FREQUENCY OF HANDWASHING POST-COVID-19 PANDEMIC AND REPORT OF DIARRHOEAL ILLNESSES AMONG A SAMPLE OF NIGERIANS

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Abstract

Background: Adequate frequency of handwashing is one of the non-curative interventions recommended to prevent any diarrhoea-related illnesses. This study investigated frequency of handwashing post-COVID-19 pandemic, and report of diarrhoeal illnesses among a sample of Nigerians with an intent to encourage handwashing to avert diarrhoea-related illnesses. Methodology: This study used a cross-sectional research design. The population of this study was 224,818,168, while the accessible population was 9813, yielding a sample size of 367. A self-developed questionnaire with three sections was used in this study. Four experts validated the instrument, and a reliability index of 0.82 was obtained using the split-half method of reliability. **Results:** The average age of the respondents in the total approach was 28 ± 5 years of age as the young Nigerians (12-45 years) and 58 ± 0 years of age as the old Nigerians (46-70 years). The findings revealed that: 199 (54.22%) of the respondents were males 168 (45.78%) were females, 13 (3.54%) of them had no formal education, 91 (24.80%) had primary education, 203 (55.31%) had their secondary education, and 60 (16.35%) of them had tertiary education. This study's findings further revealed a poor frequency of handwashing among a sample of Nigerians post-COVID-19 pandemic, and it was inferentially significant (x=1.54: p = 0.001). There was a high level of diarrhoeal illnesses among a sample of Nigerians post-COVID-19 pandemic, and they significantly suffered diarrhoeal illnesses (x=1.53: p = 0.001). The descriptive proofs showed there was a gender difference in the frequency of handwashing, and diarrhoeal illnesses, but the hypothesis test showed the gender difference was not significant both in the frequency of handwashing, and diarrhoeal illnesses (p = 0.424 & p = 0.300) respectively. Conclusion and Recommendations: It was concluded that there was a poor frequency of handwashing, and a high level of diarrhoeal illnesses among a sample of Nigerians as gender did not produce much difference in the frequency of handwashing and diarrhoeal illnesses investigated. It is recommended among others that Nigerians should improve their daily frequency of handwashing to the recommended 6-10 times daily.

Keywords: frequency, handwashing, post, COVID-19, Pandemic, Diarrhoeal illnesses.

Introduction

Frequency of handwashing has long been accepted as the standard, supporting hand hygiene and protecting public health against pollutants (impurities) and pathogens causing diseases. It is a compulsion and desire to wash hands habitually to avert diseases or infections associated with dirty hands. In general, handwashing is one of the greatest ways to prevent illnesses for oneself and his family as it is an act of washing one's hands with any liquid, especially water, and either soap or no soap to get rid of dirt or microorganisms (Centers for Disease Control and Prevention (CDC), 2022; Paul, 2023). In this study, handwashing is social-centred and is a healthy habit that involves washing one's hands with water and any liquid or powdered soap to get rid of dirt that could be contaminated from direct or indirect contact with other people, animals, or public spaces like restrooms.

It is useful to note that handwashing has potential social, surgical, and antiseptic applications. According to Rogers (2021), there are three different types of handwashing practices: surgical handwashing (the most advanced type, performed before and after a surgical procedure or medical operation as the washing reaches the elbow), antiseptic handwashing (performed in a medical setting before and after seeing a patient), and social handwashing (performed before and after eating foods and coming into contact with others, including objects and animals in a setting). Martin (2023), noted that the materials for any type of handwashing could include soap or detergent, warm running water, paper towels, alcohol, antiseptic cleaner, fingernail brush, and plastic cuticle sticks. However, the frequency of handwashing is the focus of this study.

People who work with animals, food, children, and the elderly wash their hands more frequently than those who work in offices, dispelling no myth but affirming that people's

occupation determines how often they wash their hands (Medical Associates of Northwest Arkansas, 2023). Before the COVID-19 pandemic which is 2019 version of global acute virus attack, WINNS Services (2018), maintained that 6–11 times a day of handwashing was necessary to prevent viral infections. Given this, the frequency of handwashing would have been debatable, but University College, London study, as reported by Westbrook (2020) and Parsons (2020), found that handwashing 6-10 times a day was the best way to reduce the risk of acquiring any diarrhoeal infection. Thus, the ideal frequency of handwashing is 6-10 times per day, has automatically formed the basis of all arguments and inferences in this study. This will halt the spread of COVID-19 whose modes of transmission are the droplets from an infected person, direct contact, and perhaps feaco-oral pathway. Though, Zhang, Chen, Zhu, Shu, Wang, Song, Song, Zhen, Feng, Wu, Xu, and Xu (2020), stated that till date only one study had found COVID-19 virus from a single stool specimen. Meanwhile, faeco-oral route via ingestion of contaminated food or water is the sole mode of the typhoid fever transmission Clinic Barcelona (2025).

Despite differences in the mode of disease transmission, the COVID-19 virus and diarrhoeal diseases such as typhoid appear to have a similar preventive strategy. Thus, "handwashing" is their go-to prophylactic technique. Handwashing is the fundamental health and hygiene practice to prevent COVID-19 infection and faecal-oral/diarrhoeal diseases, according to Martinez and Iftikhar (2020) and the CDC (2023). According to Felson (2021) and Mandal (2023), a complete handwash after using the restroom, interacting with others, and before preparing and eating meals can help reduce diarrhoeal illnesses. A similar method of transmission known as faecal-oral transmission is shared by the majority of bacteria (pathogens) that cause diarrhoea (CDC, 2019).

So, the pathogens are either directly or indirectly brought into contact with the mouth by objects, foods, drinks, handshakes, and faeces. It is crucial to understand from an operational standpoint that handwashing is what breaks the chain of transmission of diseases from the hands to the mouth mode. It is plausible and observed that individuals took handwashing very seriously during the COVID-19 pandemic and then regressed, which resulted in diarrhoeal diseases among people especially Nigerians. According to Cleveland Clinic (2023), diarrhoea is defined as having loose or watery faeces at least three times a day, or more frequently than usual for a person without an allergy. Diarrhoea may be acute, moderate, or chronic; where acute diarrhoea is a sudden condition of passing loose and watery stool (with or without blood) up to three times in a day for less than two weeks (Medicine Sans Frontieres, 2025). Moderate (mild) diarrhoea is passing loose or watery stool at least six times in a day, while chronic diarrhoea is passing loose stools repeatedly or often for more than four weeks (Cleveland Clinic, 2023; Ignite Healthwise, LLC Staff, 2024).

But the warning sign is that, if care is not given, it can cause serious health problems such as electrolyte imbalance, kidney failure, dehydration, organ damage, and even death with significant fluid loss and dehydration in a short amount of time (Cleveland Clinic, 2023). Diarrhoea is a common sign of gastrointestinal tract infections including typhoid fever, worm infestation and dysentery. Gastrointestinal tract diseases are caused by bacteria, viruses, and even protozoa. An increase in heart rate, dark and decreased urine production, irritability, nausea, headaches, and dizziness are some of the unique symptoms that accompany diarrhoea as a symptom of a disease (Cleveland Clinic, 2023; Medicine Sans Frontieres, 2025).

It is important to note that the degree (frequency) of handwashing practices and report of diarrhoeal illnesses can differ substantially throughout the world, within a country, and even

within a county. Zeduri, Sgueglia, Vigezzi, Ferrara, Lanave, Galvi, Abela, Novelli, Muzzi, and Odone (2022), in Europe, whose study was on hospital hand hygiene after COVID-19: has the pandemic heightened healthcare workers' awareness? Found that, among other places, general medicine wards had the lowest handwashing adherence rate at just 29 percent. Lopez-Ouintero, Freeman, and Neumark (2009), who studied hand washing among school children in Bogota, Colombia, found that there was poor handwashing behaviour among the respondents. The World Bank (2020), found that over three billion people worldwide did not practice adequate daily handwashing for some reasons such as lack of clean water. According to the findings of a study conducted in Turkey by Rahmet, Imran, and Firdevs (2020), adequate frequency of handwashing was observed and the respondents agreed that it was an efficient way to stop the spread of COVID-19, and all other diarrhoeal illnesses in a community. Finding of a study conducted in Ethiopia by Tariuwa, Metadel, and Solomon (2022), revealed a poor handwashing practices among the hair salon employees. Emmanuel, Stanley, Moses, Evans, Dooshima, and Ephraim (2023), in Ghana, whose study was on decline of handwashing, found that only 64 out of 279 respondents consistently practiced proper handwashing, while the rest declined proper handwashing.

Finding of a study in Urban New Delhi, India by Khan, Chakraborty, Brown, Sultana, Colon, Toor, Upreti, and Sen (2021), revealed that the respondents did not observe a high frequency of handwashing. Finding of a study in Uganda by Dennis (2020), revealed a very high frequency of handwashing rates among Ugandans. The finding of Tariuwa *et al.* (2022), further revealed that male gender observed a high frequency of handwashing than the female gender in their investigation.

According to the finding of Apanga, Lettor, and Akunvane (2020), in Ghana, only 49.50 percent of the participants regularly washed their hands or sanitized them using alcohol-based hand sanitizers to prevent diarrhoeal illnesses. According to the finding of a different independent study by Wolf, Hubbard, Brauer, Ambelu, Arnold, Bain, Bauza, Brown, Caruso, Clasen, Colford-Jr, Freeman, Gordon, Johnston, Mertens, Pruss-Ustun, Ross, Stanaway, Zhao, Cumming, and Biosson (2022), often washing one's hands with soap will reduce his risk of diarrhoea by 30 percent. Hossain, Islam, Khokon, and Islam (2021), who studied the assessment of factors associated with effective handwashing facilities in Bangladesh, discovered that approximately 74.22 percent of Bangladeshi households frequently used their handwash facilities to combat diarrhoeal pathogens.

Two independent studies from distinct locations in South Africa and one from Senegal mutually revealed that diarrhoea-related illnesses were prevalent with some disparities in the areas (Thiam, Diène, Fuhrimann, Winler, Sy, Ndione, Schindler, Vounatsou, Utzinger, Faye & Cisse, 2017: Wong, Von-Mollendorf, Martinson, Norris, Tempia, Walaza, Variava, Mcmorrow, Madhi, Cohen & Cohen, 2018: Johnstone, Page, Thomas, Madhi, Mutevedzi, Myburgh, Herrera, & Groome, 2021). In the same vein, the United Nations Children's Fund (UNICEF) (2022), in her studies across the globe found that deaths attributed to diarrhoea among people particularly children under five years are more alarming in South Asia and Sub-Saharan Africa than others, and it reduced the world population by 1300 each day and 484000 in a year as of 2019.

The Centers for Disease Control and Prevention (2023), found that diarrhoeal infections roughly affected 1.8 million individuals worldwide. The findings of Singh, Shah, Singh, Saha, Das, Datt, and Gupta (2022) in India, revealed that a significant number of agents responsible for diarrhoea were discovered in the participants, including 18 percent enteropathogenic Escherichia

coli, 8 percent coli-enterotoxigenic Escherichia coli, 4 percent coli-enteroaggregative Escherichia coli, 7 percent mixed infections, 10 percent cryptosporidium, and 6 percent rotavirus. The participants had severe gastroenteritis.

In Ile-Ife, Nigeria, a study conducted by Omotade, Babalola, Anyabolu, and Japhet (2023), revealed that 63 (60.6%) of the participants had gastroenteritis. Their finding further showed that due to gastroenteritis, 22 percent of the subjects had a mono-infection with rotavirus and 45 percent had numerous bacterial infections. The finding of Bejide, Odebode, Ogunbosi, Adekanmbi, Akande, Ilori, Ogunleye, Nwachukwu, Grey-Areben, Akande, Okeke (2023), who investigated diarrhoeal pathogens in the stools of children living with HIV in Ibadan, Nigeria, showed that the subjects experienced severe diarrhoeal illnesses due to the discovery of 18 out of 65 (27.70%) enteroaggregative Escherichia coli, 10 (15.40%) enteroinvasive Escherichia coli, 8 (12.30%) Cryptosporidium parvum, and 7 (10.80%) cyclospora cayetanensis in the participants. Africa, more specifically the West African region, is ideally positioned to have routine handwashing because it is a tropical region where diseases like cholera and typhoid are common. Given this, Nigerians should fare better than the previously mentioned Bangladesh in terms of handwashing against diarrhoeal infections because all levels of government, as well as private individuals, have made significant contributions in this area, including providing funds, resources, and staff to help the populace learn how to prevent and control diarrhoeal illnesses through proper and frequent handwashing.

For instance, Federal Capital Territory Abuja, Nigeria (2021), reported that during the COVID-19 outbreak, the Federal Government of Nigeria developed a road map for widespread frequent handwashing for the nation to prevent any diarrhoeal infection. Improvements to the budget are among the strategies. Other strategies include finance, institutional arrangements,

coordination, policies, strategies & frameworks, technical competence, capacity development, behaviour change, funding/support grants, and promotion/incentives. Ameh (2022), reported that the Nigerian Federal Government (FG) had collaborated with the National Task Group on Sanitation (NTGS) and other relevant parties to raise awareness of the importance of frequent handwashing as a fundamental measure for everyone's health and hygiene.

Notwithstanding efforts and donations from various organizations, the West African regions especially Nigeria continue to exhibit poor handwashing and suffer from a variety of preventable diarrhoeal illnesses. It seems that Abuja, in particular, in Nigeria is not exempt from this terrible condition. For instance, Jiwok, Adebowale, Wilson, Kancherla, and Umeokonkwo (2021), whose study was carried out in Nigeria asserted that the time series forecast indicated 16,256, 17,645, and 19,034 diarrhoeal illnesses in the years 2018, 2019, and 2020, respectively. Additionally, the researchers noticed that a large number of Nigerians were seeking treatment in medical facilities because of diarrhea-related illnesses such as typhoid, dysentery, and warm infestations post-COVID-19 pandemic. It is against this background that this study examined frequency of handwashing post-COVID-19 pandemic and report of diarrhoeal illnesses among a sample of Nigerians.

Research Questions

- 1. What is the level of frequency of handwashing among a sample of Nigerians post-COVID-19 pandemic?
- 2. What is the level of diarrhoeal illnesses Nigerians suffer after the COVID-19 pandemic?
- 3. What is the gender difference in the level of frequency of handwashing among a sample of Nigerians post-COVID-19 pandemic?

4. Is there gender difference in the diarrhoeal illnesses among a sample of Nigerians post-COVID-19 pandemic?

Hypotheses

H₀₁. Poor frequency of handwashing post-COVID-19 pandemic is not significant among a sample of Nigerians.

H₀₂. Nigerians have not significantly suffered diarrhoeal illnesses post-COVID-19 pandemic.

 H_{03} . There is no significant gender difference in the level of frequency of handwashing among a sample of Nigerians post-COVID-19 pandemic.

 H_{04} . There is no significant gender difference in the diarrhoeal illnesses among a sample of Nigerians post-COVID-19 pandemic.

Methodology

A cross-sectional research design was used in this study. The target population of this study was 224,818,168 Nigerians as of 9th September, 2023 (sourced: Worldometer, 2023), while Abuja, Nigeria formed that first accessible population whose population was 3,839,646 according to the World Population Review (2023), and the Wuse Market, Abuja Nigeria formed the second accessible population which was 9813 Nigerians as of 8th September, 2023 in which the sample of this study was drawn. The sample size of this study was 367 respondents, using the Research Advisors (2006) Sample Size Table which recommended that the population of a study that is up to 7500-10000 could use a sample size of 365-370. A multi-stage sampling procedure was employed in this study.

Stage 1. A homogenous purposive sampling technique was used to select Federal Capital Territory (FCT) Abuja, Nigeria into this study and exclude other States from this study. The

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reason is that Abuja is the capital city of Nigeria where every State of the Federation is expected to be represented.

Stage 2. A total purposive sampling technique was used to include markets and exclude all other social places; that is places expected to meet a substantial number of persons at the same time from this study. The reason is that markets connote less anxiety (worry and fear) than schools and hospitals among others.

Stage 3. The same total purposive sampling technique was used to include Wuse Market, Abuja, Nigeria in this study and exclude others from this study. The reason is that it is the biggest market in Abuja, and the expectation is that all States of the Federation could be well represented.

Stage 4. An accidental sampling technique was used to reach out to the respondents hence their movement could not be stereotyped; they (buyers) were not stationed except for business owners.

A self-developed questionnaire was used. The instrument has sections A-C. Section A sought demographic information of the respondents. Section B sought information on the frequency of handwashing on a three-point Likert scale, while section C sought information on diarrhoeal illnesses among the respondents. For the easy analysis of the data generated, a criterion mean (x) of 3+2+13 = 2.00 was set for the decision rule for section B. A score of less than 2.00 was considered a poor frequency of handwashing, while a score equal to or above 2.00 was considered an adequate frequency of handwashing. Furthermore, in section C, a criterion mean (x) of 2+12 = 1.50 was set for the decision rule. Thus, a score that is less than 1.50; the mid-point was regarded as a low diarrhoeal illnesses, and a score equal to or above the mid-point was considered a high diarrhoeal illnesses among a sample of Nigerians. In testing the

hypotheses, both frequency of handwashing and diarrhoeal illnesses were considered to be significant and not significant when their p-values were less than, and equal to or above 0.05 level of significance respectively. The instrument for data collection was validated by three experts from the field of health. A reliability index of 0.81 was obtained, using the split-half method of reliability after a pilot test at the Zuba roadside market. The researchers used 10 business owners (7 males and 3 females), irrespective of distinctions in the language in the Wuse Market as the research assistants who of course, helped the researchers to administer the copies of the questionnaire, did follow-up, and collected the duly filled copies within four weeks.

Data analysis, frequency counts and percentages were used to display the demographic information of the respondents. Mean, and standard deviation were used to answer research questions 1 and 2. Frequency counts and percentages were used to answer research questions 3 and 4. One sample t-test was used to test hypotheses 1 and 2. Two sample (independent) t-test was used to test hypotheses 3 and 4, and all hypotheses were tested at 0.05 level of significance.

Results

S/n	Variables	Frequency	Percentage (%)
1.	Age		
i	. Young age (12-45 years old); 28 ± 5	172	46.87
1	D. Old age (46-70 years old); 58 ± 0	195	53.13
	Total	367	100.00
2.	Gender		
6	. Male	199	54.22
1	o. Female	168	45.78
	Total	367	100.00
3.	Educational status		
5	. No formal education	13	3.54
1	Primary education	91	24.80
(. Secondary education	203	55.31
(I. Tertiary education	60	16.35
	Total	367	100.00

The findings of this study were organized and presented in Tables 1-9. **Table 1. The demographic data of the respondents**

Table 1 shows there were 172 (46.87%) young Nigerians and 192 representing 53.13 percent old Nigerians in this study. It shows that 199 (54.22%) were males and 168 (45.78%) were females. It further shows that only 13 (3.54%) of the respondents had no formal education, 91 (24.80%) had primary education, 203 (55.31%) had secondary education, and 60 (16.35%) of them had tertiary education. Secondary education was the highest followed by primary education because many Nigerians were convinced that there were no jobs for them after tertiary education. This is because many who had a tertiary education were yet to get a job.

 Table 2. Frequency of handwashing among a sample of Nigerians post-COVID-19

 outbreak

			J	Freque	ncy						
S/n	Information on	1-5	times	6-10	times	11	times	and	Ν	х	SD
	handwashing	daily		daily		aboy	ve daily				
1.	I used to wash my hands	295		36		36			367	1.29	0.636
	Total x									1.29	0.636

Table 2 shows that the mean value is less than the criterion mean set for this investigation

(1.29 < 2.00). This implied that there was a poor frequency of handwashing among a sample of

Nigerians post-COVID-19 pandemic.

 Table 3. Level of diarrhoeal illnesses among a sample of Nigerians post-COVID-19 invasion

S/n	Information on diarrhoeal illnesses	Yes	No	N	Х	SD
1.	Have you suffered diarrhoea (a runny stomach) after the global COVID-19 invasion?	199	168	367	1.54	0.499
2.	Do you know anyone or persons who have suffered diarrhoea after the global COVID-19 outbreak in your network?	187	180	367	1.51	0.501
	Total x				1.53	0.5

Table 3 shows that the mean value is greater than the mean value set in this study (1.53)

1.50). This implied that there were high level of diarrhoeal illnesses among a sample of

Nigerians post-COVID-19 pandemic.

S/n	Gender	Poor frequency of	%	Adequate frequency	%	Total	%
		handwashing		of handwashing			
a.	Male	163	55.25	36	50.00	199	54.22
b.	Female	132	44.75	36	50.00	168	45.78
	Total	295	80.38	72	19.62	367	100.00

Table 4 shows that the males indicated lower frequency of handwashing than the females

(163 [55.25%]> 132 [44.75%]). Meanwhile, male and female Nigerians were equal in the

adequate frequency of handwashing post-COVID-19 outbreak (36 [50.00% = 36 [50.00%).

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S/n	Gender	Low	diarrhoeal	%	High	diarrhoeal	%	Total	%
		illnesses			illnesses				
a.	Male	71		54.20	128		54.24	199	54.22
b.	Female	60		45.80	108		45.76	168	45.78
	Total	131		35.69	236		64.31	367	100.00

Table 5. Gender differences in diarrhoeal illnesses post-COVID-19 outbreak

Table 5 shows that the male indicated more both in the low and high diarrhoeal illnesses

than the female (71 [54.20%: 128 [54.24%]> 60 [45.80%]:108 [45.76%]).

Table 0. Summary	of t-test	i analysis of	n poor na	nuwashing	post-COVI	19 pa	indenne
Variable	Ν	Mean	SD	SEM	Т	Df	p-value
Handwashing	367	1.20	0.398	0.21	57.627	366	0.001
Total	367						

 Table 6. Summary of t-test analysis on poor handwashing post-COVID-19 pandemic

Key: N = Number, SD = Standard Deviation, and SEM Standard Error Mean.

Table 6 shows that the p-value is less than the level of significance set for this study (p = 0.001 < 0.05). This implied that the hypothesis which stated that poor frequency of handwashing post-COVID-19 pandemic was not significant among a sample of Nigerians is rejected. Therefore, poor frequency of handwashing post-COVID-19 pandemic was significant among a sample of Nigerians (p = 0.001).

Table 7.	Summary o	of t-test analy	ysis on	diarrhoeal	illnesses	post	COVID-19	pandemic

Variable	Ν	Mean	SD	SEM	Т	Df	p-value
Diarrhoeal illnesses	367	1.64	0.480	0.025	65.609	366	0.001
Total	367						

Table 7 shows that the p-value is less than the level of significance set for this study (p = 0.001 < 0.05). This implied that the hypothesis which stated that Nigerians had not significantly suffered diarrhoeal illnesses post-COVID-19 pandemic is rejected. So, the Nigerians had significantly suffered diarrhoeal illnesses post-COVID-19 pandemic (p = 0.001).

 Table 8. Summary of t-test analysis on gender difference on handwashing post-COVID-19

 outbreak

Variable	Ν	Mean	SD	SEM	Т	Df	p-value
Male	199	1.18	0.386	0.027	801	365	0.424
Female Total	168 367	1.21	0.412	0.032			

Table 8 shows that the mean value of the female whose number was less is greater than that of the male with a higher number (x =1.21> 1.18). It further shows that the p-value is greater than the level of significance set for this study (p = 0.424> 0.05). Based on this, the hypothesis which stated that there was no significant gender difference in the level of frequency of handwashing among a sample of Nigerians post-COVID-19 pandemic is not rejected. This implied that there was no significant gender difference in the level of frequency of handwashing among a sample of Nigerians post-COVID-19 pandemic (p =0.424).

 Table 9. Summary of t-test analysis on gender difference in the diarrhoeal illnesses post-COVID-19 outbreak

Variable	Ν	Mean	SD	SEM	Т	Df	p-value
Male	199	3.10	0.902	0.064	1.038	365	0.300
Female Total	168 367	3.00	0.848	0.065			

Table 9 shows that the mean value of the male is relatively above the mean value of the female (3.10>3.00). It further shows that the p-value is higher than the level of significance set in this study (p = 0.300 > 0.05). So, the hypothesis that stated that there was no significant gender

difference in the diarrhoeal illnesses among a sample of Nigerians post-COVID-19 pandemic is not rejected. Hence, there was no significant gender difference in the diarrhoeal illnesses among a sample of Nigerians post-COVID-19 pandemic (p = 0.300).

Discussion

The findings of this study revealed pertinent data on levels of handwashing frequency post-COVID-19, which may be utilized to forecast diarrhoeal illnesses and encourage handwashing behaviour among communities to prevent all feaco-oral diseases that are associated with diarrhoea. The finding of this study revealed that there was a poor frequency of handwashing among a sample of Nigerians post-COVID-19 pandemic. (1.29< 2.00). In measuring it inferentially, it revealed that poor frequency of handwashing post-COVID-19 pandemic was significant among a sample of Nigerians (p = 0.001). The researchers opined that this is expected as Nigerians are adept at easing up on preventive measures like frequent handwashing, which were implemented and followed during the COVID-19 pandemic. The regressive handwashing practice may have resulted from localized attitudes towards health campaigns in Nigeria before this study.

Thus, the finding of this study is consistent with the findings of studies by Lopez-Quintero *et al.* (2009), the World Bank (2020), Zeduri *et al.*, Khan *et al.* (2021), (2022), and Tariuwa *et al.* (2022), which revealed lower frequency of handwashing among the participants. Also, it was in an agreement with findings of Emmanuel *et al.* (2023) in Ghana, who found that only 64 out of 279 respondents consistently practiced proper handwashing, with the remaining 120 respondents (95) declining to do so regularly.

The poor frequency of handwashing among a sample of Nigerians post-COVID-19 pandemic this study revealed however, did not agree with that of Dennis (2020), who found that

handwashing rates in Uganda surpassed the 50 percent target set by the 2020 National Development Plan II by an astounding 86 percent in just the last three months. The reason for this contradictory outcome is that Ugandans can keep a positive attitude towards health programmes and initiatives.

The finding of this study showed that there were high diarrhoeal illnesses among a sample of Nigerians post-COVID-19 pandemic, and it was significant (p = 0.001). The researchers attributed this finding (ill condition) to the poor frequency of handwashing habits among Nigerians. Thus, the finding of this study was consistent with the findings of Singh, Shah, Singh, Saha, Das, Datt, and Gupta (2022), Bejide *et al.* (2023), Centers for Disease Control and Prevention (2023) and Omotade *et al.* (2023), which revealed a high prevalence of diarrhoeal infections which had affected roughly 1.8 million individuals worldwide owing to lower frequency of handwashing among communities.

Furthermore, the finding of this study revealed that there was a gender difference in the frequency of handwashing among a sample of Nigerians post-COVID-19 pandemic. However, it was not inferentially significant (p = 0.424). The investigators opined that both male and female respondents were in this surrounding with the same level of experience, and perhaps with the same level of awareness of handwashing which was why their effort could not reach a threshold to produce a significant difference at the testing of the hypothesis. The finding of this study conflicts with the finding of Tariuwa *et al.* (2022), which revealed that there was a significant gender difference in the frequency of handwashing as the female gender was less in the practice than the male gender.

Finally, the finding of this study descriptively revealed that there was a gender difference in diarrhoeal illnesses among a sample of Nigerians, but inferentially, there was no significant

gender difference in the diarrhoeal illnesses among the respondents post-COVID-19 pandemic (p = 0.300). The reason behind this result could be as aforementioned.

Conclusion

By the findings of this study, it was concluded that Nigerians' poor frequency of handwashing practices post-COVID-19 led to the diarrhoeal illnesses that respondents had suffered. However, the poor frequency of handwashing habits and diarrhoeal illnesses reported among Nigerians were not influenced by gender to create a difference.

Recommendations

- There is a need to conduct regular Health Education campaigns on handwashing for Nigerians in all public places such as markets.
- 2. Nigerians should improve their frequency of handwashing up to 6-10 times daily to avert diarrhoeal illnesses.
- 3. The Nigerian males should do more to improve their frequency of handwashing as they wash less in the practice than their female counterparts.
- 4. Nigerian females should do more to prevent diarrhoeal illnesses as they suffer more than their male counterparts

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