

THE ROLE OF TOILET HYGIENE IN TRANSMISSION OF VAGINAL AND URINARY TRACT INFECTIONS IN HUIS WELGEMOED, CUT CAMPUS

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ABSTRACT

The 2012 residents of Huis Welgemoed, a residence for female students at Central University of Technology, Free State Bloemfontein Campus have reported a high prevalence of infections of the vagina and the urinary tract. They assume that this problem is associated with poor hygienic conditions in the toilets of their residence. However, this assumption may not be entirely true, as other factors may also contribute to their problem. Previous studies have shown that there is an evident relation of vaginitis and urinary tract infections (UTI) among students and the practices of personal hygiene or the level of toilet sanitation in their residences. Especially in facilities where the students have complained about the hygiene state of their residence toilets as unsatisfactory. This preliminary study has shown that the residence conforms to the standards set out by the S.A. requirements for toilets in student housing of 1 toilet per 6 students and that the cleaning materials and methods used by staff are adequate. Interestingly, the authors have found that a lack of knowledge around UTI's and VI's regarding basic prevention strategies is most probably the cause of the high incidence of these two types of infections.

Keywords: Public toilets, Females, Health concern, Vaginitis, Urinary tract infections

1. INTRODUCTION

UTI's are very common among university students, and the majority of women have recurrent infections within one year (Siiri et al., 2009). *Escherichia coli* is responsible 75- 90% of uncomplicated UTI's (Karen et al., 2006), whereas *Staphylococcus saprophyticus* causes an estimated 5 - 15% of UTI's frequently in younger women (Micheal et al., 2007). From previous studies there is an evident relation of vaginitis and UTI's among students and the practices of personal hygiene or the level of toilet sanitation in their residences, especially in facilities where the students have complained about the hygiene state of their residence toilets as unsatisfactory (Ojo, O and Anibijuwon I. 2010).

Students from Huis Welgemoed assume the high rate of UTI's among residents is associated with poor hygienic conditions in the toilets of their residence. However, this assumption may not be entirely true as other factors may also contribute to the problem as there are several causes for UTI's and vaginal infections (VI's).

Anything that disturbs the usual vaginal environment would result in conditions favoring the production of unwanted microorganisms leading to infections of this very sensitive area. Hygiene factors such as hand washing practices, the use of bubble baths or scented soaps which may contain irritants; squatting over the toilet seat which makes a person susceptible to UTI's because the bladder does not drain completely; stress; douching; not urinating frequently during the day and also after sexual intercourse; and wiping from the back to the front which leads to the transfer of fecal matter from the anal region to the vagina are common culprits causing vaginitis and UTI's. Also, reduced water intake, which normally helps to balance the bladder activity and keep it bacteria free, plays an important role in susceptibility to pathogenic organisms (Amali, et al. 2009).

2. METHODOLOGY

To determine whether the toilets have a role in the transmission of vaginitis and UTI's among the residents of Huis Welgemoed, a questionnaire was used to obtain information on the prevalence of vaginitis or UTI's since the beginning of the first school term, as well as common hygiene practices of the residents. Information regarding the study was fully disclosed to residents and written consent was obtained from all participants.

The cleaning staff was also interviewed to determine the cleaning frequency of the toilet facilities, as well as the types of cleaning materials used. Time and budget constraints did not permit microbial testing of each of the thirteen toilets in the residence, nor comprehensive screening for all possible bacteria linked to infection (*Streptococcus* sp., *Escherichia coli*, *Klebsiella* sp., *Staphylococcus* sp., *Proteus* sp., and *Pseudomonas* sp.). To determine which toilets were used most frequently, each toilet was allocated a number and a perforated form together with an envelope was placed behind its door. This form consisted of numbers at the bottom and the participants were asked to tear one number and put the torn piece of paper into the envelope each time they use that specific toilet over a period of 5 days.

Surface swabs were taken from the six most frequently used toilets, resulting in 46% representivity of the total number of toilets in the residence. Three surface swabs were collected from surfaces which are most likely to be contaminated, i.e. on the toilet seat, flush handle and inside the toilet bowl. Swabs were collected by placing a sterile template cut-out, representing 10 cm² onto the surface to be swabbed, moistening a sterile cotton swab in sterile saline solution and swabbing the entire area three times whilst rotating the swab continuously. Samples were transported to the laboratory within 1 hour (Ellen et al., 2007) and serially diluted samples were plated on ChromoCult® Coliform Agar to enumerate *E. coli* and faecal coliform bacteria and incubated at 37°C for 18 hours.

3. RESULTS AND DISCUSSION

Out of 79 residents, 39 students (49%) took part in this study after giving written consent to participate. The study population consisted of only female students, as this is a female only residence. The majority of participants (62%) were under the age of 21 with 72% enrolled in the first or second year of study. The residence consists of three floors with 10 of the respondents (26%) are housed on the ground floor, 26 (64%) on the first floor and the remaining 4 (10%) on the second floor. The ground floor has two bathrooms of which the first with two toilets are located near the residence entrance and the TV room. These two toilets were used 100 and 57 times respectively in the five day period. Both of these two toilets were sampled and were designated Toilet 1 and Toilet 2). The second bathroom on the ground floor has three toilets which were used 40, 18, and 26 times each. The first floor of the residence has one bathroom with 4 toilets that were used 79 (Toilet 3), 30, 17 and 50 (Toilet 4) times each. The first floor has an additional two toilets located on the opposite side of the bathroom. These two toilets were used 68 and 46 times respectively during the 5 day enumeration period. The second floor has only two toilets, both of which were sampled (Toilet 5 and Toilet 6).

Each floor of the residence has one cleaning lady responsible for cleaning the toilets twice a day – early in the morning and again in the afternoons. All toilets are cleaned using similar cleaning materials and same measured chemicals. The cleaning chemicals are a water based degreaser for use on hard surfaces (sold under the brand name Ransolve) and a specialized toilet bowl cleaner (sold under the brand name Randum) that contains hydrochloric acid.

Unfortunately, sampling was conducted shortly after cleaning of the toilets, which probably explains the extremely low bacterial counts. At the very least, it demonstrates that the cleaning regime followed is effective in sanitizing the toilets as only two of the six toilets sampled showed the presence of faecal coliforms, but no *E. coli*. Of these two, only Toilet 3 (located on the first floor, used a total of 79 times during the 5 day enumeration period) was highly contaminated with faecal coliforms detected on the flush handle, seat and inside the bowl. This may be due to a number of factors such as the toilet not yet having been cleaned during the morning cleaning cycle, or it may have been used a number of times after cleaning prior to being sampled. Toilet 6 located on the second floor only showed faecal coliforms in the toilet bowl. Interestingly, the most frequently used toilet (Toilet 1 on the ground floor used 100 times) did not show any signs of contamination, which is probably due to it having been cleaned just prior to sampling.

Table 1: Faecal coliform counts on each of the toilets

	Bowl	Handle	Seat
	(cfu/cm²)	(cfu/cm²)	(cfu/cm²)
Toilet 1	nd	nd	nd
Toilet 2	nd	nd	nd
Toilet 3	1.8 x 10 ³	1.2 x 10 ⁷	1.5 x 10 ⁵
Toilet 4	nd	nd	nd
Toilet 5	nd	nd	nd
Toilet 6	5.6 x 10 ⁴	nd	nd

nd = none detected

Analysis from the questionnaires revealed the following trends:

- 46% of the respondents have had one or more UTI/VI during the past academic year; and
- only 54 % sought medical treatment for the infection;
- Participants indicated symptoms ranging from vaginal itching (27%); burning sensation during urination (21%), discolored urine (6%), pain around the bladder area (29%);
- 62 % rated their toilets fairly clean and 38% showed a great dissatisfaction in having to use these toilets;
- 56 % use bathtubs when taking a bath and add bath salts and/or bathing foams which may also irritate their already sensitive vaginal area;
- 21 % do not think that the use of condoms can help reduce risk of a UTI or VI; while
- 51% were not aware that condom use can help reduce the risk of infection;
- 64 % do not urinate after sex;
- after urinating 36 % wipe off their residual urine from the back to the front;

- 74% of the students only change their sanitary pads after an average of about 6 hours which may contribute to the occurrence of VI's as the higher moisture content would encourage growth of pathogenic microbes or an excess of the normal flora, leading to a discomfort or irritation in that area

A few general recommendations can be made based on the results gathered from this study: Health education must be provided to the students on hygiene methods such as the frequency of changing sanitary towels and tampons, and that they should wipe themselves from the front to the back after urinating. The students must be encouraged to seek medical attention for the prevention of complications and also wash and disinfect the bathtubs before they use them.

As this is only a very preliminary study, it has many shortcomings and many areas to expand and improve the study have been identified:

- Greater effort should be made to achieve higher response rates from the questionnaires (>50%);
- Questionnaires should be expanded to include questions on average daily water intake, frequency of sexual activity, general knowledge on VI's and UTI's, types of home remedies used to treat infections, as well as the source of these remedies (colloquial, internet based or other)
- All 13 toilets should be sampled;
- Over an extended period; and
- At different times of day to eliminate sampling bias and errors.

4. CONCLUSION

The hygiene of the toilets at Huis Welgemoed was satisfactory, and the number of toilets provided complies with the S.A. requirements for toilets in student housing of 1 toilet per 6 students (DHET, 2011). The cleaning methods used by the staff were satisfactory and the cleaning materials effective. The study however revealed that the hygiene and/or sanitary practices of the students were questionable and probably significantly contributed to the occurrence of UTI's and VI's in the residence.

As a pilot study, the results gathered here are extremely useful: several trends have been identified and interesting avenues of investigation have been pointed out. Furthermore, a number of shortcomings have been identified that will be used to better a future investigation.

5. REFERENCES

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