PREVALENCE AND RISK FACTORS ASSOCIATED WITH HEALTH DISORDERS AMONG HOSPITAL CLEANING WORKERS: A CROSS-SECTIONAL STUDY

By

Elbadry AS

Department of Community Medicine and Public Health, Faculty of Medicine, Menoufia University, Menoufia, Egypt.

Elbadry AS: m_rezk9207@yahoo.com

Abstract

Introduction: Hospital cleaning workers are exposed to a variety of health hazards with little attention paid to them. **Aim of work:** to assess the prevalence and risk factors of work-related health disorders among hospital cleaning workers. **Materials and methods:** This cross-sectional study used a self-administered questionnaire to collect data on work-related risk factors and the occurrence of various health complaints among 5000 hospital cleaning workers (response rate 86.24%). The frequency of health disorders among workers was estimated by using binary logistic regression analysis to detect the risk factors. **Results:** Health disorders among hospital cleaning workers in decreasing order of frequency was 24.7% respiratory symptoms, 18.3% skin symptoms, 16.7% combined respiratory and skin symptoms, 14.7% musculoskeletal symptoms, 11.1% combined skin and musculoskeletal symptoms, 8.4% psycho-social problems and 6.1% needle stick and sharp object injuries. Risk factors for health complaints included duration of working >10 years (OR=0.68, CI=0.54 – 0.96), female gender (OR=1.78, CI=1.58 – 3.88), working in the operating room (OR=1.56, CI=1.26 – 2.82), working in surgical ward (OR=4.14, CI=1.82 – 8.74), number of night shifts/month>8 (OR=1.78, CI=1.24 – 4.86), absence of hard containers for needles (OR=1.96, CI=1.52 – 2.78), absence of standard hospital policies (OR=2.43, CI=1.96 – 2.86), absence of primary medical examination (OR=1.68, CI=1.12 – 3.24), absence of periodic medical examination (OR=0.18, CI=0.03 – 0.24), absence of protective clothes except for gloves (OR=1.42, CI=1.14 – 2.26), working hours 8-12 hours per day (OR=2.12, CI=1.42 – 3.54) and working hours >12 hours/day (OR=2.24, CI=1.19 – 3.12). **Conclusion:** Health and safety of hospital cleaning workers has been inadequately provided which mandates the high need for health education, diagnostic and therapeutic interventions to this work group.

Key words: Hospital cleaning workers, Health disorders, Respiratory disorders, Skin disorders, Musculoskeletal disorders and Needle stick injuries.

Introduction

Hospital cleaning workers perform a wide range of activities from light tasks as dusting, sweeping, and vacuuming to heavy duties as carrying heavy equipments and exposure to toxic cleaning solutions (Zock, 2005 and Magnano et al, 2009). The use of specific cleaning products at work as hydrochloric acid and detergents were associated with lower respiratory tract symptoms among women with current asthma in a previous study (Vizcaya et al, 2015). Among 667 health care workers and 124 cleaning and kitchen employees, irritant contact dermatitis was the most frequent single diagnosis in both groups with nearly 80% of the employees had skin lesions and 27% had severe dermatosis (Weisshaar et al, 2007). A population of 99 women working in hospital cleaning activities in Italy participated in a study to define the risk assessment for cumulative trauma diseases (CTD), confirmed that carpal tunnel syndrome seems to be a disease related to cleaning workers although their risk assessment was negative for CTD (di Carlo et al, 2003).

Aim of work

To assess the prevalence and risk factors of work-related health disorders among hospital cleaning workers.

Materials and methods

- **Study design:** It is a cross sectional study.

- **Place and duration of the study:** The study was done at 13 tertiary hospitals within Menoufia governorate included Menoufia University hospital, Shibin El-Kom Teaching hospital and 11 central hospitals; during the period from April 2017 to the end of August 2018.

- **Study sample:** A total of 5000 hospital cleaning workers were enrolled in the study after thorough explanations of the study objectives through personal interviews with the chiefs of the corresponding hospitals.

- **Study methods:** Out of 5000 **pre-designed questionnaire** forms were distributed to all hospital cleaning workers and collected after completion; 4312 forms were returned with a response rate of 86.24%. The pre-designed questionnaire included three sections; **section one** included questions about demographic characteristics as age and gender, **section two** included current and past occupational history with emphasis on primary and periodic medical examinations, availability and use of

protective clothes other than gloves, availability of appropriate hard containers to collect used needles, duration of employment, place of work, working hours per day and number of night shifts per month, and finally **section three** included questions about health hazards and symptoms in the respiratory, skin, musculoskeletal systems, occurrence of needle stick injuries and psychosocial problems with their frequency over the past three months with corresponding search for medical advice, administration of specific drugs or admission to hospitals.

Consent

Written informed consents were signed by all participants before being enrolled into the study.

Ethical approval

The Medical Ethics Committee at Menoufia Faculty of Medicine approved the study protocol before starting the study.

Data management

Data were analyzed using IBM SPSS version 22 (SPSS Inc., Chicago, IL). Chi-square test was used to examine the relation between qualitative variables. For quantitative data, comparison between two groups was done using student t-test. This study employed logistic regression analysis to assess the factors associated with health disorders among the studied health care workers. The results were expressed as odds ratios (OR) with 95% confidence intervals (CI). The value $p \leq 0.05$ was treated as statistically significant.

Results
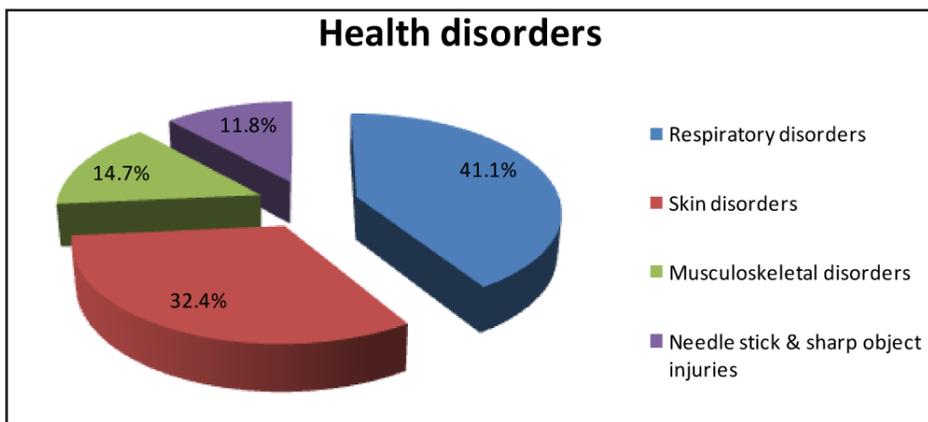
Figure (1): Prevalence of health disorders among hospital cleaning workers.

Figure 1 showed the prevalence of health disorders among hospital cleaning workers which was in decreasing order of frequency; 41.1% respiratory symptoms, 32.4% skin symptoms, 14.7% musculoskeletal symptoms and 11.8% needle stick and sharp object injuries.

Table (1): Risk factors for health disorders among hospital cleaning workers in relation to the number of complaints per month over the last 3 months (No=4312):

Risk factors	Number of complaints per month		Test of significance	p value
	< 3 times (No=2142)	≥ 3 times (No=2170)		
Age (years)				
Mean±SD	37.18±8.66	36.98±8.78	t=0.75	0.45
Duration of work (years)				
<10	846 (39.5%)	1222 (56.3%)		
>10	1296 (60.5%)	948 (43.5%)	χ^2= 121.4	<0.001**
Gender				
Male	1068 (49.9%)	934 (43.0%)	χ^2= 19.88	<0.001**
Female	1074 (50.1%)	1236 (57.0%)		
Place				
Operative room	1382 (64.5%)	1008 (46.5)	χ^2= 141.7	<0.001**
Internal wards	760 (35.5%)	1162 (53.5)		
Hard containers				
Present	1348 (62.9)	666 (30.7)	χ^2= 484.8	<0.001**
Absent	794 (37.1)	1504 (69.3)		
Number of night shifts/month:				
≤8	1086 (50.7%)	928 (42.8%)		
>8	1056 (49.3%)	1242 (57.2%)	χ^2= 26.9	<0.001**
Ward				
Medical	1232 (57.5%)	910 (41.9%)	χ^2= 104.1	<0.001**
Surgical	42.5%))910	1260 (58.1%)		
Hospital policies				
Present	52.5%))1124	1014 (46.7%)	χ^2= 14.01	<0.001**
Absent	1018 (47.5%)	1156 (53.3%)		
Primary examination				
Present	1146 (53.5%)	1050 (48.4%)	χ^2= 11.08	<0.001**
Absent	996 (46.5%)	1120 (51.6%)		
Periodic examinations				
Yes	768 (35.9%)	1334 (61.5%)	χ^2= 282.18	<0.001**
NO	1374 (64.1%)	836 (38.5%)		
Protective clothes				
Yes	1120 (52.3%)	994 (45.8%)	χ^2= 17.86	<0.001**
NO	1022 (47.7%)	1176 (54.2%)		
Working hours				
≤ 8	860 (40.1%)	492 (22.7%)	χ^2= 159.35	<0.001**
>8-12	796 (37.2%)	964 (44.4%)		
>12	486 (22.7%)	714 (32.9%)		

**: Highly statistically significant

Table 1 showed that there was a statistically significant difference between workers who were complaining less than 3 times per month and those with more than 3 times per month as regard duration of work >10 years, female gender, working in the operating room, absence of hard containers for needles, working in emergency ward, increased number of night shifts >8, absence of standard hospital policies, increased working hours per day >8 hours, lack of protective clothes, absence of pre-employment examination and periodic medical examination risk factors.

Table (2): Logistic regression analysis to detect risk factors associated health disorders among cleaning workers.

Risk factors	Beta (β)	Odds ratio (OR)	p –value	95% CI
Duration of work <10 year (reference) >10 year	-0.947	0.68	**0.01***	0.54 – 0.96
Gender Male (reference) Female	0.641	1.78	**0.03***	1.58 – 3.88
Place of working OR (reference) Internal ward	0.198	1.56	**0.004***	1.26 – 2.82
Ward Medical (reference) Surgical	1.38	4.14	**0.001*†**	1.82 – 8.74
Number of night shifts/month: ≤8 (reference) >8	0.288	1.78	**0.03***	1.24 – 4.86
Hard containers Present (reference) Absent	0.678	1.96	**0.007***	1.52 – 2.78
Hospital policies Present (reference) Absent	0.082	2.43	**0.02***	1.96 – 2.86
Primary examination Present (reference) Absent	0.154	1.68	**0.01***	1.12 – 3.24
Periodic examination Yes (reference) NO	3.38‡	0.18	**0.001****	0.03 – 0.24

Protective clothes				
Yes (reference)				
NO	0.332	1.42	**0.04***	1.14 – 2.26
Working hours				
≤ 8 (reference)				
>8-12	0.74	2.12	**0.006***	1.42 – 3.54
>12	0.76	2.24	**0.001****	1.19 – 3.12

†Hosmer and Lemeshow Test Chi-square = 91.66 (p <0.001);
‡Omnibus Tests of Model Coefficients Chi-square = 86.97 (p <0.001).
The model explained 70.4% of the variency and correctly classified 80.1%.
OR: Operating room,   *: Statistically significant,   **: Highly statistically significant

Logistic regression analysis revealed that duration of work >10 years, female gender , working in the operating room , working in surgical ward , number of night shifts/month>8 , absence of hard containers for needles , absence of standard hospital policies , absence of primary medical examination , absence of periodic medical examination , absence of protective clothes except for gloves , working hours 8-12 hours per day and working hours >12 hours were considered as risk factors associated with health disorders among cleaning workers as shown in Table 2.

Discussion

A predesigned questionnaire was distributed to 5000 professional cleaning workers and collected after completion with 4312 forms were returned (response rate 86.24%). Our study revealed that health disorders among hospital cleaning workers in decreasing order of frequency was 41.1% respiratory symptoms, 32.4% skin symptoms, 14.7% musculoskeletal symptoms and 11.8% needle stick and sharp object injuries (Figure 1).

Our work showed that 41.4% of the studied group was complaining of respiratory symptoms (Figure 1) which is higher than the figure declared recently by Hawley et al, 2017 who conducted their study on 50 hospital cleaning staff with 34% of workers reported lower respiratory symptoms over the past 12 months. This discrepancy may be related to the lower rate of availability and usage of personal protective equipments in our study.

In a recent study comprised 50 professional cleaning women, work-related asthma was diagnosed in 46% of

symptomatic cleaners, of whom 15 were considered as having work-exacerbated asthma while 8 as having occupational asthma following thorough history taking, skin prick tests, serum specific IgE antibodies, and specific inhalant challenge test (Lipińska-Ojrzanowska et al, 2017).

The increased risk of asthma among the studied group has been shown to be related to the duration of employment which is confirmed in the current study as working for more than 10 years (Table 2) and also due to the lack of use of protective equipments.

Our study showed that 32.4% of the studied group were complaining of skin symptoms (Figure 1) which is higher than the results reported by Mirabelli et al, 2012 who examined 818 professional cleaning workers in Spain , and detected that hand dermatitis was present in 28% of their studied sample and was associated with the use of hydrochloric acid. The higher percentage among our study group may be due to the shortage in the use of protective equipments.

One thousand five hundred and four patients (1020 women and 484 men) were included in a register-based study including workers with occupational contact dermatitis in Denmark in 2010

revealed that irritant contact dermatitis was diagnosed in 70% of all cases with 68% of these were caused by wet work. Forty-six percent of all patients were employed either in the healthcare sector, in cleaning, or as kitchen workers (Carøe et al, 2014).

The current study showed that 14.7% of the studied group had musculoskeletal complaints (Figure 1). Cleaning workers who were involved in repetitive manual tasks were more prone for work-related upper-limb musculoskeletal injury (Bell et al, 2012).

A total of 145 musculoskeletal injuries and cuts were identified among hospital cleaners, with an annual incidence rate of 32.1 per 100 person-years in two health care facilities in the Canadian province of British Columbia. Musculoskeletal injury was more common in females and those working in acute care facility. Cleaners with >10 years of experience were at significantly lower risk for all injuries and irritation incidents (Alamgir et al, 2008).

In a previous cross sectional study on 624 workers, low back pain was associated with longer working hours, flexion and trunk rotation, psychosocial demands and working directly in

collection. Many workers develop their activity at the presence of pain to keep their job (Pataro et al, 2014).

In our study, female workers have higher rate of complaints than men (the difference was statistically-significant) (Table 1). Female workers were more exposed to cleaning products with a higher frequency of work-related health disorders than men (Lee et al, 2014).

In a French national study included 3738 cases with occupational allergic contact dermatitis, 52% of the cleaning staff were women (Bensefa-Colas et al, 2014) which is similar to our study as 2310 (53.57%) of the hospital cleaning workers were females (Table 1).

Our study revealed that, working in the operating room, working in surgical ward and absence of protective clothes except for gloves were independent risk factors for health problems (Table 2). In a previous pilot study included 183 cleaning workers, data on health disorders and occupational factors were collected by personal interviews or self-administered questionnaires. Chemical-related symptoms were more common among workers who performed patient area cleaning (44%) and except for gloves; regular use of personal protective equipments was infrequent (Lee et al, 2014).

In the current study, absence of hard containers for used needles and absence of standard hospital policies for disinfection were independent risk factors for health problems (Table 2).In a study done by Beghdadli et al, 2009 , 108 exposures to blood were reported by 70 women and 38 men in which needle stick injuries represented 81% of cases. Cleaning staff and hygiene workers are at high risk of blood contamination and more than one-third of injuries occurred because of mismanagement of hospital waste products, where needles were not disposed appropriately in hard containers.

Limitations of the study:

Self reported questionnaire over the past three months may be the victim from recall bias as well as non-inclusion of the private sector to assess the risk of exposure to health hazards; both elements constitute unintended limitation of this study.

Conclusion and recommendations

Hospital cleaning workers are at high risk for respiratory, skin, musculoskeletal disorders and needle stick injury , either alone or in combination secondary to their

occupational exposure to hazardous materials.

Health and safety of hospital cleaning workers has been inadequately provided which mandates the high need for health education, diagnostic and therapeutic interventions to this work group.

Future research should focus on the type of educational training considering the perceived benefits and disadvantages while developing plans to decrease health hazards among hospital cleaning workers.

Conflicts of interest

None declared

Acknowledgement

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