

RESEARCH ARTICLE

**Evaluation of Health
Requirements in Public Toilets
during Hajj event**

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ABSTRACT

Any successful event is judged on the adequacy and cleanliness of the toilet facilities. Approximately 2.5 million people from different parts of the world gathered in the holy sites (Arafat, Muzdalifah and Mina) in Makkah. The toilets should be adequate in number, conveniently located, suitable for Hajj event and maintained in a clean and tidy manner. The study aimed to assess the mandatory health requirements for public toilets in the holy places at Makkah city (Arafat, Muzdalifah and Mina). An evaluation requirement checklist was made to evaluate the fulfillment of these requirements and whether they conform of local and international public toilet standards. Randomly 242 toilets were selected and assessed for the availability of essential hygienic items most of them from Mina (44%) followed by Arafat and Muzdalifah. The results showed a lack in each of hand washing soap (99%) followed by hand drying methods (97%), posters or signs for hand washing (89%), exhaust fans (86%), sanitizers and disinfectants (81%) and lighting and ventilation (63%). There was statistically significant difference in place of the toilets (holy site) across hand washing station, washing soap, sanitizers (disinfectants) and Hand-drying methods. It was concluded that the provision of safe, accessible, hygienic, highly ventilated, well lighted and cleaned public toilets during Hajj rituals would more likely to protect pilgrims against adverse health effects.

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INTRODUCTION

World Toilet Day (November 19th) was officially designated in 2013 by the United Nations General Assembly. World Toilet Day is a day to raise awareness and inspire action to tackle the global sanitation crisis [1]. Globally, 2.5 billion people (36% of the global population) do not use improved sanitation facilities (safe, clean toilets) and 1 billion people still defecate in the open (15% of the global population) - the majority of these (934 million) live in rural areas [2]. A Public toilet, as defined by Water and Sanitation for the Urban Poor, is characterized by its location in public place, its availability to anyone [3]. Thus, it is a room or booth for use by the public for urination and defecation purposes. In recent years more research on public toilets has been conducted regarding their provision, governance, and implementation policies in governmental, professional, organizational, and cultural contexts [4]. The successful events are judged on the adequacy and cleanliness of the toilet facilities. It has been shown that public toilets could pose health and safety problems specifically for women, children, the elderly and the disabled [5]. If not regularly decontaminated, however, residual organisms from an infected person can survive in significant populations. Toilets can provide an ideal environment

for spread of pathogens from gut, respiratory tract and skin via hands and surfaces from one person to another [6]. Toilet doorknobs contamination is one of the common ways by which organisms are picked up by contact with surfaces [7]. Hajj is a 5-day event that is considered as the largest annual gatherings in the world. Approximately 2.5 million people from different parts of the world gathered in the holy sites (Arafat, Muzdalifah and Mina) in Makkah. The toilets should be adequate in number, conveniently located, suitable for Hajj event and maintained in a clean and tidy manner. The provision of safe and accessible public toilets is an important function of local government. There is a considerable focus done by Saudi authorities on providing accessible public toilets which is seen in; the plenty of well-designed public toilets facilities in the holy places (figure 1), part of them is friendly to persons with disabilities and special needs (figure 2), the layout of new improved clearly designated toilets, the separate approach for each sex (figure 3), the use of bright balloons to make toilets clearly identified, the water supply is serviced on a 24-hour basis during Hajj event, the high number of labors, supervisors, engineers, housekeepers to keep toilets clean and ready for use during the Hajj event. Although of these efforts, still not every pilgrim's needs are met [8]. Still the

number and facilities not yet be provided according the number of pilgrims compared to the guidance of Health and Safety Executive [9]. There should be adequate number of toilets that is accessible by handicapped persons and provision of portable toilets as much as possible and whenever is needed [9,10]. Doors should be fitted with latches, sliding dead-bolts or other similar locking devices. While door locks should be accessible from the inside only, authorized outside key access may be necessary in emergencies or to take an out-of-order. All toilets, urinals and lavatories should be constructed of durable, easily cleanable materials and installed with adequate ventilation and lighting. They should be provided with hand washing basins with running water, soap (bar or liquid), disposable towels or air dryers and waste containers. They should also be cleaned and maintained for the duration of the event. Signage should be in place to direct pilgrims to the places of the toilets. Besides the scientific and environmental approach, the fundamental principles of design of public toilets should follow Islamic jurisprudence rules. It is better to refer and stress on the Islamic teaching on the aspect of cleanliness and the philosophy of designing of toilet [11]. For example, ample water, preferably running water should always be available for

cleaning the body and place. In addition, all the toilets should be established opposite to the direction of qiblah (direction of Kaabah in the holy Mosque in Makkah) [11]. The study aimed to assess the mandatory health requirements for public toilets in the holy sites (Arafat, Muzdalifah and Mina) at Makkah city during Hajj season.

METHOD

The study was undertaken during Hajj 1436 H (2015) to assess the sanitary requirements of public toilets in the Holy sites in Makkah, Saudi Arabia. The selected toilets were sited around the three mosques in holy place about 100 meter distance from each mosque (Figure 4). An evaluation Requirement Checklist was made to evaluate the fulfillment of these requirements and whether they conform of local and international public toilet standards (Figure 5). Randomly selected 242 toilets were assessed for the availability of essential hygienic items. All results outcomes were analyzed and assessed using Statistical Package for Social Sciences “IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp”

RESULTS

The total number of toilets visited was 242. One hundred and eight of them (43.8%) were from Mina while 71 (27.3%) were from Arafat and 65(27.3%) were from Muzdalifah as shown in figure (6). Generally, the results showed a lack in the hand washing soap with (99%) followed by hand drying methods (97%), posters or signs for hand washing (89%), exhaust fan (86%), sanitizers or disinfectants (81%), lighting and ventilation (63%)(figures 7-10). The crowded toilets were (52%) (Figure5). Statistically, there is a significant difference in place of the toilet (holy site) across hand washing station, washing soap, sanitizers (disinfectants) and Hand-drying procedure (p value =0.00) (Table 3), while there was no significant differences in place of the toilet (holy site) across crowd into toilets (p value =0.48).

DISCUSSION

Mass gathering means a congregation or assembly of more than 5,000 people in an open space or open air for a period of more than 24 hours [12]. Facilities should be adequate in number, healthy, safe, conveniently located, suitable for the event, and maintained in a clean and tidy manner so that insanitary conditions do not occur. The present study aimed to assess

the mandatory health requirements for public toilets in the holy places in Makkah (Arafat, Muzdalifah and Mina). Randomly selected 242 toilets were assessed for the availability of essential hygienic items mostly from Mina (44%) followed by Arafat and Muzdalifah. Pilgrims spend most of their time in Mina during Hajj (three to four days). Our results indicated a lack in hand washing soap toilet (99%) followed by hand drying methods (97%), posters or signs for hand washing (89%), exhaust fan (86%), sanitizers and disinfectants (81%) and lighting and ventilation (63%). There was a statistically significant difference in place of the toilets (holy site) across hand washing station, washing soap, sanitizers (disinfectants) and Hand-drying methods. Good hygiene behavior and the effectiveness of hygiene promotion during Hajj are essential. Although rarely found, handwashing with soap may be one of the most cost-effective means of preventing infection in mass gatherings. Inadequate sanitary conditions and poor hygiene practices play major roles in the increased burden of communicable disease within mass gathering. Hand washing with soap has been reported to reduce diarrheal morbidity by 44% and respiratory infections by 23% [13,14]. However, globally, the rates at which hands are washed with soap range from only 0-34%

of the time [15]. Removal of microorganisms from skin is enhanced by the addition of soaps or detergents to water. The proper drying of hands should be an essential component of effective hand hygiene procedures [16,17]. It has been reported that washing hands with either soap and water or water alone combined with drying on paper towels can effectively remove bacteria from the hands. However, if hands are only shaken dry after washing, some bacteria are likely to remain [18]. Hand-drying effectiveness includes the speed of drying, degree of dryness, effective removal of bacteria, and prevention of cross-contamination [18]. The directional signage reduces the number of enquires to be made by the pilgrims before reaching the toilets and the average time taken by the pilgrims to reach toilets. Posters help to teach the pilgrims how to follow the effective hand washing procedures. A study by Kansas State University shows posters can make a difference when it comes to hand hygiene in a health care setting [19]. Ventilation and lighting are two vital elements that contribute to the success of a public toilet. In fact, these two elements have direct and instant influences on pilgrims feeling when they enter and use the toilet. Because of their function, toilet rooms are expected to have high concentrations of contaminants: These “wet rooms” are best served by

having a local exhaust system that removes contaminants before they can migrate away from the source [20]. Our results showed that 52% of the study toilets were crowded. Statistically there was no significant difference in place of the toilet (holy site) across crowd into toilets. Many Studies around public toilet provision show that access and equality of public toilets is an environmental, sanitary, political and social issue [4, 21,22]. Adverse health effects result when pilgrims cannot get access to toilets during Hajj rituals. Medical evidence also shows that health problems, including constipation, abdominal pain, diverticuli, and hemorrhoids, can result if individuals delay defecation [13]. Medical studies show the importance of regular urination, especially for women. Public toilets serve the people who have to go frequently (every hour or so) and to those for whom the need to go comes suddenly and urgently (restroom challenged). The “restroom challenged” make up a large and somewhat part of pilgrims. Adverse health effects that may result from voluntary urinary retention include increased frequency of urinary tract infections, which can lead to more serious infections and, in rare situations, renal damage [24]. In the present study 12.5% of the studied toilets were not gender separated. That may be due to the non-commitment of

some pilgrims when using toilets specially the eldest. Finally, all the toilets in the study were containing a place for performing ablution which is one of the features that need to be taken into consideration when designing a toilet from Islamic perspective. In addition, all the toilets studied, were established the direction of qiblah during location and designing [11]. In conclusion, the provision of safe, accessible, hygienic, highly ventilated, well lighted and cleaned public toilets during Hajj rituals would more likely to protect pilgrims against adverse health effects.

REFERENCE

- 1-UNICEF (2013), UNICEF Sanitation Factsheet for World Toilet Day 2013 http://www.unicef.org/toilets4all/WTD_Sanitation_Factsheet_November_2013.pdf
- 2- WHO & UNICEF 2013. Joint Monitoring Programme - Progress on sanitation and drinking-water - 2013 update.
- 3-Pepurah D Baker K K, Moe C, Robb K A, Wellington N, Yakubu H and Null C. Public toilets and their customers in low-income Accra, Ghana. *Environment and Urbanization*. 2015 ; 27: (2): 589-604.
- 4-Afacan Y. Public toilets: an exploratory study on the demands, needs, and expectations in Turkey. *Environment and Planning B: Planning and Design* 2015;42: 242 – 262
- 5-Anthony K H, Dufresne M, “Potty parity in perspective: gender and family issues in planning and designing public restrooms” *Journal of Planning Literature* 2007; 21: 267–294.
- 6- Gerhardts A., Hammer T. Balluff R., C., Mucha H. and Hoefler D. A model of the transmission of micro-organisms in a public setting and its correlation to pathogen infection risks. *Journal of Applied Microbiology*. 2012; 112: 614–621.
- 7- Ahmed OB, Seraj B. Microbial contamination of doorknobs in public toilets during Hajj. *Asian Journal of Science and Technology*. 2016; 07 (10): 3676-3679.
- 8- Ascoura I El. Impact of Pilgrimage (Hajj) on the Urban Growth of the Mecca.

Journal of Educational and Social Research. 2013; 3 (2):255-263.

9- The Event Safety Guide (Sanitary facilities). A guide to health, safety and welfare at music and similar events: Health and Safety Executive UK second edition 1999, available from UK Health and Safety Executive HSE.

10- Jones, H. E. & Reed, R. A. Water and Sanitation for Disabled People and Other Vulnerable Groups: Designing Services to Improve Accessibility.2005. WEDC, Loughborough University, Leicestershire.

11- Abdul Rahim A .A concept of clean toilet from the Islamic perspective. Journal of Islamic Built Environment. 2005;1(1):71-84

12- Al-Tawfiq JA, Memish ZA. Mass gathering medicine: 2014 Hajj and Umra preparation as a leading example. International journal of infectious diseases 2014;27: 26–31..

13-Curtis VA, Danquah LO, Aunger RV. Planned, motivated and habitual hygiene behaviour: an eleven country review. Health Educ Res. 2009;4:655–673.

14- United Nations Children’s Fund Soap, Toilets, and Taps. A Foundation for Healthy Children. [Accessed August 5, 2009]. Available at: www.unicef.org/wash/files/FINAL.

15-Global Handwashing Day Global Public-Private Partnership for Hand Washing. [Accessed August 5, 2009]. Available at: www.globalhandwashingday.org.

16-Boyce J., Pittet D. Guideline for hand hygiene in health-care settings: recommendations of the healthcare infection control practices advisory committee and the HICPAC/SHEA/APIC/IDSA hand hygiene task force. Infect Control Hosp Epidemiol. 2002;23(12, suppl):S3–S40.

17-World Health Organization . WHO Guidelines on Hand Hygiene in Health Care. World Health Organization; Geneva, Switzerland: 2009.

18- Huang C , Ma W , Stack S . The Hygienic Efficacy of Different Hand-Drying Methods: A Review of the Evidence. Mayo Clin Proc. 2012; 87(8): 791–798.

19- Filion K , KuKanich K S . , Chapman B , Hardigree M K. Observation-based

evaluation of hand hygiene practices and the effects of an intervention at a public hospital cafeteria. *American journal of infection control*. 2011; 39, (6): 464–470

20- Sherman, M. ASHRAE's New Residential Ventilation Standard. *ASHRAE Journal*. 2004: S149-S156.

21- Kwarteng A B, Agyemang-Duah W, Arthur F, Agyemang E. Assessing sanitation conditions and its impacts on the health status of urban dwellers in Abuakwa, Ghana. A Cross sectional survey. *Research on Humanities and Social Sciences*. 2015; 5(17):115-126

22- Greed C H. “The role of the public toilet in civic life”, in *Ladies and Gents: Public Toilets and Gender* Eds O Gershenson, B Penner (Temple University Press, Philadelphia, PA). 2009. pp 35–48

23- National Institutes of Health Publication No. 95-2754, July 1995, Quoted in Schmidt and Brubaker, “The Code and Practice.

24-Nielsen, A. Waite, W. Epidemiology of Infrequent Voiding and Associated Symptoms. *Scandinavian journal of urology and nephrology*.1994; 157(157):49-53.



Figure 1. Plenty of well-designed public toilets facilities in the holy places.



Figure 2. Part of toilets is friendly to persons with disabilities and special needs.



Figure 3. Separate approach for each sex

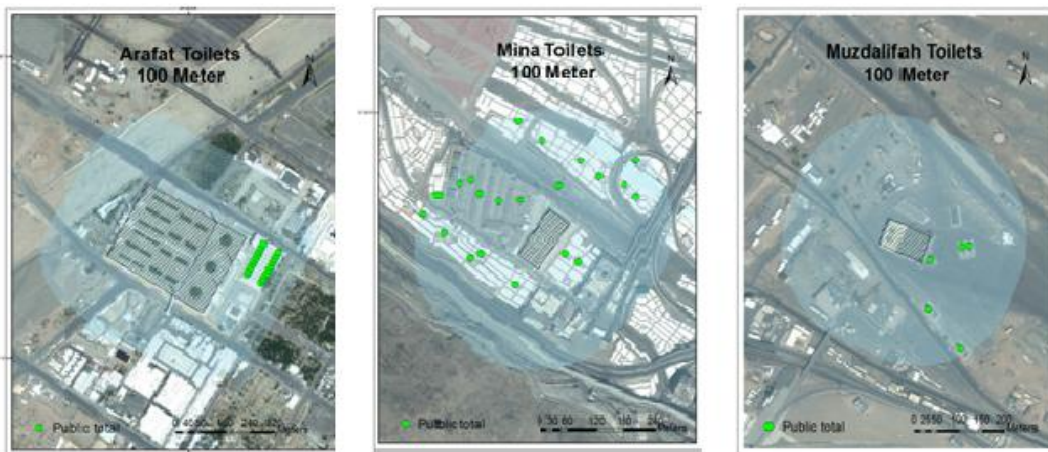


Figure 4. Distribution of toilets in the holy places


Evaluation of health requirements of public toilets during Hajj				Umm Al-Qura University The Custodian of the Two Holy Mosques Institute for Hajj and Umrah, University, Makkah, Saudi Arabia	
No	Date	Time	GIS		
STUDENT NAME:-					
Holy place: 1-Arafat 2-Muzdalifah 3-Mina			<input type="checkbox"/>		
			Toilet No		
1	People crowd into toilets.		Yes ①	No ②	<input type="checkbox"/>
2	Separation of female toilets.		Yes ①	No ②	<input type="checkbox"/>
3	Availability of water supply.		Yes ①	No ②	<input type="checkbox"/>
4	Free of Waste overflow.		Yes ①	No ②	<input type="checkbox"/>
5	Availability of Locked-designed doors.		Yes ①	No ②	<input type="checkbox"/>
6	Presence of taps and flushing tanks		Yes ①	No ②	<input type="checkbox"/>
7	Adequacy of Lighting and ventilation.		Yes ①	No ②	<input type="checkbox"/>
8	Presence of exhaust fan.		Yes ①	No ②	<input type="checkbox"/>
9	Presence of handwashing station.		Yes ①	No ②	<input type="checkbox"/>
10	Presence of hand-drying methods.		Yes ①	No ②	<input type="checkbox"/>
11	Presence of poster or sign for handwashing procedure.		Yes ①	No ②	<input type="checkbox"/>
12	Availability of hand washing soap.		Yes ①	No ②	<input type="checkbox"/>
13	Availability of sanitizer or disinfectant.		Yes ①	No ②	<input type="checkbox"/>
14	Presence of cleaning services.		Yes ①	No ②	<input type="checkbox"/>
15	The walls and floors constructed of durable and cleanable materials		Yes ①	No ②	<input type="checkbox"/>

Figure 5: Requirements checklist used in the study

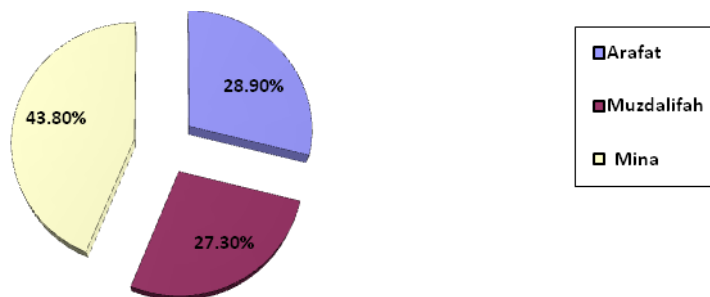


Figure 6. The toilets tested from the three holy places.

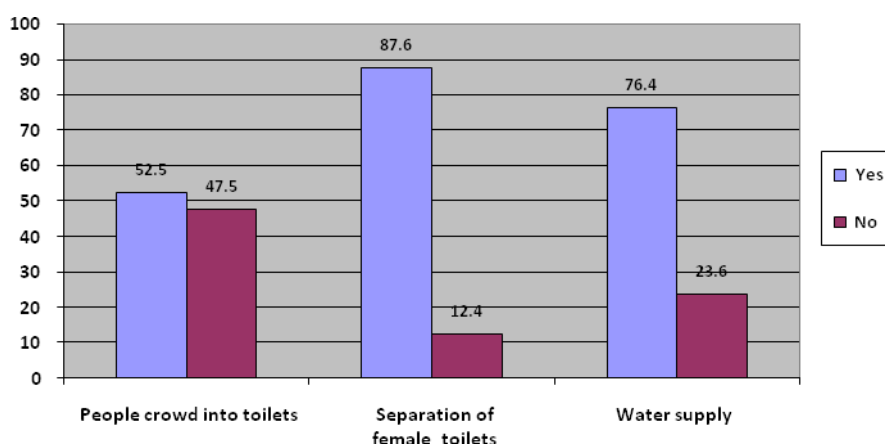


Figure 7. Toilets crowd, separation according to gender and availability of water supply.

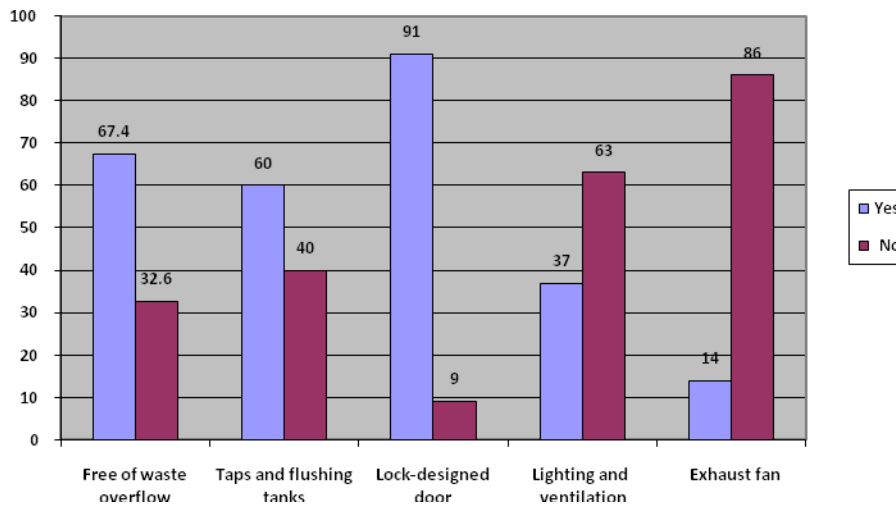


Figure 8 The presence of waste overflow, taps and flushing tanks, locked-designed doors, lighting & ventilation and exhaust fans.

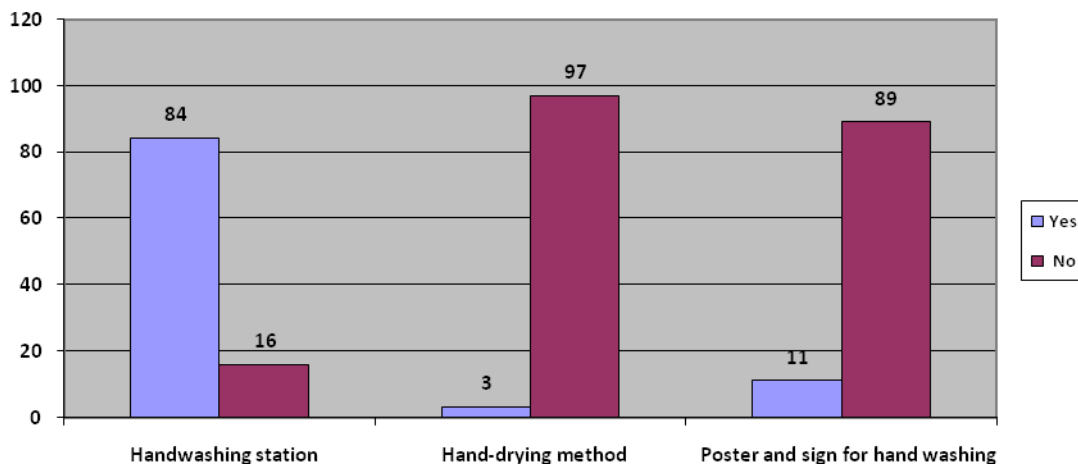


Figure 9. The availability of hand washing stations, hand-drying methods and posters or signs.

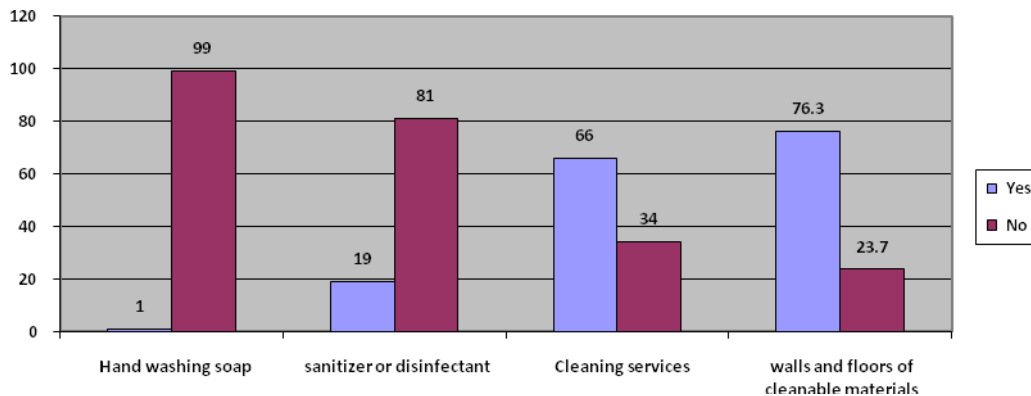


Figure 10. The presence of hand washing soap, sanitizers or disinfectants, cleaning services and cleanable walls and floors materials