# A Study of Hand Washing Practices in Toilet Door Knob

**Pooja Choubey[1], Dr. Krishan Pal[2],**

[1]Research Scholar, OPJS University, Churu, Rajasthan
[2]Associate Professor, OPJS University, Churu, Rajasthan

## Abstract

The rising occurrence and spread of disease epidemics from group to group have become significant public health issues. In select government offices, motor parks and markets in India bacterial contamination has been investigated for door handles / grips on public convenience. Of the 180 Swab samples grown, 156 were positive (86.7 percent ). The studies of women's dressing handles/knobs (41.7%) and door grips/knobs were higher than those of males (11.5%). The study also found that the toilet door handles/knives were contaminated more frequently than in public offices and banks in markets, power plants and restaurants. Contamination was also greater at the handles/knot of doors (87.2 percent) than at the bathroom door handles/knobs (85 percent ). Most bacterial pathogens were coliforms. Staphylococcus aureus (30.1 percent), Klebsiella Pneumoniae (25.7 percent), Escherichia coli and private public education organisations for human and environmental health comprise the isolated bacteria diseases. It shows that the most common sites in the town have very pathogenic bacteria, causing epidemics fast. The city health agencies, health officials, the Environmental Protection Board, and private organisations would also be trained on personal and environmental hydration.

***Keywords:*** *Public conveniences, Door handles/knobs, Bacterial contamination, Pathogenic bacteria, Epidemics, Environmental hygiene*

## 1. INTRODUCTION

Everywhere there are and are a big part of all habitats, microorganisms. You exist in these environments either openly or as parasites. We live in fomites or patches as temporary contaminants, often as a source of population and diseases in hospitals, which pose significant health risks. The rising epidemics have become important to public health, and their spread from group to group. While the risk of contamination is recognised as lower than that associated with hospital patients, an evaluation of potential causes and sources includes the annual rise in food toxicity involving household outbreaks. In reality, formitism and regular interactions between individuals, who are one way to spread the disease, are the main source of and spread of community disease. Forms which represent a significant source of the transmission of infectious diseases in direct contact with human beings or natural habitats of pathogens. These sizes include door grips, kitchens, toilets and toilets, lavatories, cabinets, chairs and tables, especially in public rooms, hospitals, hotels, restaurants and toilet facilities. One of the most common causes of contamination is the toilet and bathroom door handles. Public toilets and toilets are mostly used by people who choose their own microbial flora and other organisms, and when they enter and go out, place them in door-handles / buttons. Host excreted pathogen level, the probability of transporting infection agents to susceptible individuals, organism virulence, immunocompetence of contact persons, control procedures such as disinfecting and personal hygiene depends on the frequency of site contamination and exposures. In most the public toilets found in parks and markets, especially in India, unfortunately there is a lack of water supply. Users can't wash hands with these conveniences after using and carry contaminants. This could cause methicillin-resistant outbreaks of staphylococcus aureus in high prevalence zones and cholera outside the bridges.

## 2. HAND WASHING KNOWLEDGE

Hand washing has been recognised internationally and adopted by countries worldwide, including the WASH Program, as a low cost and efficient way to prevent disease from being communicable. Hand washing is considered

the most efficient way to eliminate genes, thus shielding one from infectious diseases such as diarrhoea and pneumonia as well as avoid the spread of genetic germs to others before and after certain behaviours (i.e. before eating and going to the toilet).

The prevalence of diarrhoea and pneumonia among children is strong for the washing of the hands. In the five most populous and poverty-stricken countries: India, Nigeria, Democratic Republic of Congo, Pakistan and Ethiopia almost 90% of deaths in infants from diarrhoea and pneumonia occur. This highlights the importance of hand washing in countries like India in particular. While in developed countries the need for hand washing is greater, the practise has been found low due to the lack of understanding or combination of both infrastructures. Although many hand washing studies have been conducted in India, no hand washing studies have been conducted. There are a large number of migrants who are working every year in the area, which placed a great deal of stress on various basic facilities, such as accommodation, drinking water, drainage, sanitation and the development of slums. Owing to the lack of proper facilities and health related aminity, the health status of the slum inhabitant is affected. In these areas many disease vectors flourish because of a lack of hygiene, poor supply of water, drainage and garbage.

## 3. HAND CONTAMINATION AND HAND WASHING PRACTICES

Transmission of infections by contaminated health care workers (HCW) in most healthcare environments is common pattern. The failure to practise adequate hand hygiene is a major cause of HCAI diseases and multi-resistant species and a major contributor to infectious disease outbreaks by the World Health Organization (WHO). WHO recognises that washing hands of HCWs with soap is the most effective and cost efficient way to prevent infection in patients? 2008 has been declared the International Year of Sanitation by the United Nations General Assembly[4]. The Global Public Private Hand Washer Partnership has proclaimed 15 October 2008 the first Global Hand Washing Day, with the goal of fostering a global culture of hand washing with soap, in order to further the UN call for enhanced hygiene practises. Initiated mainly by introducing simple behavioural changes, this campaign reduced the mortality rate associated with diarrhoea diseases. The WHO launched a global campaign in 2009 entitled 'SAVE LIVES: Clean Your Hands' as part of a major global effort to improve hand hygiene in health care. In 1847 Ignas Semmelweis in Vienna produced an interesting directive for health care workers to practise hand hygiene. Despite Semmelweis's wealth, the general population and healthcare environments still have poor hand-washing compliance rates.

In the guidelines on hand hygiene issued by Center for Disease Control (CDC) Atlanta and the WHO, a range of strategies for promotion and improvement of hand hygiene are recommended. Observatory studies show poor hand hygiene compliance among HCWs despite the institutional policies and protocols on hand hygiene. The medical doctors rather than nurses were a significant risk factor consistently associated with poor adherence to recommended hand hygiene practises. Hand washing is an essential practise to learn from students both before taking care of the patients and after contact with any possible source of contamination such as the toilet. The inherent hand hygiene that drives the majority of the community's hand washing behaviour, such as washing when the hands are visibly dirty or after eating or using the toilet, and the elective hygiene of the hand when contacts do not appear threatening and when contacts do not induce a direct inherent response to a hand wash. Protocols often occur in healthcare situations that require such optional washing of hands.

Although the emphasis given in the hand sanitary curriculum varies from institution to Institute, hand hygiene is of high significance. It is unclear if students in a school are actually sensitive to and are compliant with hand hygiene. Another observational study on hand-washing practises in a liberal arts college in the Mid-Atlantic region revealed that after using the toilet not all students were washing their hands. In colleges, students are inevitably going to follow these positive behaviours in their working lives, by practising good manual hygiene habits. Although the hand hygiene practises are given considerable attention, small efforts are made in order to avoid the sources and the risk of contamination by the hands. In addition to the hand-wash skills that are learned in the curriculum, a variety of steps were taken at the school to encourage hand hygiene after toilet use. The illustrated WHO recommended steps for hand washing were applied in all toilets and other strategic points. "You washed your hands?" a banner with the title. "The students had to wash their hands in both toilets on the inner side of the outdoor doors before leaving the bathroom. Installed with hand driers in all toilets were liquid soap dispensers. Many strategic points have been installed with alcohol-based hand rub dispensers.

## 4. IDENTIFICATION AND CHARACTERISATION OF BACTERIAL CONTAMINANTS

The first isolated bacterial isolates are macroscopic examination of the colons. Due to length, colour, pigmentation, height, surface and marginal texture, blood hemolysis, chocolate agar plates and lactose fermentation of MacConkey, colonies were distinguished. Several biochemical studies have been performed to identify the various isolates Barrow and Feltham (1993).

## 5. MATERIALS AND METHODS

Testing was performed in selected public places in India using the whole aseptic precaution of toilet door handles. Samples have been obtained with Swab-rin (Reynolds, 2005) method of the American Public Health Association. Samples have been gathered. In door handles / knobs, a sterile application with cotton tape is used (swab stick) with sterile peptone water. It was then placed in bottles of joy containing clear peptone water, which was shaken and collected loosely. The bottles of gems were wrapped in an ice bag and shipped from the Teaching Hospital to analyse the samples. Threaded, slightly twisted and spilled onto MacConkey, Blood Agar, and chocolate stick plates, the pepton water in which the samples of the swab from the door handles/knobs were rinsed. It would allow for a quick recovery of all species in the swab. The plate was then aerobically incubated at 37$^{o}$C for 24 hours.

## 6. RESULTS

Bacterial contamination was collected by tests of both toilet and door handles / knobs in selected public places. Eighty (180) swab samples; 70 of male toilets, 70 of female toilets, 20 of male toilets and 20 of female bathrooms respectively. Of the 180 samples of bacterial infection, 156 (86.7 percent) were positive (table 1). Of the 140 toilet door handles / knobs collected, 122 (87.1 percent) showed bacterial contamination, while of the 40 toilet handles / knobs collected, 34 (85 percent) showed bacterial contamination (Table 2). Staphylococcus aureus had the highest prevalence of bacteria contaminant, following 25.7% Klebsiella pneumoniae, 15.6% Escherichia coli, 11.2% Enterobacter, 7.1% Citrobacter, and 5.9% Pseudomonas, while the Proteus had a minimum prevalence, 4.5%, as shown in table 4. Among isolated bacteria, Staphylococcus Areus had the highest prevalence 31%.

**Table 1: Distribution and percentages of positive samples of male and female toilets and bathrooms door handles/knobs**

| Door handles/knobs | Total samples Examined | Number positive | % of positive samples |
|---|---|---|---|
| Male toilets | 70 | 57 | 36.5 |
| Female toilets | 70 | 65 | 41.7 |
| Male bathrooms | 20 | 16 | 10.3 |
| Female bathrooms | 20 | 18 | 11.5 |
| Total | 180 | 156 | 86.7 |

**Table 2: Distribution of bacterial contamination on toilets and bathroom door handles/knobs swabbed**

| Toilets | | Bathrooms | |
|---|---|---|---|
| Number of samples | Culture positive (%) | Number of samples | Culture positive (%) |
| 140 | 122 (87.1) | 40 | 34 (85) |

**Table 3: Distribution and percentage bacterial contamination of toilets and bathroom door handles/knobs in relation to the establishments sampled**

| | Banks | Markets/parks | Churches | Restaurants | Government establishments |
|---|---|---|---|---|---|
| Number of samples | 8 | 80 | 4 | 4 | 84 |
| Number of positive samples | 5 | 72 | 3 | 4 | 72 |
| Percentage of positive samples | 62.5 | 90 | 75 | 100 | 85.7 |

**Table 4: Prevalence and degree of growth of bacteria isolated from contaminated door handles/knobs**

| Bacteria | Number isolated | Degree of growth | Prevalence (%) |
|---|---|---|---|
| *Staphylococcus aureus* | 81 | ++++ | 30.1 |
| *Klebsiella pneumoniae* | 69 | +++ | 25.7 |
| *Escherichia coli* | 42 | ++++ | 15.6 |
| *Enterobacter spp.* | 30 | +++ | 11.2 |
| *Citrobacter spp.* | 19 | +++ | 7.1 |
| *Pseudomonas aeruginosa* | 16 | ++ | 5.9 |
| *Proteus spp.* | 12 | +++ | 4.5 |

## 7. DISCUSSION

The door handles and knobs have been well-documented in bacterial, fungal and viral contamination and are in turn used as a form of trans-infection and recontamination of the hands being washed. Any of these pollutants can be highly pathogenic and transferable to another person or help to inoculate. In this study, bacterial pollutants, door handles and bathroom bathing knobs were assessed and classified in churches, parks and markets as well as banks, restaurants and government facilities in India. Bacterial contamination was identified in 156 of the 180 samples analysed (86.7 percent). In similar situations this is slightly less than the figure of Otter and French (2009) for a positive 95%. This can be due to the use of the water system, especially in public offices examined. The continuous cleaning of these toilets may also result from the cleaning contractors working with these establishments. The test shows also that the contamination level of toilet doors/bags (87.1 percent) for bathrooms was slightly higher than that on the toilet handles/bags (85 percent ). The wider use of toilets as opposed to the bathrooms within the population can cause this difference in pollution rates. In contrast to people going to toilets, fewer people in public bathrooms use their baths. This research also indicates that female toiletries and door grips / tubs have increased bacterial contaminations (41,7% and 11,5%), compared to male toilets and door handles / baskets, respectively) (36.5 percent and 10.3 percent ). This is similar to the findings of Kennedy et al.(2005). This is perhaps due to the pollution-enhancing habits of other women. For example, women hold a great many beauty items in their bags and use them every time they enter the public domain (hand creams, lotions, eyelids, papers, miracles, makeups, etc.). This way of life results in pollutants being left at the doors of these goods, which is rarely seen in men's toilets. The study also found, compared with banks, churches and governmental institutions, that toilet/bathroom markets/parks and restaurants were highly contaminated (90% and 100%) by door handles and bowls (62,5 percent , 75 percent and 85,7 percent , respectively). In keeping with Boone and Gerba (2010), the traffic, exposure and climate pollution rates vary. The laundry facilities in the latter group had a much higher traffic level than in the former groups of banks, churches and public institutions. The formerly confines the use of bacterial pollutants on the surfaces often to staff and / or continuously purifies them, while the latter confines only few tools to the surrounding toilets and toilet facilities, by cleaning and wiping door grips / buttons after very few uses. This is similar to Kennedy et al. study (2005), which shows that the most frequent pollution has been caused by high traffic toilets such as airports, bus terminals, schools and toilets with one or two urinals. In addition, there are no cleaners for restaurants, engine parks, and markets, with the majority of those available lacking training for equipment or disinfectants at these locations, which leads to high levels of infection. Prior research shows that regularly and severely used formitis is most commonly infected, leading to an increase in heterotrophic bacterial loads (Bright et al., 2010). The most used bacterial pollutants throughout the report are Staphylococcus aureus (30.1%), Klepsiella Pneumoniae (25.7%) and Escherichia coli (15.6%). Pseudomonas aeruginosa isolation (5,9 percent) is important for a growing population's health risks. The same is true of Kennedy et al. (2005) and Rusin et al. (2002). (2002). The majority of positive samples tested were more than one type of bacterial isolate, but most cases are from parks and markets. The high level of these pollutants is especially significant in these environments as a result of the increased number of immunocommitted patients and transplantation cases.

## 8. CONCLUSION

In addition, we will remember that bacterial contamination is high and that bacterial pollutants are extremely prevalent. It can be a time bomb due to its outbreak potential. It will include the education of the public on personal and environmental hygiene through the community health superintendents, sanitary officers and environmental protection council and private organisation.

## 9. REFERENCES

1. Boone SA, Gerba CP. (2010): The Prevalence of human parainfluenza virus I on indoor office formite. Food and Environmental virology, 2 (1): 41-46.
2. Bright KR, Boone SA, Gerba CP. (2010): Occurrence of bacteria and viruses on Elementary classroom surfaces and the potential role of Elementary Classroom hygiene in the spread of infectious diseases. The Journal of School Nursing, 26 (1): 33-41.
3. Galtelli M, Deschamp C, Rogers J. (2006): An assessment of the prevalence of pathogenic micro-organisms in the rotor wing air ambulance. Air Medical Journal, 25 (2): 81-84.
4. Goldhammer KA, Dooley DP, Ayala EW, Hill BL. (2006): Prospective study of bacterial and viral Contamination of exercise equipment. Clinical Journal of Sports Medicine,16 (1): 34-38.
5. Giannini MA, Nance D, McCullers JA. (2009): Are toilet seats a vector for transmission of Methicillin-resistant Staphylococcus aureus? American Journal of Infection Control. 505-506.
6. Kennedy DI, Enriquez CE, Gerba CP. (2005): Enteric bacterial contamination of public restrooms. Cleaning Industry Research Institute. www. ciriscience.org (Accessed 20/12/2010).
7. Li S,Eiseberg JNS, Sicknall IH, Koopman JS. (2009): Dynamics and control of infections transmitted from person to person through the environment. American Journal of Epidemiology, 170 (2):257-265.
8. Monarca S, Grottolo M, Renzi D, Paganelli PS, Zerbini I, Nardi G. (2000): Evaluation of environmental bacterial contamination and Procedures to control cross infection in a sample of Italian Dental Surgeries. Occupational and Environmental Medicine, 57: 721-726.
9. Otter J, French G. (2009): Bacterial contamination in touch surfaces in the public transport system and in public areas of a hospital in London. Letters in Applied Microbiology, 49:803- 805.
10. Osterholm MT, Hederg CW, MacDonald KL. (1995): Epidemiology of infectious diseases. In: Mandell, Douglas and Bennett's principles and Practice of Infectious diseases vol.I, 4th edition. Churchill-Livingstone, New York. P. 165.
11. Pittet D, Dharan S, Touveneau S, Sauvan V, Pernegar TV. (1999): Bacterial contamination of the hands of hospital staff during routine Patient care. Archives of Internal Medicine, 159: 821-826.
12. Prescott LM, Harvey JP, Klein DA. (1993): Microbiology, 2nd edition. W.M.C. Brown, England. Pp. 706-707,805.
13. Reynolds KA. (2005): Hygiene of environmental surfaces. International Journal of Environmental Health Research, 15 (3): 225-234.
14. Rusin P, Maxwell S, Gerba CP. (2002): Comparative surface-to-hand and fingertip-to-mouth transfer efficiency of Gram-positive bacteria, Gram-negative bacteria, and phage. Journal of Applied Microbiology, 93:585-592.
15. Sleigh DJ, Timbury MC. (1998): Notes on Medical Mirobiology, 5th edition. Churchill-Livingstone, New York. P.173.