

## Environmental services workers' Knowledge and Performance Regarding



### Environmental Cleaning at Emergency Room

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## 1.ABSTRACT

**Background:** The role of environmental cleaning is important to decrease economic burden of hospital and decrease physical, economic burden for patients. Environmental service workers support patient care by performing a variety of cleaning duties and provide important infection control activities. **Aim:** This study aimed to assess cleaners' knowledge and performance, regarding environmental cleaning at emergency room. **Method:** A cross-sectional study design was used. **Setting:** The study was conducted at the emergency rooms at Sherbin and Health Insurance Hospital. **Sample size:** the study was carried out on 16 cleaners who are working at the selected hospitals by using convenience sampling technique. The researchers used three tools in this study. The researchers developed the first and second tool. Tool I: Socio economic assessment, Tool II: This tool was used to assess cleaners' knowledge regarding environmental cleaning. Tool III: World Health Organization (WHO) 2016 tool assessment checklist to assess performance for cleaners. **Result:** shows good knowledge among environmental services workers and satisfactory performance about environmental cleaning process. **Conclusion:** The researchers conclude that environmental services workers have a good degree of knowledge. However, there is an apparent lack of some cleaning routine work and procedures.

**Recommendation:** design health education booklet about environmental cleaning for environmental services workers at emergency room

Keywords: Cleaning; Emergency; Knowledge; Performance.

## 2.Introduction:

Environmental Service Workers (ESWs) support patient care by performing a variety of cleaning duties. They provide important infection control activities. Emergency department (ED) is a complex and dynamic healthcare environment. Patients present with undifferentiated illnesses and variable acuity. Patients await diagnosis, intervention, and disposition in proximity of one another. The Emergency Department (ED) is a busy place subject to rapid patient turnover and even overcrowding (CDC, 2013). So, the role of environmental cleaning is important to decrease economic burden of hospitals and decrease physical, economic burden for patients.

Environmental Service Workers (ESWs) are exposed to occupational risks including infectious microorganisms from clients/patients/residents and the health care environment. Chemical agents used for cleaning, and ergonomic stressors related to

the mechanics of cleaning that may involve repeated pushing, pulling, lifting, or twisting.

Health care facilities doing effort to minimize these risks for protecting their environmental service workers and for allowing them to perform their work in an optimal and safe environment (Martino, et al., 2018). In addition, ESWs should be aware of work restrictions in areas associated with risks such as areas occupied with known or suspected communicable infected client/patient/resident. Also, in the areas the risks associated with the chemical products and equipment used (Gammon & Hunt, 2018).

Therefore, an appropriate strategy must be used to mitigate against these risks. This strategy is providing workers with infection prevention and control materials to select and use of personal protective equipment (PPE) when handling chemicals, blood, and body fluids. Also, have access to appropriate ergonomic considerations. (Verbeek et al., 2020).

The key to cleaning principles, is using of friction to remove visible dirt, organic material, and debris. Clean from least soiled to most soil and from high surfaces to low surfaces to ensure the physical removal of foreign material e.g., dusts, soil, and organic material such as blood, secretions, excretions, and microorganisms using mechanical and/or chemical means (**Dancer, 2011**). Routine hand hygiene should be performed after handling soiled linen, equipment, or waste. On exit from the unit when pick up involves multiple areas prior to completion of the run. When gloves are discarded (**Hor et al., 2017**). Single use medical equipment/devices (e.g., syringes, urinary catheters, infusion supplies) must be disposed after use and on-expiration date. Frequently touched surfaces e.g., light switches and call buttons particularly in entrances, waiting rooms, foyers, around staff stations and lifts should be thoroughly cleaned and disinfected with increased frequency (**Joshi et al., 2018**).

In addition, the surfaces of procedural rooms such as CT scan, MRI, fever/testing clinics should be cleaned and disinfected during the procedure and frequently touched surfaces between case. Terminally cleaning the area at the end of the session/day as local policies (**CDC, 2017a**). The space should not be carpeted, and all surfaces should be impermeable and easily cleaned. A surface may be visibly free of soil, but this may not reflect that the surface is free of microbial load (**Guh & Carling, 2010**). Equipment used in clinical areas should be cleaned/disinfected between patients and have a smooth, non-porous, intact surface to facilitate cleaning/disinfecting. (**Siani, & Maillard 2015**).

An inherent consideration of all disinfection strategies is the elimination of the most resistant microbial sub-population. Yet, there are disagreements about when and where a cleaning agent (removing of a bioburden from surfaces) or a disinfectant (killing microorganisms on surfaces) should be used (**Siani & Maillard, 2015**). This is further complicated by the fact that many disinfectant products will have a detergent (cleaning). In addition, there are many factors that will affect

the efficacy of a disinfectant; these include factors related to the disinfectant, such as concentration, pH and overall formulation, factors related to the target microorganisms and factors related to the product usage, such as contact time, organic load, type of surface and temperature (**Maillard & McDonnell, 2012**).

The Centers for Disease Control and Prevention (CDC) specifies a contact time of disinfectants 3–5 min based on the evaporation of the product; however, a 1-min contact time is more realistic in reflecting in-use conditions. Indeed, contact times of 30–60 s has been reported for a few disinfectants (**CDC, 2017a**). For antimicrobial wipes, there is no international or national guidance on wipe selection and use (**Royal College of Nursing, 2011; Sattar & Maillard, 2013**). Without an accepted standard test for wipes, information on the effectiveness of a product can only be gleaned from laboratory tests. This can lead to the use of wipes that might not be appropriate for applications in the healthcare environment (**Siani et al., 2011**). The choice of disinfectant will depend on its intended use; thus, the manufacturer's instructions should be followed to ensure correct application (**Maillard & McDonnell, 2012**). Incorrect selection and use of a formulated disinfectant can result in the transference of microorganisms to clean surfaces (**Siani et al., 2011**). The changing and/or cleaning of cloths and the wiping of surfaces from clean to dirty is crucial to limiting microbial transference (**Siani & Maillard, 2015**).

Poor knowledge about ESWs is the most common responsible reason for low adherence in implementing appropriate environmental cleaning at various healthcare facilities (**Geber Mariyam et al., 2018; Effie, 2016; Al-Mahdali, 2015**). Knowledge is the foundation of everything and is a prerequisite for promoting preventive measures and enhancing good practices towards the fight against the disease (**Youssef et al., 2021**). Having adequate knowledge is a pre-requisite for implementing standard precautions (SPs) in healthcare facilities and preventing the

occurrence of HAIs in healthcare settings. (Alrubaiee et al., 2017).

Significantly, it is believed that 20–30 % of healthcare-associated infections (HCAIs) could be avoided with better application of existing knowledge and realistic infection control practices. Changing in attitudes and belief structures should be reworked in a rigorous and scientific manner to achieve proper practice (National Audit Office, 2009).

### **2.1 Aim of the study is to:**

Assess environmental services workers' knowledge and performance regarding environmental cleaning at emergency room.

### **2.2 Research Questions:**

1. What is the level of knowledge of environmental services workers regarding environmental cleaning of the emergency room?
2. What is the level of knowledge and performance of environmental services workers regarding environmental cleaning of the emergency room?

## **3. Method**

### **3.1 Study Design**

Across-sectional study design was used.

### **3.2 Settings:**

The study was conducted in the emergency room in Sherbin and Insurance Hospital. There are four emergency units in each hospital.

### **3.3 Participants and sampling**

The study group involved environmental services workers who are working in the emergency room in the previous mentioned hospitals and were available during the study period. Convenient sampling technique was used to involve all the 16 environmental services workers.

### **3.4 Data collection:**

Data collection was conducted during the period from March 2021 to December 2021, by using of five tools. Researchers developed tools number I, and II after reviewing the relevant literature. Tools number III was adopted from the CDC, (2017).

### **Tool I: Socio economic assessment tool:**

The researchers used this tool to assess the demographic and occupational characteristics of nurses and environmental services workers such as (age, gender, educational level, years of work experience in emergency room, current position, working hours and attendance of training courses about environmental cleaning). **Tool II: Structure interview assessment tool:** The researchers used CDC, (2017) tool to assess environmental services workers' knowledge regarding environmental cleaning. This tool included 10 questions about definition, importance of environmental cleaning, the appropriate time of cleaning and disinfection, types and concentrations of disinfectant using at different emergency room. **Tool III: Practice assessment checklist:** World Health Organization (WHO) Guidelines on core components of Infection Prevention and Control (IPC) program at the national and acute health care facility level 2016 developed this tool to assess environmental services workers ' practice such as cleaning, disinfection, ensuring dryness of all the room by using (appropriate – in appropriate). The researchers used this tool three times per the day (morning, evening, and night shifts).

Face and content validity of the developed data collection tools was tested by a jury group consist of five experts in infection prevention and control. In addition to conducting a pilot study on 10 % and (2) environmental services workers to test applicability and feasibility of the study tools, as well as the time needed to collect the required data. Participants in the pilot study were not included in the main study sample.

### **3.5 Ethical consideration and administrative process.**

The researchers obtained the approval from Research Ethics Committee, Faculty of Nursing, Mansoura University and obtained verbal consent from each nurse and environmental services workers before starting of the study after the explanation of the aim and process of the study. The researchers emphasized that the participation in the study is voluntary, and any participant had the right to withdraw from the study at any time without

any responsibility. The collected data will be treated confidentially and used only for research purpose. The researchers obtained an official letter from the faculty of nursing to the manager of five governmental hospitals in Mansoura city. To permit the researcher conducting the current study.

**3.6 Statistical Analysis**

Statistical package for the social science (SPSS), version (22) was used for statistical analysis of the data, as it contains the test of significance given in standard statistical books. Numerical data were expressed as mean and SD. Qualitative data were expressed as frequency and percentage (%). Chi-square, Fisher's, Pearson, and t-tests were used to compare frequencies and correlation between the study variables. Probability (P-value) is the degree of significance of the results was considered: (p-value > 0.05) was considered not significant (NS), (P-value ≤ 0.05) was considered significant (S) and the (p-value ≤ 0.01) was considered highly significant (HS).

**4. Results**

Table (1) illustrates the occupational and demographic characteristics of the studied environmental services workers. More than half (56.3%) of environmental services workers had primary or preparatory degree. Regarding environmental services workers age, 62.5% of them aged more than 40 years. Females constitute 81.3% of environmental services workers. Regarding years of

experiences 37.5 % of them had less than 5 years. All (100%) of the environmental services workers attended seminars or courses on environmental cleaning infection control measures.

Table (2) clarifies environmental services workers' knowledge about environmental cleaning. All environmental services workers (100%) mentioned the importance of using soap and water before disinfectant the surfaces and 87.5% reported that the cleaning is important for killing the bacteria. All environmental services workers 100% mentioned that cleansing should be done after each procedure.

While table (3) describes the distribution of environmental services workers' performance regarding environmental cleaning. All the environmental services workers (100%) decontaminate the contaminated clothing before laundering, clean the toilets thoroughly at least once every shift and mopped dry. All of them (100%) did not clean all examination tables daily, did not place caution signs at both ends of corridor to alert staff and visitors of a potential risk, did not following steps of corridor cleaning only when the first half has dried completely.

Table (4) and figure (1) shows that majority (87.5%) of environmental services workers had satisfactory total performance while only 12.5% of them had unsatisfactory score.

Table (1): Occupational and demographic characteristics of the studied environmental services workers (16)

Personal characteristics	No	%
<b>Hospital name</b>		
- Sherbin hospital	8	50
- Health insurance hospital	8	50
<b>Education level</b>		
- Illiterate or read and write	7	43.8
- Primary or preparatory	9	56.3
<b>Age</b>		
- 30-40 years	6	37.5
- >40 years	10	62.5
<b>Gender</b>		
- Male	3	18.8
- Female	13	81.3
<b>Years of experience</b>		
- <5 years	6	37.5
- 5-10 years	6	37.5
- >10 years	4	25

Attended seminars or courses on infection control measures included environmental cleaning.	16	100
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Table (2): Environmental services workers' knowledge regarding environmental cleaning.

Items	No	%
<b>The way of cleaning</b>		
- Using soap and water then using disinfectant	16	100
<b>Importance of cleaning</b>		
- For killing bacteria	14	87.5
Appropriate time for cleaning after each procedure	16	100
<b>Disinfectant names</b>		
- Chloride	16	100

Table (3): Distribution of environmental services workers' performance regarding Environmental Cleaning for three shifts (n=16).

Items	Satisfactory	
Contaminated clothing decontaminated before laundering	16	100
Washable walls washed daily and as necessary, using specified disinfectant	12	75
Sinks, soap dishes, and paper towel dispensers cleaned daily and replenished	12	75
The curtains change once in 7 days or as and when required	15	93.8
The isolation room have special mop and container for cleaning	15	93.8
The toilets thoroughly cleaned at least once every shift and mopped dry	16	100

Table (4): Distribution of the Studied environmental services workers' according to their total practice scores (n=16).

Performance	No.	%
Satisfactory	14	87.5
Unsatisfactory	2	12.5



Figure 1: Distribution of the Studied environmental services workers' according to their total practice scores (n=16).

### 5. Discussion

Hospital environmental service workers (ESWs) are playing an important role in interrupting the chain of infection (Matlow et al., 2012). Hospital environmental services workers are the unsung heroes in the fight against various contagious diseases and infections. They are responsible for deep cleaning and disinfecting of the surfaces that

host potentially dangerous germs and viruses to prevent spread of infection in the hospitals. Additionally, cleaning hospitals is replete with challenges, since the environmental services workers run a daily gauntlet of infection risks to ensure that hospital spaces run smoothly (Youssef et al., 2021). However, their status as unskilled laborers in a behind-the-scenes role have left them out of the public eye.

Concerning the occupational and demographic characteristics of the studied environmental services workers, the present study indicated that more than half of environmental services workers had primary or preparatory degree. Females constitute more than four-fifth of environmental services workers. More than two-thirds of environmental services workers had less than 5 years and environmental services workers' experiences ranged from 5 to 10 years. All the environmental services workers attended seminars or courses on environmental cleaning infection control measures. These findings agreed with **Youssef et al., (2021)**, who noticed that most environmental services workers attended regular training sessions. Moreover, lower percentage of environmental services workers are females, around third of them are male, and their qualification ranged between higher educational level of school or less. Nearly half of them their experience in health facilities cleaning 3 years or more.

Regarding environmental services workers' knowledge related environmental cleaning, the current study showed that all the environmental services workers reported that using soap and water before using disinfectant. More than four-fifth of them reported that cleaning is important for killing the bacteria. All environmental services workers mentioned that the appropriate time for cleaning after each procedure, duration of different type of hand washing for 40 seconds & use liquid soap and wearing gloves at the beginning of the work. This results confirmed to **Youssef et al., (2021)** findings who reported that almost all the surveyed hospital environmental services workers had a good overall knowledge score. This might be attributed to the environmental services workers received intense training courses and practices in the departments. Also, the current findings were consistent with **Tenna et al., (2013)** and **Kasa et al., (2020)** findings—who revealed that most of healthcare workers (HCWs) have knowledge.

**Youssef et al., (2021)** recorded that only half of the environmental services workers had answered correctly on items that focused on the requisite to rinse the surface after the

application of disinfectant. On the other hand, **Ayed, (2015)** and **Sarani et al., (2015)** studies, reported lower scores regarding knowledge and performance of environmental services workers towards environmental cleaning. They also found that all the environmental services workers clean the bed surface including under the mattress with disinfectant and clean the walls thoroughly using a specialized soap/disinfectant solution in the morning. While more than three thirds of environmental services workers mopped floor with a disinfectant solution. The current results revealed that majority of cleaning staff stated that they cleaned and disinfected common areas at hospitals in addition to the frequently touched objects all the time, particularly after the COVID pandemic that made cleaning and disinfection process became more valuable. Moreover, all the environmental services workers clean the toilets thoroughly at least once every shift and mopped dry, but all of the environmental services workers did not clean all examination tables daily, did not place caution signs at both ends of corridor to alert staff and visitors to a potential risk, did not cover mop only half of the width at time, and did not clean the remaining half of the corridor wet mop only when the first half has dried completely. Most environmental services workers in the current study had satisfactory total performance while only less than one third of them had unsatisfactory score.

These results were in accordance with **Youssef et al., (2021)** and added that understanding the determinants of cleaning performance is critical in tailoring interventions to improve hospital—cleaning. Also, **Bernstein et al., (2016)** concluded that the perceived lack of appreciation of environmental services workers and the absence of recognition of the value of their work may hamper some environmental services workers from carrying out their responsibilities and impact negatively their performance.

## **6. Conclusion**

Cleaning staff are tackling many challenges on the front lines. The present findings indicated that environmental services

workers have a good degree of knowledge and satisfactory level of performance regarding environmental cleaning in emergency rooms. However, there is an apparent lack of some cleaning routine work and procedures. The study's findings will aid future planning for improved infection control measures in the emergency rooms of hospitals.

#### 7. Recommendation:

design health education booklet about environmental cleaning for environmental services workers at emergency room

8. Conflict of interest: None.

9. Acknowledgments: We acknowledge all participants included in this investigation.

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