

Having a hand-washing facility with soap and water in South Africa (SDG 6.2.1), what are the predictive factors?

Tota A Tota,¹ Rethabile J Seutloali,² Bukola G Olutola³

^{1,2,3} School of Engineering, Science and Health, Independent Institute of Education (IIEMSA), South Africa.

³ Corresponding author: bolutola@iiemsa.co.za

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Abstract: According to the sustainable development goal 6, countries are to ensure availability and sustainable management of water and sanitation for all. One of the indicators of the goal is the proportion of population using a hand-washing facility with soap and water i.e., the percentage of people living in households that have a handwashing facility with soap and water available on the premises. As a standard hygiene measure to prevent infections including the new coronavirus, WHO advises the public to practice handwashing with soap and water and published a guideline on proper handwashing techniques. In 2017, 42 countries including South Africa had less than 50% access to basic handwashing facilities (including soap and water) at home. Three years later, in 2020, 44.8% of South Africans were with basic handwashing facilities including soap and water in their homes. Therefore, this study looked at the prevalence of having a handwashing place/facility for households in South Africa in 2022 and the key predictors of having a handwashing place in South African households. Data used were from the 2022 South African General Household Survey, a nationally representative survey. Handwashing with water and soap after defaecation was used as a measure of having facilities for handwashing including water and soap. Descriptive statistics and multivariable logistic regression analysis were used to describe the characteristics of the sample, prevalence, and predictors of handwashing facilities with soaps and water amongst South Africans. Of the 19,351 households who participated in the study, 57.8% (10,801) were male headed households. About 0.3% (n=43) of the households were headed by children from 14-17 years. After defaecation, 34.9% (n=5448) of household members used only water to clean their hands, 3.7% (n=550) clean their hands with hand sanitizer or wet wipes, 0.6% (n=106) did not clean their hands while 60.8% (n=8914) used soap and water to clean their hands on their premises. The older the age of the head of household, the higher the percentage of members of the household who washed their hands with soap and water. Conversely, the poorer the household, the less the percentage of household members who used water and soap to wash their hands after defaecation. The use of any form of flush toilet /water closet, not sharing the toilet with the neighbour, safe waste removal and living in the urban areas were the predictors of handwashing with soap and water. In conclusion, this study showed that the percentage of South Africans with handwashing facilities (including soap and water) increased from 2020 when it was 44.4% to 60.8% in 2022. The predictors highlighted should be the focus for policy makers to further increase the accessibility of the South African population to handwashing facilities.

Key words: Handwashing, SDG 6.2.1, Soap, South Africa, Water.

Introduction

Water, sanitation, and hygiene (WASH) were deemed essential for good health (Wami, 2022). Access to a sufficient quality and quantity of water and sanitation was considered crucial for health and well-being and was expected to be available to all. Consequently, the United Nations General Assembly, through Resolution A/RES/64/292, declared safe and clean drinking water and sanitation a human right essential to the full enjoyment of life and all other human rights. Inadequate sanitation was recognized as a major cause of disease worldwide, attributed to an estimated 280,000 diarrhoeal deaths, and drinking contaminated water was associated with an estimated 502,000 diarrhoeal deaths annually (Wami, 2022). According to Kisaakye, Ndagurwa, and Mushomi

(2021), handwashing with soap or detergents killed germs and had been effective in preventing the occurrence of diarrhoea. Moreover, it was highlighted in health campaigns for fighting pandemics such as cholera and diarrhoea. Various settings, including health centres, schools, commercial areas, refugee settings, prisons, market centres, transport hubs, worship centres, and residential areas, were emphasised as important areas to focus on in the promotion of hand hygiene (UNICEF & WHO 2020).

Ensuring access to clean water, sanitation, and hygiene (WASH) facilities was a fundamental objective outlined in Sustainable Development Goal 6 (SDG 6), emphasising the need for countries to provide sustainable water and sanitation management for all. A crucial indicator of progress towards this goal was the proportion of the population utilising handwashing facilities with soap and water, especially within households. Recognizing the importance of hand hygiene as a preventive measure against infections, including the novel coronavirus, the World Health Organization (WHO) advocated for regular handwashing with soap and water and disseminated guidelines on proper handwashing techniques (WHO, 2020).

Despite its simplicity and effectiveness, encouraging handwashing for disease prevention poses a significant challenge, particularly in settings with limited resources (Bulled et al., 2017). As noted by Wolf, Johnston, Freeman, Ram, Slaymaker, Laurenz, and Prüss-Ustün (2019), the absence of on-site handwashing facilities with soap and water does not guarantee regular handwashing. In situations where the facility is off-site or water and soap need to be fetched, routine handwashing, especially after potential faecal contact or critical times like before preparing food or eating, is less likely to occur. Therefore, this study used washing hands with soap and water after defaecation as a measure of having a facility for handwashing (including water and soap).

South Africa, a nation with diverse cultures and landscapes, plays a crucial role in the global pursuit of Sustainable Development Goal (SDG) 6.2.1. The accessibility of handwashing facilities with soap and water is not only integral to public health but also indicative of broader socio-economic development. Despite concerted efforts and progress, challenges persist in ensuring widespread availability and utilisation of such facilities across the country. Despite global initiatives, disparities in access to basic handwashing facilities persist. In 2017, 42 countries, including South Africa, reported less than 50% access to basic handwashing facilities at home (Amuakwa-Mensah, 2021). In 2020, although South Africa experienced a modest increase to 44.8%, a significant gap remained.

Therefore, this research looked at the factors that influenced handwashing with soap and water after defaecation in South Africa. By exploring the intricate interplay of social, economic, and environmental variables, this study intends to provide valuable insights that can guide policymaking, drive targeted interventions, and ultimately advance South Africa towards achieving SDG 6. Within the pursuit of SDG 6.2.1, which strives for universal access to sufficient and equitable sanitation and hygiene, particular emphasis is placed on the availability of handwashing facilities with soap and water.

Methodology

The sample design for the GHS 2022 was based on the 2013 master sample (MS). The master sample used a two-stage, stratified design with probability-proportional-to-size (PPS) sampling of primary sampling units (PSUs) from within strata, and systematic sampling of dwelling units (DUs) from the sampled PSUs. A self-weighting design at provincial level was used and MS stratification was divided into two levels. Primary stratification was defined by metropolitan and non-metropolitan geographic area type. During secondary stratification, the Census 2001 data were summarised at PSU level. The following variables were used for secondary stratification: household size, education, occupancy status, gender, industry and income. The sample weights were constructed in order to account for the following: the original selection probabilities (design weights), adjustments for PSUs that were sub-sampled or segmented, excluded population from the sampling frame, non-response, weight trimming, and benchmarking to known population estimates from the Demographic Analysis division within Stats SA.

The sampling weights for the data collected from the sampled households were constructed so that the responses could be properly expanded to represent the entire civilian population of South Africa. The design weights, which are the inverse sampling rate (ISR) for the province, are assigned to each of the households in a province. The detailed methods used in ensuring standardized data collection, interviews and consent procedures for the GHS have been previously published (General Household Survey).

Dependent variable

Use of handwashing facilities with soap and water was assessed by the question “After using the toilet, do household members clean their hands using one of the following methods?” and respondents were asked to pick one of the following options: “rinse hands with water”, “wash hands with soap and water”, “clean hands with hand sanitiser or

wet wipes”, “Do not clean hands” and “Do not know”. Following the approach of the SDG 6 recommendation, the options were dichotomised into washing of hands with soap and water and others (rinse hands with water/clean hands with hand sanitizer or wet wipes/do not clean hands/do not know).

Independent Variables

Using the 2022 GHS household data, the age and the gender of the head of household were asked. The age was categorized into 14-17 years, 18-25 years, 26-35 years, 36-45 years, 46-55 years and 56 years and above. Size of the households were categorized into 1-3 family members, 4-7 members and more than 7 members. The wealth of the family was assessed by asking the respondents “Would you say you and your household are at present?”. Options included, “Wealthy”, “Very comfortable”, “Reasonably comfortable”, “Just getting along”, “Poor” and “Very poor”. The participants were asked about the household’s main source of water and the respondents had to choose one of many options. Their responses were dichotomized into piped and non-piped water sources. A question about the type of toilet facility used by the household was also asked. Like the other questions, it had many options which were collapsed into two: (1) Flush toilet type and (2) non-flush toilet type. Other variables include geographical type of the household, distance of water source from dwelling, treatment of water used for drinking, interruption of water supply during the past 12 months and sharing of toilet facility with other households.

Data analysis

The data was analyzed using STATA version 12 (STATA Corp Inc., College Station, TX, USA). Group differences were tested using chi-squares and the t-test for categorical and continuous variables respectively. All statistical tests were two-tailed, and the level of significance was set at $p < 0.05$. A multivariable logistic regression model was used to assess the predictive factors associated with having handwashing facilities with soap and water.

Results

Of the 19, 351 households which participated in the survey, 42.2% (n=8424) had a woman as the head of household. Only 0.3% (n=43) were headed by 14–17-year-old children and 26.6% (n=7096) were headed by people who were 56 years and above. More than 60% of the households had a size of 1-3 members with most of the households situated in the urban areas (69.4%; n=12399). The proportion of household members who washed their hands with soap and water after defaecation was higher than those who did not (56.5% vs. 43.5%). (Table 1).

Table 1: Characteristics of study participants

Characteristics	%(n)
Age of head of households (years)	
14-17	0.30 (43)
18-25	5.7 (795)
26-35	21.6 (3021)
36-45	25.4 (4238)
46-55	20.4 (4158)
56 and above	26.6 (7096)
Gender of head of households	
Male	57.8 (10927)
Female	42.2 (8424)
Wealth status of the households	
Wealthy	0.4 (49)
Very comfortable	3.4 (593)
Reasonably comfortable	18.6 (3371)

Just getting along	51.3 (10055)
Poor	20.3 (4126)
Very poor	6.1 (1154)
Household size	
1-3 members	61.7 (11347)
4-7 members	34.2 (6963)
More than 7 members	4.1 (1041)
Geography location of the household	
Urban	69.4 (12399)
Traditional	26.2 (6252)
Farms	4.4 (700)
Number of less than 5-year-old children in the household	
None	73.2 (14045)
1-2	25.5 (5006)
3 or more	1.3 (300)
Water interruption during the past 12 months in the household	
Yes	43.8 (8803)
No	36.1 (6269)
Not applicable	20.1 (4279)
Washing of hands with soap and water after defaecation	
Yes	56.5 (10550)
No	43.5 (8598)
Distance of water source from the dwelling	
On premises	80.0 (15049)
Off premises	20.0 (4266)
Treatment of drinking water	
Yes, always	9.6 (1841)
Yes, sometimes	8.0 (1689)
No	82.4 (15820)
Source of drinking water	
Piped/borehole	91.8 (17341)

Non-piped water	8.2 (2010)
Type of toilet facility	
Flush toilet	66.0 (11752)
Non-flush toilet	34.0 (7521)
Sharing of toilet facility with other households	
Yes	24.4 (3892)
No	75.6 (15270)

In **table 2**, the percentage of households who washed their hands with water and soap after defaecation was highest in a household with heads of households who were 56 years and above. The older the head of household, the more the percentage of the households who used water and soap to wash their hands. However, the percentage of households who did handwashing with both water and soap did not differ with the gender of the head of household. More people from households (61%; n=7424) in urban areas did handwashing with soap and water than households in either the traditional locations (46%; n=2825) or farms settlements (46.8%; n=301), $p<0.001$). Also, more households with water source on the premises had more people who washed their hands with water and soap after defaecation than those with water sources off the premises (60.9% vs. 38.7%; $p<0.001$). Depending on the type of water source, those with piped borne water or borehole had more people who washed with their hands with soap and water than those without piped borne water or borehole (57.9% vs. 40.9%; $p<0.001$).

Table 2: Prevalence of handwashing with water and soap on and off premises

Characteristics	%(n)	P-value
Age of head of households (years)		<0.0001
14-17	38.2 (16)	
18-25	46.6 (350)	
26-35	51.8 (1503)	
36-45	56.0 (2270)	
46-55	60.0 (2367)	
56 and above	60.5 (40.4)	
Gender of head of households		0.670
Male	56.4 (5976)	
Female	56.7 (4574)	
Wealth status of the households		<0.0001
Wealthy	71.5 (33)	
Very comfortable	72.5 (406)	
Reasonably comfortable	73.9 (2361)	
Just getting along	55.9 (5520)	

Poor	46.0 (1852)	
Very poor	32.8 (377)	
Household size		<0.0001
1-3 members	55.4 (6110)	
4-7 members	59.4 (3945)	
More than 7 members	49.1 (495)	
Geography location of the household		<0.0001
Urban	61.0 (7424)	
Traditional	46.0 (2825)	
Farms	46.8 (301)	
Number of less than 5-year-old children in the household		<0.001
None	57.4 (7791)	
1-2	54.7 (2625)	
3 or more	45.7 (134)	
Water interruption during the past 12 months in the household		<0.0001
Yes	59.3 (5062)	
No	58.9 (3594)	
Not applicable	45.9 (1894)	
Distance of water source from the dwelling		<0.0001
On premises	60.9 (8904)	
Off premises	38.7 (1636)	
Treatment of drinking water		<0.0001
Yes, always	72.1 (1290)	
Yes, sometimes	64.7 (1070)	
No	53.9 (8190)	
Source of drinking water		<0.0001
Piped/borehole	57.9 (9743)	
Non-piped water	40.9 (807)	
Type of toilet facility		<0.0001

Flush toilet	65.4 (7591)	
Non-flush toilet	38.9 (2931)	
Sharing of toilet facility with other households		<0.001
Yes	43.8 (1710)	
No	60.6 (8840)	
Refuse removal		<0.0001
Safe refuse removal	65.0 (7142)	
Unsafe refuse removal	41.8 (3359)	

In multivariable logistic regression, households with more than seven members were less likely to wash their hands with water soap after defaecation compared to those with one to three members (AOR: 0.85; 95% Conf. Interval: 0.72-0.99). Households without any type of flush toilet were less likely to use handwashing with soaps and water when compared to those with flush toilet facilities (AOR: 0.43; 95% Conf. Interval: 0.36-0.51). Also, sharing of toilets with other households is associated with the use of handwashing with soaps and water after defaecation. (**Table 3**).

Table 3: Factors associated with having handwashing facilities with soap and water.

Characteristics	AOR (95% Conf. Interval)	p-value
Wealth status of the households		
Wealthy	1.0	
Very comfortable	1.02 (0.49-2.14)	0.940
Reasonably comfortable	1.22 (0.58-2.56)	0.597
Just getting along	0.69 (0.38-1.45)	0.329
Poor	0.58 (0.27-1.22)	0.150
Very poor	0.36 (0.17-0.77)	0.009
Household size		
1-3 members	1.0	
4-7 members	1.05 (0.98-1.14)	0.184
More than 7 members	0.85 (0.72-0.99)	0.041
Geography location of the household		
Urban	1.0	
Traditional	1.48 (1.19-1.83)	<0.001
Farms	1.09 (0.72-0.95)	0.583
Water interruption during the past 12 months in the household		
Yes	1.0	

No	0.91 (0.81-1.01)	0.085
Not Applicable	0.83 (0.72-0.95)	0.007
Treatment of drinking water		
Yes, always	1.0	
Yes, sometimes	0.94 (0.76-1.15)	0.535
No	0.66 (0.55-0.78)	<0.001
Type of toilet facility		
Flush toilet	1.0	
Non-flush toilet	0.43 (0.36-0.51)	<0.001
Sharing of toilet facility with other households		
Yes	1.0	
No	1.95 (1.73-2.20)	<0.001
Refuse Removal		
Safe	1.0	
Unsafe	0.62 (0.52-0.73)	<0.001

Discussion

This study showed that the wealth status of a household, household size, geographical location of a household, water interruption during the past 12 months in the household, treatment of drinking water by the household, type of water facility, sharing of toilet facility with other households and safe refuse removal were factors associated with the handwashing with water and soap after defaecation in South Africa. To stop the transmission of infectious diseases, hand cleanliness is a vital component of public health. Achieving Sustainable Development Goal (SDG) 6.2.1, which calls for providing a handwashing station with soap and water, is essential to guaranteeing the population's wellbeing in the context of South Africa.

According to this study, households with more than seven family members were more likely to have people who wash their hands with water and soap compared to those with one to three members. Larger families may face challenges in allocating resources, including space and finances, for the construction and maintenance of hand-washing facilities (Murei, 2022). Limited resources may lead to prioritisation of essential needs over hygiene facilities, impacting the likelihood of having a dedicated hand-washing facility with soap and water (Mbakaya, Kalembo, & Zgambo, 2020). Larger families might find it challenging to educate all members consistently about the importance of hand hygiene. The availability of infrastructure, such as plumbing and water supply, may affect the feasibility of installing hand-washing facilities in larger households (Eichelberger, Hickel, & Thomas, 2020). Cultural norms and practices within larger families may influence the emphasis placed on hygiene and the adoption of modern hand-washing facilities (Shaikh, 2020). Socioeconomic status can be a key determinant. Larger families with lower socioeconomic status may face more significant challenges in providing and maintaining adequate hand-washing facilities (Kisaakye, Ndagurwa & Mushomi, 2021). South Africa is a water scarce country and there have been instances where households have had dry taps for many days or weeks. This study found no statistically significant difference between households that have had water interruptions in the 12 months preceding this 2022 survey and those with no interruption with regard with handwashing with soap and water. However, those who did not have access to reticulated water were less likely to do their handwashing with soap and water. Infrequent access to water can cause people to wash their hands less often or to switch to less efficient techniques (Hillier, 2020). Communities are more susceptible to infectious diseases as a result of poor hand hygiene, which can help spread a variety of infections.

The findings suggest that safe restrooms such as the use of flushable toilet or water closets are essential for encouraging handwashing with soap and water, which improves public health and hygiene. A supply of clean water is usually

available at safe lavatory facilities, which is necessary for doing a thorough handwashing. Even in leading African economies like South Africa, many communities still rely on the bucket system for sanitation, and sustainable sanitation is intricately linked to water issues. Nhamo, Nhemachena, and Nhamo (2019) highlight the water–sanitation–hygiene (WASH) link as crucial for addressing SDGs, especially SDG 6. South Africa, like many nations, faces challenges in water, sanitation, and hygiene, and understanding predictive factors influencing access to proper handwashing facilities is vital for designing effective interventions. Hand hygiene is fundamental in preventing the spread of infectious diseases and promoting public health. The availability of handwashing facilities, along with soap and water use, is a basic yet powerful measure in this context. However, achieving widespread access to such facilities remains a complex challenge, particularly in regions with diverse socio-economic landscapes.

A steady supply of water guarantees that people can wash their hands well, eliminating bacteria and grime (Suen, So, Yeung, Lo and Lam (2019). An essential step in halting the spread of faecal-oral and waterborne illnesses is regular hand washing. Diseases including diarrhoea, cholera, and other gastrointestinal infections are spread by inadequate sanitation and poor hand hygiene (Brown, Cairncross & Ensink, 2013). Access to water and soap, along with secure restrooms, contribute to severing the chain of disease transmission. People are more likely to adopt better hygiene habits when there are secure restrooms with handwashing stations (WHO, 2020).

Handwashing stations and soap dispensers are examples of amenities that can be found in safe restrooms. Having soap on hand improves the efficacy of handwashing by eliminating and dissolving bacteria from the skin. The general health of the community is enhanced by everyone using secure restrooms and washing their hands properly. In heavily crowded places where infections can spread quickly, this is especially crucial.

The accessibility and cleanliness of restrooms might be impacted by households sharing toilets. According to Tumwebaze and Mosler (2014), in urban slums, shared restrooms are a common thing, but for users to enjoy them, they must be kept and cleaned. This current study showed that sharing of toilet with other households could negatively affect handwashing with soaps and water after defaecation. Given that good handwashing facilities are frequently seen as essential elements of overall sanitation, the availability of private, well-maintained restrooms are important. In locations where there are households with low income, supplies for personal cleanliness may be scarce, and shared restrooms may be more prevalent. Therefore, infrastructure related to sanitation might be impacted by urbanisation. Previous study suggest that sanitation is essential for health and happiness, but supplying safe, inexpensive, and effective toilets that remain sustainable is becoming more and more difficult for cities of all sizes (Andersson, Dickin & Rosemarin, 2016). Meanwhile, this study showed that households in traditional South African settlements were more likely to have members washed their hands with water and soap compared to the urban settlers. The perceived significance of hand washing, and other hygiene practices may be influenced by cultural norms and practises in these traditional settings (Odo and Mekonnen, 2021).

Ineffective waste management can promote the growth of viruses, bacteria, and other diseases. Thus, there may be a higher chance of contamination for handwashing stations. The presence of hand-washing facilities and other enhanced sanitation practices are more common in communities with effective waste collection systems. This is because a hygienic atmosphere promotes a culture of cleanliness, highlighting the significance of hand washing following different activities.

This study is not without its limitations. The outcome variable used handwashing with soap and water after defaecation as a measure of having handwash facilities. It did not necessarily mean that the respondents had the facilities. Also, the study could not establish causation and temporality because of its cross-sectional nature. However, the strength of the study lies in its use of nationally representative data.

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