepers to a variety of risk factors such as dust, bioaerosols, volatile organic matter and mechanical stress, which make them susceptible to certain occupational diseases. The important morbid conditions detected in these workers include the diseases of the respiratory system and eye, accidents, injuries, cuts and wounds, skin infections, animal bites, etc.[3] Other than the home environment, workplace is the setting in which the people spend the largest proportion of their time. In favorable conditions, health contributes to good health and economic achievements. However, the work environment exposes many workers to health hazards like chemical agents, other hazardous substances (dust, fumes), noise, vibrations, radiation, repetitive movements, static or awkward postures, infectious diseases and work related stress.[4] The health of the workers has several determinants, including risk factors at the workplace leading to cancers, accidents, musculoskeletal diseases, respiratory diseases, hearing loss, circulatory diseases, stress related disorders and communicable diseases and others.[5] Health Care Workers (HCWs) are attributed to the group at highest risk of occupationally acquired blood borne diseases as the result of contact with blood and body fluids.[6] Health care workers incur 2 million Needle Stick Injuries (NSIs) per year that result in infections with hepatitis B and C and HIV. The World Health Organization estimates the global burden of disease from occupational exposure to be 40% of the hepatitis B and C infections and 2.5% of the HIV infections among HCWs as attributable to exposures .at work.[7] Needle Stick Injuries (NSI) are wounds caused by sharps such as hypodermic needles, blood collection needles, intravenous cannulas or needles used to connect parts of iv delivery systems. Because of the environment in which they work, many HCWs from physicians, surgeons, and nurses to housekeeping personnel, laboratory technicians and waste handlers are at an increased risk of accidental needle stick and sharps injuries.[8] Working and social conditions of hospital increases morbidity in the sweeper employees. Many studies were conducted on industrial health and occupational safety. Very few studies are conducted on health problems & occupational hazards of sweepers working in the hospital. Thus the aim was to study the morbidity pattern and occupational hazards if any, in the sweepers working at a Municipal teaching hospital in Mumbai.

METHODS

A cross-sectional epidemiological study was carried out during the period of January 2008 to June 2009 in the Lokmanya Tilak municipal medical college & general hospital, Mumbai. The present study was conducted in the 1440 bedded tertiary care municipal hospital in Mumbai. It has its own teaching institute catering to a population coming from all classes of society but predominantly from the middle and lower classes. All the sweepers working in the hospital during the study period were included in the study. Universe was considered as the sample and included all 267 sweepers working in the hospital. Sweepers from EMS (Emergency Medical Services), OT (Operation Theatre), ICU (Intensive Care Unit), wards, OPD (Outdoor Patient Department), diagnostic services & supportive services were selected for study. Employee working as a sweeper in a tertiary care hospital regularly for a period of past 6 months or more and who gave consent was included in the study. Temporary employees working for less than six months were excluded from the study. Group meetings of the sweepers were arranged to apprise them of the purpose of the study and to ensure their cooperation. A pre-designed and pre-tested questionnaire was used to get information regarding socio-demographic factors and medical history followed by general and systemic examination and basic laboratory investigations. Exposure to any sort of occupational hazards if any was also noted. Informed consent from the sweepers was taken before including them in the study. History of illness the sweepers had in the past twelve months and at the time of study were ascertained. The illness was classified into acute and chronic. Acute illness refers to health effect, brief, sometimes loosely used to mean severe. Chronic illness is defined as a condition lasting three months or more duration according to US National Centre for Health Statistics. Pre-designed and pre-structured questionnaire was used to obtain basic socio-demographic information. They were also asked regarding the use of personal protective devices during work and whether they were aware of the related hazards associated with their work. All the questions were asked in the participant's language or else the meaning was conveyed properly**.** Information given by the participants and their identity were kept confidential. Standard clinical methods and investigations were used for the diagnoses of diseases, and opinion of the specialists from the hospital was obtained to confirm them. All these illness were finally classified by using International Classification of Diseases version 10 (ICD 10) to know the final diagnoses. Ethical committee of the institute had approved the study. Data were judiciously entered in MS Excel sheet and analyzed by SPSS 17. Tables, percentage and chi square test was used for analysis of data.

RESULTS

It was observed from Table 1 that out of 267 sweepers, maximum 133 (49.8%) were in 39-48 year age group of which 82 (30.2%) were males & 51 (19.1%) were females. 74 (27.7%) sweepers were in 49-58 year age group and 55 (20.6%) sweepers in 28-38 year age group. Out of total 267 sweepers 107 (40.1%) were females & 160 (59.9%) were males. 124 (46.4%) sweepers were from poor socioeconomic class, 100 (37.5%) sweepers from lower middle socioeconomic class, 30 (11.2%) sweepers in upper middle socioeconomic class, 10 (3.7%) in below poverty line and 3 (1.1%) belonged to high class. No sweeper was in upper high socioeconomic class. 164 (61.4%) were educated upto secondary, 41 (15.4%) upto primary level & only 8 (3.0%) till higher secondary.

Table 1: Distribution of study population according to socio-demographic characteristics.

Socio-demographic factors	No. of respondents (n=267)	Percentage
Age		
18-28 years	5	1.9
29 -38 years	55	20.6
39- 48 years	133	49.8
49-58 years	74	27.7
Sex		
Male	160	59.9
Female	107	40.1
Socio-economic status		
Upper High	0	0
High	3	1.1
Upper middle	30	11.2
Lower middle	100	37.5
Poor	124	46.4
Below poverty line	10	3.7
Educational status		
Illiterate	54	20.2
Primary school (1-4)	41	15.4
Secondary school (5-10)	164	61.4
Higher secondary school	08	3.0
Religion		
Hindu	244	91.4
Muslim	02	0.7
Buddhist	21	7.9
Type of family		
Nuclear	193	72.3
Joint	05	1.9
Extended	69	25.8
Duration of service in hospital		
Less than 1 year	22	8.2
1-10 years	37	13.9
11-20 years	85	31.8
More than 20 years	123	46.1

54 (20.2%) were illiterate. Maximum 244 (91.4%) were Hindu, 21 (7.9 %) were Buddhist, 02 (0.7 %) were Muslims. Out of 267 sweepers, 193 (72.3%) had nuclear family and 69 (25.8%) had extended family, only 5 (1.9%) employees had joint family. 123 (46.1%) sweepers completed more than 20 years of service, 85 (31.8%) completed 10 years of service, 37 (13.9%) completed 01 year of service & 22 (8.2%) completed more than 6 months of service (Table 1).

It was found that out of 267 employees, 153 (57.3%) had smoked or consumed tobacco in any form in their life. 70 (26.2%) employees were addicted to tobacco smoking. Maximum 41 (58.58%) employees smoked bidis and 29 (41.42%) were addicted to cigarette smoking. No other forms of smoking were observed in this study. 86 (32.2%) sweepers were addicted to smokeless tobacco. 45 (52.32%) sweepers had tobacco in chewing form, 24 (27.9%) in misheri form, 07 (8.14%) in gutkha and pan form each and 3 (3.49%) were addicted to tobacco to supari.

89 (33.3%) sweepers informed about ever consumed alcohol in their lifetime. 66 (24.7%) sweepers were currently addicted to alcohol. 21 (31.81%) consumed alcohol daily and 25 (37.87%) consumed alcohol once weekly. 45 (68.18%) employees were addicted to country liquor (Deshi daru). Out of 267 sweepers, 126 (47.2%) employees had normal body mass index. 20(7.5%) sweepers were underweight, 90 (33.7%) sweepers were preobese (overweight) and 31 (11.6%) sweepers were obese. Out of 126 sweepers with normal BMI, 81 (50.6%) were males and 45 (42%) were females. Out of 121 obese employees, 70(43.6%) were males and 51 (47.5%) were females. No Significant association was found (X^2=3.07, df=2, P >0.05). Out of 267 sweepers, 221 (82.78%) had normal blood pressure. 46 (17.22%) sweepers had hypertension. 33 new cases of hypertension were diagnosed during examination. Out of 46 hypertensive, 33 (20.62%) were male & 13 (12.14%) were female. This difference was found statistically significant (X^2=3.23, df=1, P <0.05).

It was seen from Table 2, out of 267, history of acute illness was elicited from 64 (23.97%) sweepers. Among the total 64 sweepers, malaria accounted for 34 (12.73%), followed by trauma/fall 8 (2.9%), chest pain 7 (2.62%) and others included gastroenteritis 3 (1.2%), typhoid 2 (0.8%), migraine 2 (0.8%) and one case each of PUO and dental caries.

It is evident from Table 3, that 52 (19.47%) sweepers had history of chronic illness. The important chronic morbid conditions affecting the sweepers were hypertension 12 (4.5%), followed by chest pain 9 (3.37%), pain in abdomen 7 (2.62%) and cataract with 3 (1.2%) sweepers. 10(3.75%) sweepers had other general signs and symptoms according to ICD 10.

Table 2: List of chronic illness in sweepers elicited through history taking.

ICD 10	Acute illness	Number (n=267)	Percentage
	Yes	**64**	**23.97**
	No	**203**	**76.03**
B50-B51	Malaria	34	12.73
R07	Chest pain	07	2.62
S50 & S80	Trauma/ Fall	08	2.9
D17	Lipoma	01	0.4
K02	Dental caries	01	0.4
G43	Migraine	02	0.8
R50	PUO	01	0.4
A09	Gastroenteritis	03	1.2
R05	Cough	03	1.2
A01	Typhoid	02	0.8
I95	Other(low BP)	02	0.8

Table 3: List of chronic illness in sweepers elicited through history taking

ICD 10	Chronic illness	Number (n=267)	Percentage
	Yes	**52**	**19.47**
	No	**215**	**80.53**
A15	TB	02	0.8
I10	Hypertension	12	4.50
H25	Cataract	03	1.2
N80-N98	Gynecological diseases	02	0.8
M05	Rheumatoid disease	01	0.4
R07	Chest pain	09	3.37
J45	Asthma	01	0.4
R10	Pain abdomen	07	2.62
E10-E11	Diabetes Mellitus	01	0.4
I95	Hypotension	04	1.5
R68	Other general signs & symptoms	10	3.75

It was observed from Table 4, 160 (59.9%) sweepers had some morbidity present. The morbid conditions commonly affected included musculoskeletal disorders 55 (20.6%), hypertension 46 (17.2%), gastrointestinal problem 26 (9.7%), eye disorders 23 (8.6%) and respiratory system diseases 21 (7.9%). Diabetes mellitus was seen in 18 (6.7%) and skin diseases in 17 (6.4%) sweepers. Rest included UTI, gynecological problems, TB, and ENT problems.

It was seen from Table 5, that out of 267 sweepers, 226 (84.6%) used some form of personal protective devices regularly and 41 (15.4%) didn't use regularly. 237 (88.8%) sweepers used gloves for waste handling or working in hospital, 199 (74.5%) used cap & mask for waste handling or working in hospital, 260 (76.5%) sweepers used soap & antiseptic solution for washing hands after work in hospital. Only 30 (11.2%) sweepers were using other form of personal protective devices for waste handling waste or working in hospital. Out of 41 sweepers, 28 (68.3%) didn't use personal protective devices regularly due to ignorant attitude towards it, 9 (22.0%) gave reason as non-availability of PPD on regular basis & 4 (9.7%) gave skin irritation (contact dermatitis) as reason for no regular usage of PPD.

Table 4: Morbidity profile in sweepers elicited.

Morbidity present	Number (n=267)	Percentage
Yes	**160**	**59.9**
Musculoskeletal disorder	55	20.6
Hypertension	46	17.2
Gastrointestinal problem	26	9.7
Ophthalmic diseases	23	8.6
Respiratory system diseases	21	7.9
Diabetes Mellitus	18	6.7
Skin diseases	17	6.4
Urinary tract infection	06	2.2
Cardiovascular system diseases	05	1.9
Injuries	02	0.8
Gynecological problem	03	1.2
Periodontal Disease	02	0.8
Hepatitis	01	0.4
ENT	01	0.4
TB	01	0.4
Venous system (piles/varicose veins)	5	1.9
Others (depression/tingling/weakness)	18	6.7

Table 5: Distribution of study population according to various variables regarding personal protective devices (n=267).

Variables	No. of respondents	Percentage
Use of personal protective devices regularly		
Yes	226	84.6
No	41	15.4
Use of protective measures while waste handling or working in hospital*		
Gloves	237	88.8
Cap & mask	199	74.5
Soap, antiseptic solution for hand washing	260	97.3
Apron, slippers, gown	30	11.2
Reasons for not using personal protective devices (PPD) regularly (N=41)		
Ignorant attitude	28	68.3
Non availability of PPD	09	22.0
Skin irritation /contact dermatitis	04	9.7

*Total does not add to 100% due to multiple responses

It is evident from Table 6 that out of 267 sweepers, 138 (51.7%) were aware about health hazards in their occupation, 84 (31.5%) were unaware; whereas 45 (16.9%) did not know about any health hazards in their occupation. 113 (42.3%) sweepers had needle prick or sharp injury. Out 113 sweepers, 74 (65.5%) had single needle prick or sharp injury & 39 (34.5%) had repeated needle prick or sharp injury. Out of 113 (42.3%) who had needle prick or sharp injury at work place, 65 (57.5%) took injection Tetanus Toxoid & 21 (18.5%) had taken Antiretroviral treatment (ART). 6(5.0%) had antiseptic cleaning of prick area. No action was taken by 48 (42.47%) sweepers.

Table 6: Distribution of study population according to various variables regarding health hazards and needle prick injury (n=267).

Variables	No. of respondents	Percentage
Awareness about health hazards related to their occupation		
Yes	138	51.7
No	84	31.5
Don't Know	45	16.9
Needle prick or sharp injury		
Yes	113	42.3
No	154	57.7
Frequency of needle prick/sharp injury (N=113)		
Single	74	65.5
Repeated prick#	39	34.5
Action taken after injury*		
Injection T.T	65	57.5
Antiseptic cleaning	06	5.0
Antiretroviral treatment	21	18.6
No action	48	42.5

#Employees having more than one prick are taken as repeated needle prick or sharp injury
*Total does not add to 100% due to multiple responses

DISCUSSION

In our study, maximum 133 (49.8%) were in 39-48 year age group of which 82 (30.2%) were males & 51 (19.1%) were females followed by 74 (27.7%) sweepers in 49-58 year age group. A study conducted by Gore HD et al.[9] to assess working environment and occupational hazards in class IV sweepers in tertiary care hospital, Mumbai found that out of 320 sweepers 108 (33.7%) were female and 212 (66.3%) were male. A study conducted by Nagaraj C et al.[10] in Bangalore on street sweepers found that majority of the subjects belonged to the age group of 30 to 50 years**.** Sabde YD et al.[3] conducted study on street sweepers in Nagpur Municipal Corporation found that out of 149 employees 54.6% were males, the mean age of the street sweepers was 39.70 years with standard deviation of 7.15. 244 (91.4%) were Hindu, 21 (7.9 %) were Buddhist, 02 (0.7 %) were Muslims. Similarly, maximum workers were Hindus as shown by Jawale N[11] in the study in Jaslok hospital, Mumbai and Nagaraj C et al.[10] in Bangalore. In the present study, 164 (61.4%) were educated upto secondary, 41 (15.4%) upto primary level & only 8 (3.0%) till higher secondary. 54 (20.2%) were illiterate. Similarly, a study by Lal M[12] on 118 class-IV employees found that 32.5% employees were illiterate employees. Kungskulniti N[13] conducted study on sweepers found that 9.4% were illiterate. In the study by Nagaraj C et al.[10] they found maximum sweepers to be illiterate. Our study showed history of acute illness in 64 (23.97%) employees. Among the total 64 sweepers, malaria accounted for 34 (12.73%), followed by trauma/fall 8 (2.9%), chest pain 7 (2.62%) and others included gastroenteritis 3 (1.2%), typhoid 2 (0.8%), migraine 2 (0.8%) and one case each of PUO and dental caries.

A study on morbidity pattern in hospital class IV employees by Gore HD et al.[9] found that **o**ut of 320 class IV employees 163 (50.9%) had some or other health problem. Maximum 112 (68.7%) employees had musculoskeletal disorder, 74 (45.3%) had gastrointestinal problem, 63 (38.6%) had skin diseases, 46 (28.2%) had injuries, 39 (23.9%) had respiratory diseases, 31 (20.2%) had ophthalmic diseases. Out of 320 employees 27(8.4%) were underweight, 76(23.8%) were preobese and 78 (24.4%) were obese. Out of 154 obese employees 13 (8.4%) had diabetes mellitus while out of 166 normal Body Mass Index employees only 3(1.8%) employees had diabetes mellitus. Nagaraj C et al.[10] studied the morbidity profile of sweepers working under Bangalore city corporation showed similar findings with 40% sweepers having ICD class XVIII (other signs and symptoms) and 10.7% of class X. Out of 60 cases of class XVIII, maximum were of cough , followed with cough, headache and chest pain. Sabde YD et al.[3] in their study on street sweepers found upper respiratory tract infections (URTI) in 7.3%, followed by chronic bronchitis (5.9%) and bronchial asthma (1.8%). In the present study, the morbid conditions (both acute and chronic) were musculoskeletal disorders 55 (20.6%), hypertension 46 (17.2%), gastrointestinal problem 26 (9.7%), eye disorders 23 (8.6%) and respiratory system diseases 21 (7.9%). Diabetes mellitus was seen in 18 (6.7%) and skin diseases in 17 (6.4%). Nagraj C et al.[10] also showed that major ailments encountered were hypertension (18.9%), respiratory ailments (7.78%) and skin ailments (3.11%). A study conducted among waste collectors by Hansen J[14] in Denmark showed the prevalence of chronic bronchitis (7.8%) was significantly higher than that among park workers. Sabde YD et al.[3] in their study found morbid conditions common in respiratory system 15%, followed by cardiovascular system 9.9% and then eye disorders 9.2%.

Gerson RR et al.[15] studied the compliance of universal precautions among health care workers and found compliance extremely high for certain activities (e.g., glove use, 97%; disposal of sharps, 95%) to low for

others (e.g., wearing protective outer clothing, 62%; wearing eye protection, 63%). In the present study, 138 (51.7%) were aware about health hazards in their occupation, 84 (31.5%) are not aware; whereas 45 (16.9%) do not know about any health hazards in their occupation. Gurubacharya DL et al.[16] showed that 4% and 61% of health care workers, respectively, were unaware of the fact that hepatitis B and hepatitis C can be transmitted by needle-stick injuries. 113 (42.3%) sweepers had needle prick or sharp injury in their career. Out 113 employees, 74 (65.5%) employees had single needle prick or sharp injury & 39 (34.5%) employees had repeated needle prick or sharp injury. Tarantola A et al.[17] in 2003 analysed 7,649 BBF exposures reported by health care workers and found 77.6% of the reports were related to needle injury. Sharma R et al.[18] in their study found 79.5% of health care workers having had one or more Needle Stick Injuries (NSI) in their career. The average number of NSIs ever was found to be 3.85 per HCW (range 0-20). Most of the injuries (34.0%) occurred during recapping. A study in rural North India by Kermode M et al.[19] too had found a similar prevalence of NSI ever in working lifetime to be 73%. In our study, 65 (57.5%) took injection tetanus toxoid & 21 (18.5%) had taken antiretroviral treatment (ART) as Post-Exposure Prophylaxis (PEP) against HIV/AIDS, 6 (5.0%) washed the site of injury with antiseptic as a response to NSI. No action was taken by 48 (42.47%) in response to the needle stick injury. Similarly, Sharma R et al.[18] showed that 60.9% washed the site of injury with water and soap while 38 (14.8%) did nothing. Only 20 (7.8%) of the HCWs took Post-Exposure Prophylaxis (PEP) against HIV/AIDS after their injury. Muralidhar S et al.[20] also showed similar results as with majority of HCWs took action instantly (60%), while 14 per cent took action later on the same day and 26 per cent did not take any action after a NSI.

CONCLUSION

Sweeper employees in hospital are the important part of health team. Their health, motivation, communication, training is important for high quality health care and also protection of their health. Periodic examination should be done annually & immediate corrective measures should be taken to protect the health of employees at risk. Stress management principles must be implemented in the sweepers to enhance physical and mental health. More studies among these sweepers must be encouraged to formulate the strategies for their health. There is need for safety training programme for all health workers including sweepers in the hospitals. IEC material should be displayed prominently at the places of work, emphasizing the point about no recapping. Prompt services for needle stick injuries must be made available at the hospitals. Health care workers should be made aware of hazards, preventive measures and post-exposure prophylaxis to needle-stick injuries.

ACKNOWLEDGEMENTS

We express our deep sense of gratitude to the dept. of community medicine, Lokmanya Tilak municipal medical college, Mumbai. We also acknowledge the help and support of all the sweepers of Lokmanya Tilak municipal medical college, Mumbai.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Health and Safety Executive. Self-reported work-related illness and workplace injuries in 2006/07, Labour Force Survey, HSE, UK, 2007. Available at: www.hse.gov.uk/statistics/lfs/lfs0708.pdf.
2. WHO. Health and work. Department of Gender Women And Health, 2004. Available at: http://www.who.int/gender/documents/en. Accessed 3 November 2011.
3. Sabde YD and Zodpey SP. A study of morbidity pattern in street sweepers: a cross-sectional study. Indian J Community Med. 2008;33:224-8.
4. Simas R, Aparajita D. A study on health status of women engaged in a home- based 'Papad-making' industry in a slum area of Kolkata. Indian J Occup Environ Med. 2008;12:33-6.
5. WHO. Occupational health, 2014. Available at: www.who.int/topics/occupational_health. Accessed 14 June 2014.
6. Martins A, Coelho AC, Vieira M, Matos M, Pinto ML. Age and years in practice as factors associated with needlestick and sharps injuries among health care workers in a Portuguese hospital. Accid Anal Prev. 2012;47:11-5.
7. World Health Organization, The world health report, box 4.4, 2002. Available at: http://www.who.int/whr/2002/chapter4/en/index8.html
8. Wilburn SQ. Needlestick and sharps injury prevention. Online J Issues Nurs. 2004 Sep 30;9(3):5.
9. Gore HD, Shelke AD, Kembhavi RS, Singru SA, Gore VH, Pandve HT. Working Environment and Occupational hazards in class IV employees in tertiary care hospital, Mumbai. Glob Res Anal. 2013;2(3):146-8.
10. Nagaraj C, Sivaram C, Jayanth K, Murthy NS. A study and mortality profile of Sweepers working under Banglore City Corporation. IJOEM. 2004;8:11-8.
11. Narendra Jawale. Study on absenteeism in class-IV employees in Jaslok hospital Mumbai, 1997,DHA, Tata institute of social sciences, Deonar Mumbai. (unpublished).

12. Lal M, Biswas J. Study of Absenteeism among class-D employees. J Acad Hosp Admin. 2004;16(1):2004-01 - 2004-06.
13. Kungskulniti N, Pulket C, Miller D, Kirk R. Solid waste scavenger community. An investigation in Bangkok, Thailand. Asia Pac J Public Health. 1991;5(1):54-65.
14. Hansen J, Ivens UI, Breum NO, Nielsen M, Würtz H, Poulsen OM, et al. Respiratory symptoms among Danish waste collectors. Ann Agric Environ Med. 1997;4:69-74.
15. Gershon RR, Vlahov D, Felknor SA, Vesley D, Johnson PC, Delclos GL, et al. Compliance with universal precautions among health care workers at three regional hospitals. Am J Infect Control. 1995;23:225-36.
16. Gurubacharya DL, Mathura KC, Karki DB. Knowledge, attitude and practices among health care workers on needle-stick injuries. Kathmandu Univ Med J (KUMJ). 2003;1(2):91-4.
17. Tarantola A, Golliot F, Astagneau P, Fleury L, Brücker G, Bouvet E, et al. Occupational blood and body fluids exposures in health care workers: four-year surveillance from the Northern France network. Am J Infect Control. 2003;31:357-63.
18. Sharma R, Rasania SK, Verma A, Singh S. Study of prevalence and response to needle stick injuries among health care workers in a tertiary care hospital in Delhi, India. Indian J Community Med. 2010;35:74-7.
19. Kermode M, Jolley D, Langkham B, Thomas MS, Crofts N. Occupational exposure to blood and risk of bloodborne virus infection among health care workers in rural north Indian health care settings. Am J Infect Control. 2005;33:34-41.
20. Muralidhar S, Singh PK, Jain RK, Malhotra M, Bala M. Needle stick injuries among health care workers in a tertiary care hospital of India. Indian J Med Res. 2010;131:405-10.

DOI: 10.5455/2394-6040.ijcmph20141106
Cite this article as: Palve NN, Shidhaye PR, Chaturvedi RM, Pandit DD, Giri PA. Study of morbidity pattern and occupational hazards in sweepers working at a municipal teaching hospital in Mumbai. Int J Community Med Public Health 2014;1:24-30.