WATER RESEARCH COMMISSION

WORKING PAPER

COVID-19 and Sanitation

What we know so far? And what can be done to reduce disease transmission

by
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Abstract

Safely managed water, sanitation and hygiene (WASH) services are an essential part of preventing and protecting human health during infectious disease outbreaks, including the current COVID-19 pandemic. New research emanating from around the world has shown that the virus can spread through pathways such as faeces and urine, indicating that appropriate sanitation is a key barrier to the spread of COVID-19, like it is for other waterborne illnesses. This working paper presents an overview of how strengthening WASH practices can prevent disease transmission with emphasis on the avoidance of COVID-19.

Introduction

The new coronavirus, COVID-19, is an infectious disease that is commonly known to be spread through respiratory droplets from infected people. It is also spread when a person comes into contact with a surface that has viable virus on it. New research emanating from around the world has shown that the virus can spread through other pathways, including faeces and urine, indicating that appropriate sanitation is a key barrier to the spread of COVID-19, like it is for other waterborne illnesses. Recently, the Chinese Centre for Disease Control has shown viable strains of COVID-19 in faeces of infected patients. This means that a person can be infected from the lack of proper handwashing after toilet use and that toilet and other bathroom fixtures could be surfaces from which people get infected if another user has COVID-19.

The term WASH – water, sanitation and hygiene – is commonly used when talking about toilets. All three elements need to be combined to have an effective barrier against disease transmission. Clean water is required to wipe down surfaces and hands, clean and disinfected toilets provide a barrier from user and faecal matter and the washing of hands is essential before and after the use of toilets. This working paper presents an overview of how strengthening WASH practices can prevent disease transmission with emphasis on the avoidance of COVID-19.

What do we know about COVID-19 and sanitation?

Due to the recent emergence of COVID-19 as a pandemic, scientific literature has been catching up to understand the different modes of disease transmission. This process requires scientific rigour to ensure accuracy of predictions and / or outcomes. For this reason, research to date has been scant and results variable due to the different approaches in methodology.

To date, the virus that causes COVID-19 has been detected in faeces of patients infected with the disease. There are early indications that it could also be present in urine. There are a number of variables that still need to be understood. This includes the amount of virus shed, the period in which the virus is shed and the infectious nature of the virus in faecal matter. Early studies have shown the virus is present in faeces and anal swabs of infected patients. Further, the virus has been detected in faeces from 1 day to as high as 12 days; data appears scattered and will be provide a more accurate picture once further investigations are completed. Also unknown is the transmission risk.

It is therefore essential that sanitation and hygiene measures are strengthened to reduce the risk of disease transmission. Recently, the COVID-19 virus has been detected in bathroom fixtures of an infected patient while research to date has shown that the virus can survive on plastic and steel surfaces for up to 72 hours, which stresses the importance of cleaning and disinfection protocols.

WASH measures – appropriate risk reduction measures

This section presents key risk reduction measures that can be undertaken to reduce disease transmission. The following measures listed below have been adapted from the United States Centres of Disease Control and Prevention (CDC) (Centres for Disease Control and Prevention, 2018):

Availability of clean water

The availability of clean water cannot be overstated. Clean water is required for handwashing, surface cleaning and rinsing and, often, disinfection. Any water that has been used for this purpose needs to be properly discarded according to relevant procedures and regulations.

Handwashing

Handwashing is one of the most effective measures against disease transmission and is recommended as one of the key measures for curbing COVID-19 disease transmission. In the case of sanitation, it is recommended that a toilet user undertakes two washing cycles per toilet use. The first handwash is before you use the toilet facility. The second handwash is after you the toilet facility. The recommended handwash period is 20 seconds and with soap. Proper handwashing technique is more important than the type of soap used whether it be liquid, foaming, or bar soaps. Handwashing will not only limit COVID-19 disease risk, but also the transmission of other faecal-origin diseases.

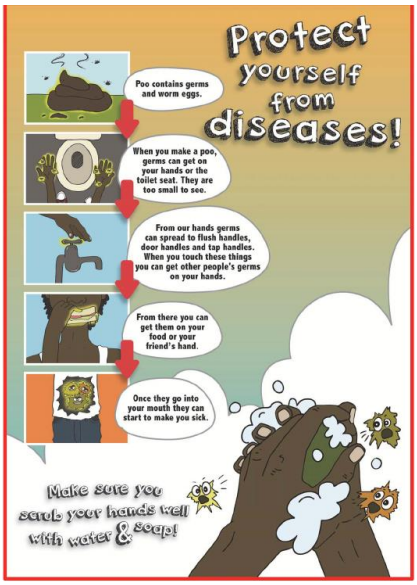

Figure 1. Importance of handwashing (Louton & Still, 2016)

Cleaning

Cleaning and disinfecting are two sides of the same coin. Together they are part of a broad approach to preventing infectious diseases. Cleaning allows for dirt, impurities and germs to

be removed from surfaces or objects. A good cleaning protocol involves the use of warm water and detergent (or soap). For heavily soiled objects, scrubbing may be necessary to remove faeces or bodily fluids, biofilms, and stubborn organic debris. Cleaning works by physically remove debris and germs from surfaces. The process does not necessarily kill germs, but by physically removing them, it lowers their numbers and the reduces the risk of disease transmission.

Often, it is necessary to rinse surfaces or objects being cleaned. For all rinsing and product application procedures, overspray should be avoided. High-pressure washing should be avoided. Although effective in removing stubborn debris, it is possible that it may also force debris and germs into crevices or porous materials, from which they can later emerge. Furthermore, high-pressure washing causes aerosolisation and overspray which may facilitate the spread of germs.

An appropriate length of time should be taken to allow surfaces to dry.

Disinfection

Disinfection means to kills germs on surfaces or objects. The process involves using chemicals to kill germs on surfaces or objects. It is important to understand that disinfection does not necessarily clean dirty surfaces or remove germs; the process involves killing germs on an object or a surface after cleaning thereby reducing the risk of spreading infection.

Sanitising refers to the lowering of the number of germs on surfaces or objects to a safe or regulated level. This involves either cleaning or disinfecting surfaces or objects to lower the risk of spreading infection. In high user systems, it is necessary to ensure that cleaning and disinfection protocols are able to match necessary sanitary levels. Sodium hypochloride is cheap, effective and readily available disinfected. User manufacturers guidelines should be followed but generally the solution is diluted (5 tablespoons to 3 litres).

Routine cleaning and disinfecting

Research undertaken by the Water Research Commission (WRC) evaluating school sanitation systems have shown the importance of undertaking regular cleaning and disinfection (Louton and Still, 2016). Further, it stressed the importance of having the necessary administrative tools and cleaning protocols available for those who manage and those that undertake cleaning protocols. The research showed that in the absence of appropriate administrative tools and cleaning, the same cleaning cloth or sponge that is used for the kitchen, is used in the toilets. This can inadvertently lead of the spread of disease, especially if no disinfection agents are being used or the cleaning material is heavily soiled. For more information on this, it is advised that the following report is accessed online from the WRC's Knowledge Hub at http://wrcwebsite.azurewebsites.net/wp-content/uploads/mdocs/TT%20699-16.pdf

Figure 2. The School Sanitation Management Handbook (Louton & Still, 2016)

The cleaning and disinfecting activities need to the match the types of germs you want to remove or kill. With respect to COVID-19, data has indicated that the virus is able to survive on surfaces for up to 72 hours. Other hardy organisms, such as Ascaris, an intestinal parasite, require hot water or a highly concentrated disinfection chemicals to render them inactive.

Generally, viruses are relatively fragile, so standard cleaning and disinfecting practices are usually sufficient to remove or kill them. The CDC indicates that for flu viruses, special cleaning and disinfecting processes, including wiping down walls and ceilings, room air deodorisers, and fumigating, are not necessary or recommended (Centres for Disease Control and Prevention, 2018). The exception to this rule would be if there have been toilet users infected with COVID-19. In this case, or it is suspected or uncertain, a specialised cleaning procedure can be undertaken followed by routine cleaning measures to maintain sanitary conditions.

Clean and disinfect correctly

It is important to follow label directions on cleaning products and disinfectants. Surface cleaning should be undertaken a general household cleaner to remove germs then followed by a rinse. A disinfectant should then be used to kill germs. It is recommended that the product be selected for its effectiveness against viruses. Disinfection usually requires a specific contact time on the surface or object to be cleaned (e.g., letting it stand for 3 to 5 minutes). Under no conditions, should commercial disinfection chemicals be mixed unless it is stated to be safe do so; the manufacturer's recommended use and application should be followed. The use of cleaning products and disinfectants often require for the use of gloves or eye protection.

Safety and cleaning protocols and training

The use of appropriate Personal Protective Equipment (PPE) and its supply is essential to disease transmission risk reduction. Gloves, boots, safety glasses and overalls are essential PPE. This not only protects cleaners from disease transmission but also from cleaning and disinfection chemicals. It is the responsibility of those managing toilet and bathroom facilities to ensure that custodial staff are able to understand how disease transmission occurs and health and safety protocols including all instruction labels and understand safe and appropriate use. This might require that instructional materials and training be provided as graphics / photos and in other languages. The WRC has developed products in this regard and can be adapted for use for other sanitation systems.

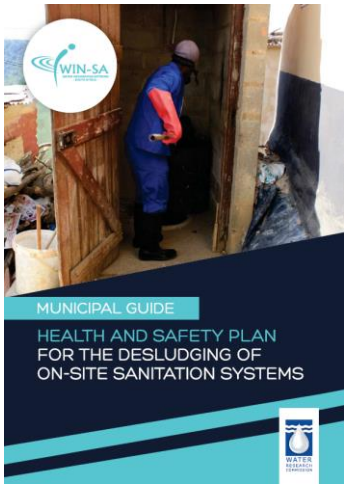

Figure 3. An example of health and safety plan that can be adapted for other sanitation systems.

Appropriate waste handling and disposal

The building's and/or municipal standard procedures for handling and disposal of waste. Limit contact with surfaces by using no-touch waste bins which are easily accessible and easy to use. Disposable items that were used to clean surfaces and items should be placed in the trash immediately after use. If there is a suspected case of COVID-19, more stringent and regular emptying should be undertaken. Avoid touching used tissues and other waste when emptying waste bins. Appropriate handwashing protocols should be followed after emptying waste baskets and touching used tissues and similar waste.

Case examples unique To South Africa

Home flush toilets

The CDC has provided the following the guidelines for bathrooms that have infected individuals (Centre for Disease Prevention and Control, 2020):

- In the bathroom dedicated for an ill person: consider reducing cleaning frequency to as-needed (e.g., soiled items and surfaces) to avoid unnecessary contact with the ill person.
- As much as possible, an ill person should stay in a specific room and away from other people in their home, following home care guidance.

- The caregiver can provide personal cleaning supplies for an ill person's room and bathroom, unless the room is occupied by child or another person for whom such supplies would not be appropriate.These supplies include tissues, paper towels, cleaners and EPA-registered disinfectants
- If a separate bathroom is not available, the bathroom should be cleaned and disinfected after each use by an ill person. If this is not possible, the caregiver should wait as long as practical after use by an ill person to clean and disinfect the high-touch surfaces.
- Wear disposable gloves when cleaning and disinfecting surfaces. Gloves should be discarded after each cleaning. If reusable gloves are used, those gloves should be dedicated for cleaning and disinfection of surfaces for COVID-19 and should not be used for other purposes. Consult the manufacturer's instructions for cleaning and disinfection products used. Clean hands immediately after gloves are removed.
- If surfaces are dirty, they should be cleaned using a detergent or soap and water prior to disinfection.
- For disinfection, diluted household bleach solutions, alcohol solutions with at least 70% alcohol, and most common EPA-registered household disinfectants should be effective.
- Launder items as appropriate in accordance with the manufacturer's instructions. If possible, launder items using the warmest appropriate water setting for the items and dry items completely.
- Wear disposable gloves when handling dirty laundry from an ill person and then discard after each use. If using reusable gloves, those gloves should be dedicated for cleaning and disinfection of surfaces for COVID-19 and should not be used for other household purposes. Clean hands immediately after gloves are removed.
    - If no gloves are used when handling dirty laundry, be sure to wash hands afterwards.
    - If possible, do not shake dirty laundry. This will minimise the possibility of dispersing virus through the air.
    - Launder items as appropriate in accordance with the manufacturer's instructions. If possible, launder items using the warmest appropriate water setting for the items and dry items completely. Dirty laundry from an ill person can be washed with other people's items.
    - Clean and disinfect clothes hampers according to guidance above for surfaces. If possible, consider placing a bag liner that is either disposable (can be thrown away) or can be laundered.
- Follow appropriate handwashing protocols.

For more information, see the CDC website: https://www.cdc.gov/coronavirus/2019-ncov/prepare/cleaning-disinfection.html

Pit latrine technologies

There is a significant proportion of the South African population that rely on latrine technologies. The pedestal is often plastic and thus COVID-19 can remain on the surface for a few days if the toilet is not cleaned properly. It is recommended that diluted Jik (or other

sodium hypochloride solution) be used to clean door handles and surfaces on a routine basis. For single households without any infected individuals, an after-every-use may not be required. However, with an infected household member, after-every-use will be necessary. Heavily soiled toilet may need a cleaning procedure before disinfection. For communal latrines, especially with a larger number of users, would require disinfection and associated protocols after-every-use. Solid disposal – such as cleaning clothes – should not be discarded into the latrine unless there is no alternative solid waste disposal system in place. For communal systems, a waste handling and disposal protocol and plan should be in place.

Communal ablution blocks - flushing

Key to reducing disease transmission is to have an appropriate management protocol in place. This would include cleaning schedules, updating training needs and PPE provision for cleaners, cleaning, health and safety protocols that includes use of chemicals, health checks, monitoring of cleaning procedures, and waste handling and disposal. The WRC resources provided earlier can assist with developing a management protocol and adapted to situation (COVID-19 is highly infectious). A deep clean may be required at the start followed by a specialised cleaning protocol for walls and ceilings.

References

Centre for Disease Prevention and Control. (2020, March 06). *Clean & Disinfect: Interim Recommendations for US Households with Suspected/Confirmed Coronavirus Disease 2019*. Retrieved from https://www.cdc.gov: https://www.cdc.gov/coronavirus/2019-ncov/prepare/cleaning-disinfection.html

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