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# THE HAND HYGIENE PROTOCOL OBSERVATION UNDER CORONA VIRUS (COVID – 19): A CASE STUDY IN MAMPONG AND OSINO TO ACCESS COMPLIANCE WITH COVID 19 PROTOCOL ON HAND HYGIENE (HH) IN GHANA – WEST AFRICA.

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## ABSTRACT

***Three billion people comprising of 40% of the world's population – do not have a place in their homes to wash their hands with water and soap. Three quarters of those who lack access to water and soap live in the world's poorest countries and are amongst the most vulnerable: children and families living in informal settlements, migrant and refugee camps, or in areas of active conflict and the most affected in this regard. This puts an estimated 1 billion people at immediate risk of COVID-19 simply because they lack basic hand washing facilities hence unable to practice hand hygiene (HH). Hand hygiene practices in our homes, health facilities, work places and in the environment is of utmost importance in fighting against Covid – 19.*** *The 5 Moments for Hand Hygiene approach was designed by the World Health Organization (WHO) to minimize the risk of transmission of microorganisms between a healthcare worker, the patient, and the environment especially during the Covid 19 period. Good hand hygiene results in a reduction of microorganisms on hands and contributes to prevention of healthcare-associated infection and improved patient safety. Pandemics has been occurring and will continue to occur as the world continues to revolve round with Covid – 19 no exception. Hand hygiene became the most first-hand efficient problem solver when such situations arises with the search for medicine (vaccines) to curb such contingencies. Hand hygiene was recommended by WHO in December 2019 as the first point of call in tackling Covid 19 and this is still ongoing but with little efficiency and accuracy in saving lives. This research work therefore sorts to access, investigate, analyze the current hand hygiene practices at Mampong in the Ashanti Region and at Osino in the Eastern Region of Ghana and its environs to see, whether healthcare workers (HCW's), people, patients, hospital clients, students and workers are still adhering to hand hygiene to curb Covid 19. The COVID-19 pandemic is an unadulterated reminder that one of the most effective ways to stop the spread of a virus is simply by hand hygiene. The investigation sorts to find out whether they are making use of good medicated soups, antiseptics, alcohol based handrub (ABHR) and sanitizers with the correct alcohol concentration for the hand hygiene. This research work will be used to make informed decisions by government bodies, private settings, CAWST, NGO's and other stakeholders both locally and internationally. Findings shows that individuals within the study area are still adhering to the WHO guidelines on hand washing and practicing it. Sanitizers with the right alcohol concentration are also being used to buttress hand washing to effectuate Covid – 19 prevention.***

***Keywords:*** *Hand hygiene (HH), Covid -19, health, WHO, Sanitizer, Microorganism, Patients, Pandemic, Mampong, Osino*

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## 1 INTRODUCTION

Access to quality health care for all is a human right and should be enjoyed as such. As clearly recognized by the United Nations (UN) Sustainable Development Goals 3 and 6, it is impossible to succeed in providing good quality health care without clean water and sanitation. Shockingly, many health care facilities (HCF's) still lack water and sanitation hygiene (WASH) and, by default, cannot implement good infection prevention and control (IPC) practices. In 2005, WHO launched the First Global Patient Safety Challenge Clean Care is Safer Care to which 142 countries pledged their commitment, thus allowing to initiate powerful actions to reduce infections occurring during health care delivery through the promotion of IPC measures and improvements in WASH (WHO, 2020). In 2003 and 2010, two monumental acknowledgements related to a safer world through improved hand hygiene were made both within and outside of health care and deemed essential to the realization of all human rights (UNHCHR, 2003). There is the need for the reinforcement of the importance of hand hygiene to reduce the spread of COVID-19 and other communicable diseases - within the context of the pandemic and beyond - through policies, regulation, innovation, private sector engagement, and behaviour change strategies. Calling to action international partners, national governments, the public and private sectors, the civil society and donors and financers to accelerate progress on hand hygiene at the global, national and community levels (WHO, 2020). Hand hygiene has been documented as the easiest and the most efficient method existing in a number of settings to minimize the risk of infection transmission, including healthcare settings, food industry, schools, and other public locations (Kouadri, 2020).

Promotion of improved hand hygiene has been recognised as an important public health measure but it is unclear how much hand hygiene is required to interrupt transmission of diarrhoea pathogens. In particular it has not been conclusively shown whether use of soap is essential to remove pathogens from hands. Recent hygiene promotion campaigns especially in low income settings have not been unanimous in recommending soap use (Ejomot et. al., 2008). A number of studies have compared different hand hygiene methods in hospital settings to access HH policies, psycho determiners, microbiology, infections on the hands and personality in general. In contrast, few studies have been published on the effect of hand hygiene on bacterial contamination of hands in the community. Hoque and colleagues found that a wide variety of hand cleansing means in poor settings (soap, ash, mud) are effective in reducing the contamination with coliform bacteria on hands [UNHCHR, 2003; UNGA, 2010) . In a small randomized trial the same author reported that soap may be more effective than water in reducing the presence of coliform bacteria on hands.

## 2 RELATED WORKS REVIEW ON HAND HYGIENE

### 2.1 Health Care Associated Infections (HCAI's)

Health care associated infections are infections people get while they are receiving health care for another conditions in or outside a health facility. Health associated infections (HAI's) happen in any health care facility, including hospitals, ambulance surgical centers, end – stage renal disease facilities and long – term care facilities. Health care associated infections are a consistent issue for both hospitals patients and health care workers. **Table 1** is a list which

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ranks the most common health care associated infections from highest prevalence to least. This is a research on health care associated infections affecting patients in U. S acute care hospital in 2011. Across 183 hospitals and 11,282 patients, 452 patients had one or more health care associated infections.

**Table 1: Health Care associated infection by percentage**

| Health Care Associated Infection | Percentage (%) of all Health Care Associated Infection |
|---|---|
| 1. Pneumonia | 21.8 |
| 2. Surgical – Site infection | 21.7 |
| 3. Gastrointestinal infection | 17.1 |
| 4. Urinary tract infection | 12.9 |
| 5. Primary bloodstream infection | 9.9 |
| 6. Eye, ear, nose, throat or mouth infection | 5.6 |
| 7. Lower respiratory tract infection | 4.0 |
| 8. Skin and soft – tissue infection | 3.2 |
| 9. Cardiovascular system infection | 1.2 |
| 10. Bone and joint infection | 1.0 |
| 11. Central Nervous System (CNS) infection | 0.8 |
| 12. Reproductive tract infection | 0.6 |
| 13. Systemic infection | 0.2 |

*Source @ 2021 Becker's Healthcare*

HCAI is a major problem for patient safety and its surveillance and prevention must be a first priority for public settings and institutions committed to making health care safer. The impact of HCAI implies prolonged hospital stay, long-term disability, increased resistance of microorganisms to antimicrobials, massive additional financial burden, high costs for patients and their families, and excess deaths (WHO, 2009). Although the risk of acquiring HCAI is universal and pervades every health-care facility and system around the world, the global burden is unknown because of the difficulty of gathering reliable diagnostic data. Overall estimates indicate that more than 1.4 million patients worldwide in developed and developing countries are affected at any time (WAPS, 2005). The magnitude and scope of the HCAI burden worldwide appears to be very important and greatly underestimated. Methods to assess the size and nature of the problem exist and can contribute to correct monitoring and to finding solutions. Nevertheless, these tools need to be simplified and adapted so as to be affordable in settings where resources and data sources are limited (WHO, 2009).

### 2.2 Historical interpretation of Hand Hygiene in Health Care

In the mid-1800s, studies by Ignaz Semmelweis in Vienna, Austria, and Oliver Wendell Holmes in Boston, USA, established that

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hospital-acquired diseases were transmitted via the hands of health care workers (HCWs). In 1847, Semmelweiss was appointed as a house officer in one of the two obstetric clinics at the University of Vienna Allgemeine Krankenhaus (General Hospital) (WHO, 2009). He observed that maternal mortality rates, mostly attributable to puerperal fever, were substantially higher in one clinic compared with the other (16% versus 7%) (Semmelweis et. al., 1861). He also noted that doctors and medical students often went directly to the delivery suite after performing autopsies and had a disagreeable odour on their hands despite hand washing with soap and water before entering the clinic. He hypothesized therefore that "cadaverous particles" were transmitted via the hands of doctors and students from the autopsy room to the delivery theatre and caused the puerperal fever. As a consequence, Semmelweis recommended that hands be scrubbed in a chlorinated lime solution before every patient contact and particularly after leaving the autopsy room. Following the implementation of this measure, the mortality rate fell dramatically to 3% in the clinic most affected and remained low thereafter (WHO, 2009). Apart from providing the first evidence that cleansing heavily contaminated hands with an antiseptic agent can reduce nosocomial transmission of germs more effectively than hand washing with plain soap and water, this approach includes all the essential elements for a successful infection control intervention: "recognize-explain-act (Pittet, 2005).

Semmelweis is considered not only the father of hand hygiene, but his intervention is also a model of epidemiologically driven strategies to prevent infection (WHO, 2009). The 1980's represented a landmark in the evolution of concepts of hand hygiene in the health care sector. The first national hand hygiene guidelines were published in the 1980s (Simmons, 1982; Garner et. al., 1985; Bjerke, 2004) followed by several others in more recent years in different countries.

In 1995 and 1996, the CDC/Healthcare Infection Control Practices Advisory Committee (HICPAC) in the USA recommended that either antimicrobial soap or a waterless antiseptic agent be used for cleansing hands upon leaving the rooms of patients with multidrug-resistant pathogens (HICPAC, 1995; Garner, 1996). More recently, the HICPAC guidelines issued in 2002 defined alcohol-based hand rubbing, where available as the standard of care for hand hygiene practices in health-care settings (Boyce et. al., 2002) whereas hand washing is reserved for particular situations only (WHO, 2006).

### 2.3 The five moments of Hand Hygiene

The World Health Organization has five recommended points in time when hand hygiene should occur in order to prevent transmission of HAIs. These recommendations are called the "My 5 Moments for Hand Hygiene" and focuses on the following times:

1. Before making contact with a patient
2. Before performing a clean/aseptic task, including touching invasive devices ( Before a procedure)
3. After performing a task involving the risk of exposure to a body fluid, including touching invasive devices (After Procedure)
4. After patient contact.
5. After touching equipment in the patient's surrounding areas (WHO, 2006)

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**Figure 1: WHO's Five Recommended Moments for Hand Hygiene**

*Source: Meredith et. al., 2018*

### 2.4 Hand Hygiene Methods

#### 2.4.1 Hand washing with soap and Water

The purpose of routine hand washing in health care is to remove dirt and organic material, as well microbial contaminants, from the hands. Clean water must be used to prevent microorganisms in the water from contaminating the hands again. However, water alone is not effective at removing substances containing fats and oils, which are often present on soiled hands. Proper hand washing also requires soap, which is rubbed on all hand surfaces, followed by thorough rinsing with water and drying (Meredith et. al., 2018).

The cleansing activity of handwashing is achieved by both friction and the detergent properties of the soap. Plain soap has minimal antimicrobial properties, but assists with the mechanical removal of debris and loosely adherent microbes, while the mechanical action removes some bacteria from hands. Time is also an important factor—handwashing for 30 seconds has been shown to remove 10 times the amount of bacteria as handwashing for 15 seconds. The entire handwashing procedure, if completed properly, as described step by step in Figure 2, should take 40–60 seconds. (CDC 2002; WHO 2009a)


**Figure 2: The Steps for Routine Handwashing at Handwashing Facility**

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*Source: Meredith et. al., 2018*

Handwashing with soap and water is recommended (rather than using alcohol based handrub (ABHR)) in the following situations:

- If hands are visibly soiled or contaminated with blood or body fluids.
- After using the toilet.
- Before eating and after eating.
- To remove the buildup of emollients (e.g., glycerol) on hands after repeated use of ABHR.
- In outbreaks of C. difficile, but not in health care settings with only a few cases of C. difficile. (Cohen et al. 2010; Siegel et al. 2007). C. difficile is a bacterial infection that causes severe diarrhea and is common in some settings.
- Before and after feeding babies or young children.
- After clearing the human waste of young children (especially in Africa).
- After sweeping classrooms and school compound (especially in Africa). (Meredith et. al., 2018)

### 2.4.2 Use of Alcohol Based Handrub (ABHR)

The antimicrobial activity of alcohol results from its ability to denature proteins (i.e., the ability to dissolve some microbe components) and kill microbes. Alcohol solutions containing 60–80% alcohol are most effective, with higher concentrations being less effective. This paradox results from the fact that proteins are not denatured easily in the absence of water; as a result, microorganisms are not killed as easily with higher alcohol-based solutions (> 80% alcohol) (WHO 2009a).

In chemistry, an alcohol exists when a hydroxyl group, a pair of oxygen and hydrogen atoms replaces the hydrogen atom in a hydrocarbon. Alcohols bind with other atoms to create secondary alcohols. These secondary alcohols are the three types (ethanol, methanol and isopropanol) of alcohol that humans use every day and therefore the best and recommended by WHO used in the preparation of ABHR depending on concentrations.

The use of an ABHR is more effective in killing transient and resident flora than handwashing with antimicrobial agents or plain soap and water. It also has persistent (long-lasting) activity. ABHR is quick and convenient to use and can easily be made available at the point of care. ABHR usually contains a small amount of an emollient (e.g., glycerol, propylene glycol, or sorbitol) that protects and softens skin. ABHR should be used at any of the “5 Moments” described earlier in this paper, unless hands are visibly soiled. (CDC 2002; Girou et. al., 2002; WHO 2009a).

To be effective, approximately 3–5 mL (i.e., 1 teaspoon) of ABHR should be used. The ideal volume of ABHR to apply to the hands varies according to different formulations of the product and hand size (refer to manufacturer’s instructions for use). ABHR should be used, following the steps shown in **Figure 3**, for approximately 20–30 seconds or until the solution has fully dried. Since ABHR does not remove soil or organic matter, if hands are visibly soiled or contaminated with blood or body fluids, wash hands with soap and water. To reduce the buildup of emollients on hands after repeated

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use of ABHR, washing hands with soap and water after every 5–10 applications of ABHR is recommended (Meredith et. al., 2018).

In *C. difficile* outbreak settings, handwashing with soap and water is recommended over ABHR as it is more effective than ABHR in removing endospores. If there are only a few cases of *C. difficile*, normal use of ABHR is recommended (Cohen et al. 2010; Siegel et al. 2007; WHO 2009a). The need for using soap and water over ABHR during outbreaks of norovirus is an unresolved issue. (Siegel et al. 2007; WHO 2009a).

Perform ABHR regularly as recommended since it is easily accessible as compared to hand washing with water and soap which is done at vantage point. ABHR is easy to carry around hence health care workers can easily carry them even to the theatre room compared to hand washing facility. Considering the fourth point on the five moments of hand hygiene ' after patient contact', a health care worker can accidently touch a patient of which at the particular moment will now require hand washing but the use of ABHR.


**Figure 3: WHO Recommendation on How to Perform Hand Hygiene with Alcohol Based Hand rub (ABHR)**

*Source: Meredith et. al., 2018*

### 2.5 Hand Hygiene Practices during Covid – 19

Hand hygiene or hand washing is one of the main protocols recommended by WHO being practice to suppress the Corona Virus. It was one of best practices by all before the discovery of the vaccine that is being injected to fight against the Corona Virus. Hand washing with soap is a cost-effective public health intervention, with significant public health benefits (Howard et. al., 2020). Hand hygiene practices in India, however, have remained low and vary

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across the important moments for hand washing. The National Sample Survey 76 Round (2018) found that a reported 35.8% household members washed hands with soap before eating, and 74.1% washed hands after defecation (MSPI, 2018). The National Family Health Survey 4 (2015-16) found that 80.3% of urban and 49.4% of rural households had a hand washing space with water and soap highlighting the importance of hand washing facilities to facilitate practice (Water Aid India, 2020).

The COVID-19 pandemic in India has underscored the disease prevention benefits of hand washing with soap and other protective measures in slowing the spread of Coronavirus. Proactive communication campaigns using television, mobile phone communication (WhatsApp, interactive voice recording, text messages), and inter-personal mediums starting from the lockdown phase (24 March – 17 May 2020) imparted important information on protective measures and on seeking health care for symptoms (Water Aid India, 2020). WaterAid India conducted a rapid mixed methods study between 28 May and 12 June 2020 to access the knowledge about the Covid – 19 protocols and its implementation in India. Families received messages about Coronavirus and protective measures during the lockdown phase of the pandemic (April – May 2020). More respondents recalled exposure over the past month to information on mask use (76%), physical distancing (70%), and hand washing (67%) (Water Aid India, 2020). With hand washing being the lowest percentage, it gave the clear indication that hand washing or hand hygiene practice was minimal during the Covid – 19 period in India and this can be attributed to the surge that arouse later on in India. Knowledge of critical times for hand washing was high for before meals and after toilet use, but low for all COVID-19 related critical times. Knowledge of hand washing for COVID – 19 specific times was also low with respect to hand washing after sneezing (34%), after contact with commonly used surfaces and objects (23%), after contact with a sick person (23%) and on returning home from outside (61%) (Water Aid India, 2020).

Hand hygiene is key to stopping the spread of COVID – 19 now – but smart investments now will also prepare us better for any future eventualities or diseases. Adopting strong hand hygiene strategies is the single most effective intervention to prevent disease and death due to antimicrobial resistance (AMR). Hand hygiene also protects against a range of other diseases, including common colds, flu, diarrhoea and pneumonia (Aiello et. al., 2008).

Somiya et. al., investigated hands washing practices among people in Sudan during Coronavirus (COVID-19) outbreak in 2020. Research findings indicated that 41.1% of the respondents washing their hands with water only while 87.9% washed them with soap and water. Those respondents who washed their hand before meal with water only were 51.1% and 59.6% of them washed their hands before meal by using soap with water. The result revealed that, 83.7% of the respondents washed their hands after going to the toilet, while 33.3% of them washed their hand after sneezing and coughing. Washing hands after hand shaking, handling money and touching animals and garbage were reported to be 56.7%, 60.3%, 82.3% and 91.5% respectively (Somiya et. al., 2020). The findings also showed that 31.2% of the respondents wearing gloves as protection against diseases (Covid – 19). length of time of washing hands among the respondents was reported as follows, 1-5sec,

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(9.2%), 6-10 sec (16.3%), 11-15 sec(14.9%), 16-20sec (28.4%), and more than 20 second (31.2%). Number of times spending in washing hands with soap under running water was reported as follows 6.4% one time /day, 27 % (2-4/day), 30.5 % (5-7/day) while 36.1% washed their hands regularly. Regarding diseases associated with hand washing practices, 32.6% of the respondents stated Corona COVID-19 (Somiya et. al., 2020).

## 3 RESEARCH METHODOLOGY

### 3.1 Research Focus

The focus group for this research work is the Mampong Municipality within the Ashanti Region and Osino in the Eastern Region, all in Ghana. This research work is intended for anyone who has gone through the horrifying Covid – 19 experienced worldwide. The questionnaires is administered to 120 citizens within the Mampong municipal and Osino comprising of health workers, government workers, private workers, traders, artisans, farmers, blacksmiths, schools and anyone willing to express and share his/her opinion and views on what was experienced during the pandemic (Covid – 19).

### 3.2 Research Approach and Study Area

The main methodology employed for this research work is the Localized and municipality based sampling method (LMBSM). The research work involves questionnaires administering, field visits to homes and institutions, and investigations at hand washing facilities points to observe the hand washing process as practiced by citizens in various establishment like at health facilities, in government work places, private sector, trading points, schools, etc. All the 120 questionnaires is collected and analyzed using Microsoft EXCEL and programed into Statistical Package for the Social Sciences (SPSS). Results obtained from the softwares is then further analyzed with real time happenings at the field to give a clear view of hand hygiene and Covid – 19 protocol on hand washing within the Mampong municipality and Osino during the pandemic.

## 4.0 RESEARCH FINDINGS AND DISCUSSIONS

### 4.1 Coronavirus and hand hygiene practice by health workers

The Covid – 19 which took center stage of the world in December 2019 in China hit various countries in 2020 killing millions of people whiles still infecting millions of people worldwide. On 31 December 2019, WHO was informed of cases of pneumonia of unknown cause in Wuhan city, China. A novel coronavirus was identified as the cause by Chinese authorities on 7 January 2020 and was temporarily name ‘2019-nCov’. Coronavirus (CoV) are large family of viruses that cause illness ranging from the common cold to more severe diseases. A novel coronavirus (nCoV) is a new strain that has not been previously identified in humans. The new virus was subsequently named the ‘COVID – 19’.

After the report of the first cause, WHO worked around the clock to support countries to prepare and respond to the COVID – 19

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pandemic. Advice for public settings was to individuals to take care of their own health and protect others by;

- Washing of hands frequently with running water and soap or using hand – sanitizer gel.
- Maintaining social distancing (Keeping a distance of 2m between oneself and next person or anyone)
- Wearing of nose mask always
- Avoiding touching eyes, nose and mouth
- Following respiratory hygiene (covering your mouth and nose with your folded elbow or tissue when coughing or sneezing, then disposing of the used tissue immediately and effectively).
- Seeking medical attention early if you have any fever, cough and difficulty in breathing.
- Staying informed and following advice given by your health care provider or authority, employed on how to protect yourself and others from Covid – 19.

The first three points were seen as the main Covid – 19 protocols. This research work focused on the first protocol which is hand hygiene (HH) or hand washing as practiced by all to curb the Covid – 19 virus. Questionnaires were administered to 120 people in Mampong in Ashanti Region and Osino in Eastern Region of Ghana to express their views, experiences and opinions during the Covid – 19 within the study area and in Ghana. As depicted in **Table 2**, 120 respondents was obtained for the research work. During data input to SPSS, all the 120 respondents was accounted for without any missing number during the software preparation as can be seen in **Table 3**. The descriptive analysis in SPSS gave the mean value as 1.79 with a standard deviation of 0.039 from the mean value. The median value is 2 with the minimum value recorded as 1 and 2 as the maximum.

**Table 2: Descriptive Statistics**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Sex | 120 | 1 | 2 | 1.76 | .430 |
| Valid N (listwise) | 120 | | | | |

**Table 3: Case Processing Summary**

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | Total | |
| | N | Percent | N | Percent | N | Percent |
| Sex | 120 | 100.0% | 0 | 0.0% | 120 | 100.0% |

**Table 4: Descriptive**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Sex | Mean | | 1.76 | .039 |
| | 95% Confidence Interval for Mean | Lower Bound | 1.68 | |
| | | Upper Bound | 1.84 | |
| | 5% Trimmed Mean | | 1.79 | |
| | Median | | 2.00 | |
| | Variance | | .185 | |

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| | | |
|---|---|---|
| Std. Deviation | .430 | |
| Minimum | 1 | |
| Maximum | 2 | |
| Range | 1 | |
| Interquartile Range | 0 | |
| Skewness | -1.222 | .221 |
| Kurtosis | -.515 | .438 |

**Table 5** depicts the sex classification that responded to the questionnaires. A total number of 29 males and 91 females answered the questionnaires by expressing their experiences during the pandemic. This indicates that 24.2% were males and 75.8 females. There reason for the higher percentage among women is because of the male: female ratio within the health sectors in Ghana. Most of the health workers in Ghana are nurses and these are females hence the greater percentage for females during the answering of the questionnaires. This can be seen in Fig. 4 with the greater number of respondents going for the females.

**Table 5: Sex of respondents**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Male | 29 | 24.2 | 24.2 | 24.2 |
| | Female | 91 | 75.8 | 75.8 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

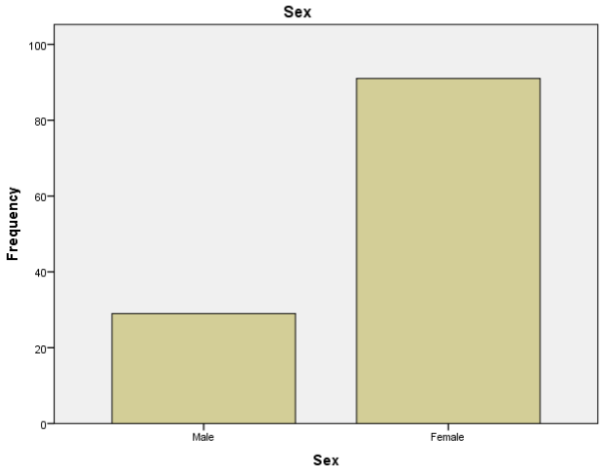


**Fig 4: Number that answered questionnaires**

**Table 6:Case Processing Summary of health workers status**

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | Total | |
| | N | Percent | N | Percent | N | Percent |
| Health Worker Satuts | 120 | 100.0% | 0 | 0.0% | 120 | 100.0% |

**Table 7** gives a clear picture of number of respondents who are healthcare workers during the questionnaires answering for this research. From the table it can be seen that 49 people representing 40.8% are health workers whiles 71 people representing 52.9% are non health workers. The research work sorts to sort view and opinions from anyone who experienced the catastrophic Covid – 19 that took center stage in 2020. By this approach, not only

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healthcare workers can express their views and opinions as the first point of call in any emergency during the pandemic. This can be seen in **Fig. 5** as it gives as mean value of 1.59 and a standard deviation of 0.494 from the mean value.

**Table 7: Health Worker Satuts**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 49 | 40.8 | 40.8 | 40.8 |
| | No | 71 | 59.2 | 59.2 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

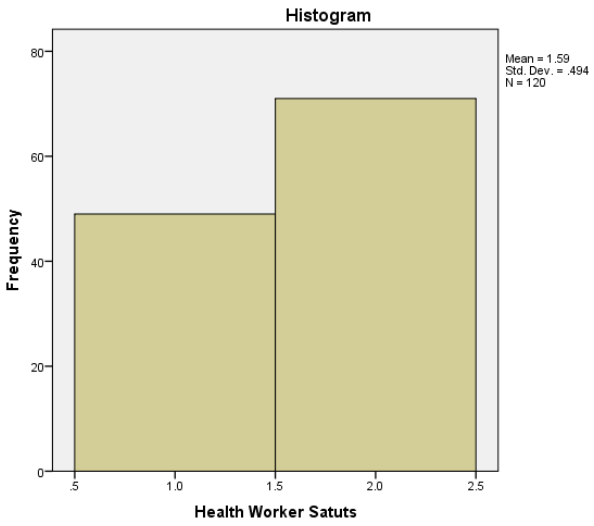


**Fig. 5: Health workers Status**

During the questionnaire administering, it was asked as to whether respondents have heard of Covid – 19. 112 respondents representing 93.9% affirmed positive whiles 8 representing 6.7% percent affirmed negative respectively. It gave clear indication of the people who are prepared and fighting the Covid – 19 by practicing the recommended protocols to be observed by all in order to curb the Covid – 19 virus. The remaining 6.7% gives the picture of people who are not interested in what is happening in the country and takes their health status at mild level of preparedness. By that, they don't take their health conditions very serious and hence unprepared for pandemics or eventualities. This is illustrated in the pie chart at **Fig. 6**. The mean value recorded is 1.07 with a standard deviation of 0.250.

**Table 8: Descriptive Statistics of number heard of hand hygiene**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Heard of Hand Hygiene | 120 | 1 | 2 | 1.07 | .250 |
| Valid N (listwise) | 120 | | | | |

**Table 9: Heard of Hand Hygiene status**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 112 | 93.3 | 93.3 | 93.3 |
| | No | 8 | 6.7 | 6.7 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

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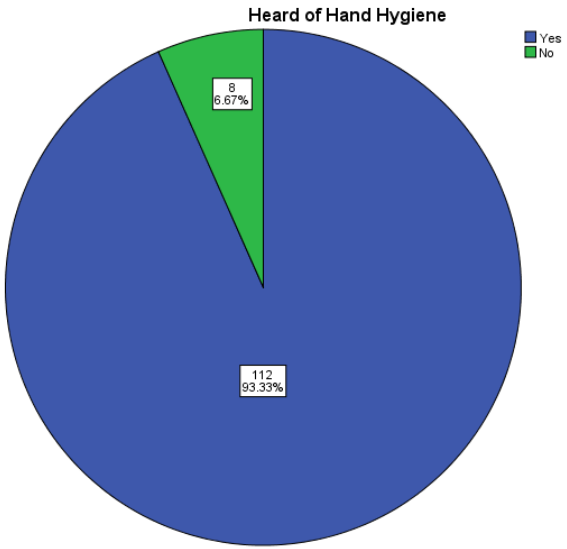


**Fig 6: Chart showing number heard of hand hygiene practice**

### 4.2 Information on Covid and hand washing essence

An aspect of the Covid – 19, investigation also sorts to review the hand hygiene as one of the protocols observed to curb the Covid virus. During questionnairing, respondents answered as to whether hand hygiene is one of the Covid – 19 protocols. 119 people indicating 99.2% affirmed positive and that they are observing with all seriousness in order not to be infected with the Covid – 19 as seen in **Table 12**. Only one person responded no at a percentage of 0.8% to indicate that he hasn't heard of Covid – 19. There should therefore be continuous information in the media to inform the citizens about the Covid – 19, its effects both positive and negative on individuals and economy, symptoms and how to protect oneself in order not to contract it. The mean value for the hand hygiene being seen as part of Covid – 19 protocol is 1.01 with a standard deviation of 0.008. The median and minimum values all stands at 1 with **Fig. 7** is showing the number of people who think hand hygiene is part of Covid – 19 protocols.

**Table 10: Case Processing Summary hand hygiene as part of Covid – 19 Protocols**

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | Total | |
| | N | Percent | N | Percent | N | Percent |
| Hand Hygiene Part of Covid - 19 Protocols | 120 | 100.0% | 0 | 0.0% | 120 | 100.0% |

**Table 11: Descriptive indication of hand hygiene seen as Covid – 19 Protocol**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Hand Hygiene Part of Covid - 19 Protocols | Mean | | 1.01 | .008 |
| | 95% Confidence Interval for Mean | Lower Bound | .99 | |
| | | Upper Bound | 1.02 | |
| | 5% Trimmed Mean | | 1.00 | |
| | Median | | 1.00 | |
| | Variance | | .008 | |
| | Std. Deviation | | .091 | |
| | Minimum | | 1 | |
| | Maximum | | 2 | |
| | Range | | 1 | |
| | Interquartile Range | | 0 | |

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| | | | |
|---|---|---|---|
| | Skewness | 10.954 | .221 |
| | Kurtosis | 120.000 | .438 |

**Table 12: Hand Hygiene Part of Covid - 19 Protocols**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 119 | 99.2 | 99.2 | 99.2 |
| | No | 1 | .8 | .8 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

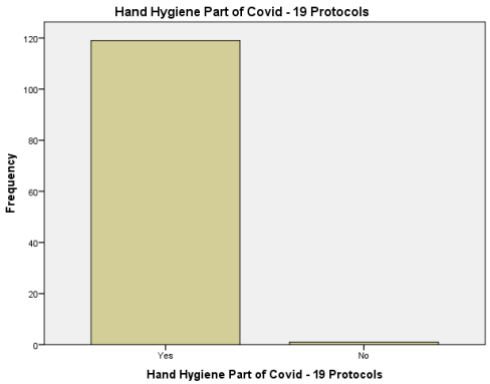


**Fig 7: Chart showing the number of people who think hand hygiene is part of Covid – 19 protocols**

Everyone fears death hence the need to protect oneself hygienically in order to live a longer life. Practicing hand hygiene in this dispensation of Covid – 19 is of essence in many ways; not to contract the Covid -19, protecting others and protecting all. **Table 13** depicts the allocation of percentages for the essence of practicing hand hygiene or hand washing. 22 people depicting a percentage of 18.3% think hand washing is to wash the Covid – 19 virus from the hand whiles 67 people given a percentage of 55.8% thinks is to stay safe. 3 people at percentage of 2.5% thinks it's a daily norm to wash the hands as usually done everywhere and the remaining 28 people out of the total 120 thinks is to kill the virus indefinitely. This was at percentage of 23.3%. Hand hygiene is considered one of the most important factor in the control of infection. It protects patients and healthcare workers from acquiring microorganisms that may cause them harm. Good hand hygiene practice is estimated to reduce the spread of health associated infection by 15 – 30%. Keeping hands clean is one of most important steps one can take to avoid getting sick and spreading the Covid – 19 to others. Handwashing with soap removes or deactivates the action of the Covid – 19 virus from the hand hence disengaging the possibility of spreading it to the next person. This helps prevents further infections because people frequently touch their eyes, nose and mouth without even realizing it. **Fig. 8** is a clear chart further depicting the essence of practicing hand hygiene and why it's important to keep doing it in order to help prevent ourselves against Covid – 19 infection and its spread among citizens.

**Table 13: Essence of Practicing Hand Hygiene**

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| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | To wash the Covid virus from the hand | 22 | 18.3 | 18.3 | 18.3 |
| | To be Safe | 67 | 55.8 | 55.8 | 74.2 |
| | It's a norm | 3 | 2.5 | 2.5 | 76.7 |
| | To kill the virus | 28 | 23.3 | 23.3 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

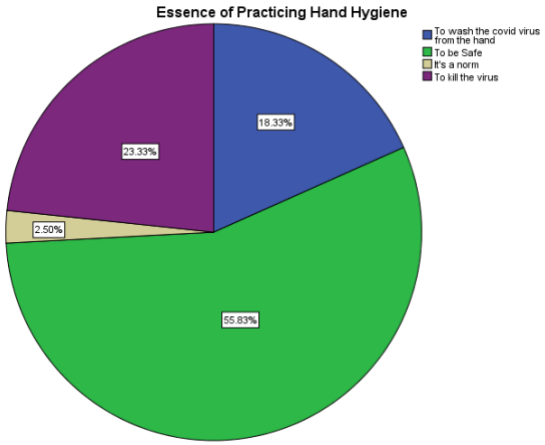


**Fig 8: Chart showing percentage of correspondence for the essence of practicing hand hygiene**

During the research work also, the duration for hand hygiene or washing practice was also observed to access the effectiveness of the hand washing process and see whether the WHO hand washing process is also followed. According to WHO, The entire handwashing procedure if completed properly, as described step by step in Figure 2, should take 40–60 seconds? (CDC 2002; WHO 2009a). **Table 15** depicts respondent's views on duration for hand hygiene practice in seconds. 43 people representing 35.8% thinks hand washing should be completed within 10 seconds. Per opinions, this is not application if one wants to go through the entire handwashing procedure recommended by WHO. 55 respondents signifying 55% thinks the entire process should be done within 30 seconds. But by WHO handwashing standards, this is also not fusible. 3 people answered that it should be done within 40 seconds and 18 respondents thinks the process should be done within 60 seconds. This represents a percentage of 15% whiles the remaining 0.8% thinks it should be done in 5 seconds. In agreement to WHO stands where hand washing should be done within 40 – 60 seconds, 17.5% indicating 21 respondents out of the 120 are practicing the hand washing protocol in order to curb Covid – 19. By **Table 14**, the mean value for the duration for hand hygiene practice is 1.99 with a standard deviation of 1.033. The chart is shown in **Fig. 9.**

**Table 14: Duration for Hand Hygiene Practice**

| | | |
|---|---|---|
| N | Valid | 120 |
| | Missing | 0 |
| Mean | | 1.99 |
| Median | | 2.00 |
| Mode | | 2 |

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| | |
|---|---|
| Std. Deviation | 1.033 |
| Sum | 239 |

**Table 15: Duration for Hand Hygiene Practice in seconds**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 10 | 43 | 35.8 | 35.8 | 35.8 |
| | 30 | 55 | 45.8 | 45.8 | 81.7 |
| | 40 | 3 | 2.5 | 2.5 | 84.2 |
| | 60 | 18 | 15.0 | 15.0 | 99.2 |
| | 5 | 1 | .8 | .8 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

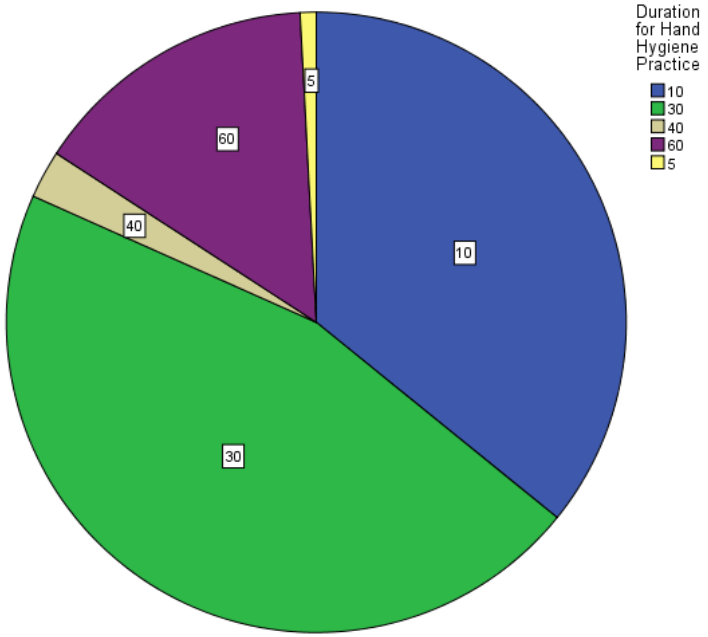


**Fig. 9: Chart showing duration for hand hygiene practice during Covid – 19**

Research objectives also sorts to investigate the target groups for Covid – 19 as known by respondents or citizens within affecting communities. People of all ages can be infected by the Covid – 19. Older people and younger people can be infected by the Covid – 19 virus. Older people and people with pre – existing medical conditions such as asthma, diabetics and heart related diseases appear to be more vulnerable to becoming severely ill when infected with the virus. By software setup and analysis (**Table 16**), the mean value is 1.36 with a standard deviation of 1.044. According to **Table 17,** 100 respondents out of 120 indicating 83.3% thinks everyone is a target for Covid 19 (the rich, poor, young,

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children, adolescents, youth, aged etc). 13 people representing 10.8% thinks the rich are the target group for Covid – 19 and the reason for its devastating effects in countries like China, USA, England, France hence concluding that the target is for well developed countries. 1 person representing 0.8% thinks the church is the target whiles 3 thinks adults are the target and the remaining 3 respondents affirming it for children as targets for Covid – 19. **Fig. 10** gives the mean distribution of hand hygiene target groups with the highest number recorded for *everyone.*

**Table 16: Hand Hygiene Target Groups**

| | | |
|---|---|---|
| N | Valid | 120 |
| | Missing | 0 |
| Mean | | 1.36 |
| Median | | 1.00 |
| Mode | | 1 |
| Std. Deviation | | 1.044 |
| Sum | | 163 |

**Table 17: Hand Hygiene Target Groups**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Everyone | 100 | 83.3 | 83.3 | 83.3 |
| | The Rich | 13 | 10.8 | 10.8 | 94.2 |
| | The Church | 1 | .8 | .8 | 95.0 |
| | Adults | 3 | 2.5 | 2.5 | 97.5 |
| | Children | 3 | 2.5 | 2.5 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

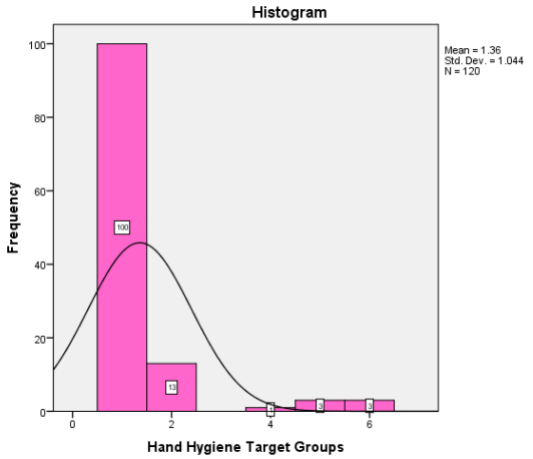


**Fig. 10: Mean distribution for hand hygiene target groups**

### 4.3 Covid – 19 Handwashing system

To prevent the Covid – 19 virus from continuous spreading depends considerably on good hand hygiene or washing practices. The Covid – 19 virus non-spread depends mainly on good Covid – 19 handwashing system so that citizens can wash their hands well following the WHO hand washing procedures. The handwashing system comprises of the water, veronica bucket, soap, standing pipe, tissue or drying material. If all these materials are available, everyone who wants to avoid contacting the COVID – 19 will wash responsibly by obeying the WHO handwashing guidelines. From **Table 18**, the valid respondents is 120 with none missing. The mean value is 1.90 with a standard deviation of 0.301. Field surveys and questionnaire answers indicates that, 108 respondents depicting

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90% make use of Veronica buckets at home, markets, food joints and at the workplace. The number that uses standing pipes is 12 indicating 10%. Other options explored by researchers includes another person pouring water over the hand for another and use of water in washing by oneself. They all accounted for zero percentage as can be seen in **Table 18**.

**Table 18: Nature of Water System for HH Practice Under Covid - 19 Protocol**

| | | |
|---|---|---|
| N | Valid | 120 |
| | Missing | 0 |
| Mean | | 1.90 |
| Median | | 2.00 |
| Mode | | 2 |
| Std. Deviation | | .301 |
| Minimum | | 1 |
| Maximum | | 2 |
| Sum | | 228 |
| Percentiles | 25 | 2.00 |
| | 50 | 2.00 |
| | 75 | 2.00 |

**Table 19: Nature of Water System for HH Practice as a Covid - 19 Protocol**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Standing Pipe | 12 | 10.0 | 10.0 | 10.0 |
| | Use of Veronica bucket | 108 | 90.0 | 90.0 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

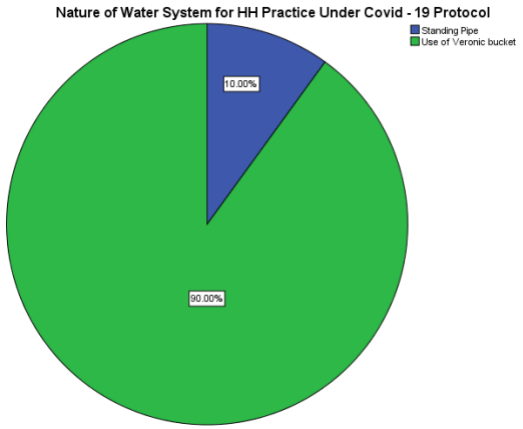


**Fig 11: Chart indicating nature of water system for hand hygiene practice as a Covid – 19 protocol.**

Visits to field to investigate as to whether hand hygiene equipments are installed at the work place or in schools and other institutions to promote hand hygiene practice which is the protocols under consideration was also embarked. Hand hygiene equipments installation was on the peak when the pandemic was on surge within the study areas and in Ghana. It's still installed in Ghana but with minimal usage when the Covid virus infection was on the decrease. Most of the equipments were supplied to the schools and institutions by private entities, government and other non-governmental organization. According to **Table 20**, 108 respondents representing 90% (as seen in **Fig. 12**) affirmed that hand hygiene equipments are installed in their working environment. 12 people depicting 10 percent affirmed negative

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meaning no hand hygiene equipment installed at their work place. This gave indication that, such institutions lack practicing hand hygiene in their working environment. Such working environments are likely to fluctuate the spread of the Covid – 19 virus.

Respondents were again tasked to indicate the hand drying material after practicing hand washing either in their homes, work place, food joint, school, institutions etc. From **Table 21**, one can see the various hand drying materials used within the study area after practicing hand hygiene which includes handkerchiefs, use of one tissue paper, getting enough tissue paper and use of nothing. Respondents analysis indicates that, 7 respondents representing 5.8% make use of handkerchiefs after handwashing whiles 28 people which is 23.3% make use of one tissue paper to dry the hands after practicing hand hygiene. The use of one tissue paper in drying the hands after washing is problematic as it still keeps the hand wet after usage in cleaning the water. Those who get enough tissue paper which wipes and dry's the hand completely is 82 people representing 68.3% whiles 2.5 make use of nothing. Those who don't make use of tissue or drying materials usually make continuous movements of the two hands in the air for air to dry it. Even though it's effective, it takes longer time for the hand to dry. Young school children have issue with the drying of the hands as most of them use the wearing shirt or dress to dry the hands after practicing hand hygiene. This cannot curb Covid – 19 but result in its spread if not properly managed by teachers at the Kindergarten and basic levels.

One disadvantage monitored in this Covid – 19 hand hygiene protocol practice in schools and other public settings is the disposal of the collected water after washing the hands. Students finds it difficult to dispose off the waste after continuous washing. Monitoring and observations indicates that, some even drop the tissue papers or drying materials in the waste water which is not hygienic. In the lower levels in schools, if not monitoring is done by teachers, children even go back and wash their hands in this waste water which can result in contacting the Covid – 19 virus. There is therefore the need for continuous monitoring by teachers and senior students especially in the kindergartens and lower primary levels of education at Mampong, Osino and Ghana in general.

**Table 20: Hand Hygiene Equipment in working Environment**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 108 | 90.0 | 90.0 | 90.0 |
| | No | 12 | 10.0 | 10.0 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

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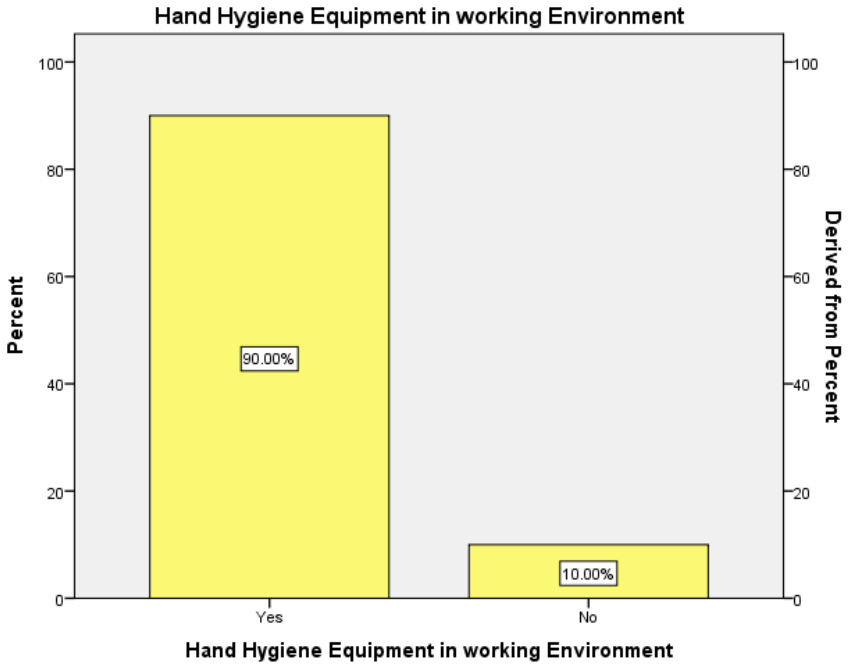


**Fig 12: Hand hygiene equipment placement in working environment status**

| | | | | | |
|---|---|---|---|---|---|
| | Get enough tissue paper | 82 | 68.3 | 68.3 | 97.5 |
| | Nothing | 3 | 2.5 | 2.5 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

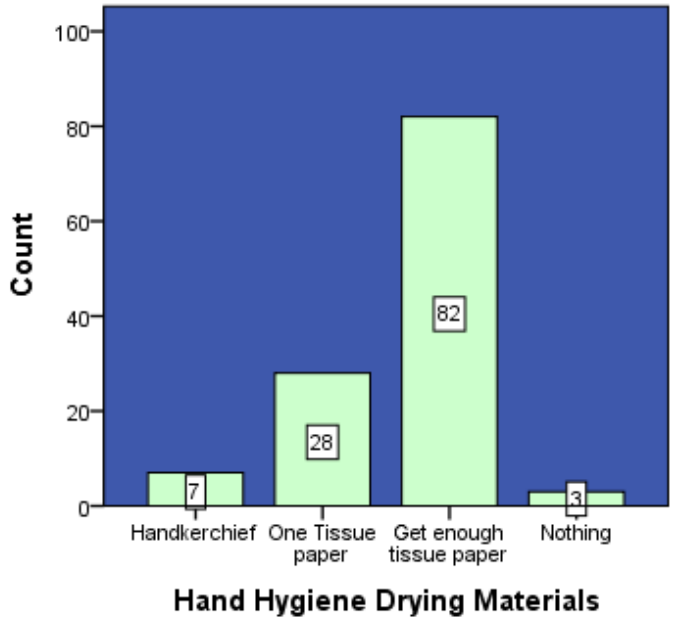


**Fig. 13: Hand hygiene drying materials usage indication**

**Table 21: Hand Hygiene Drying Materials**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Handkerchief | 7 | 5.8 | 5.8 | 5.8 |
| | One Tissue paper | 28 | 23.3 | 23.3 | 29.2 |

### 4.4 Hand hygiene education level and psychological impacts on citizens

Hand hygiene has been a practice over the years practiced by health workers across the breadth of Ghana. Formal education on hand hygiene is defined as providing education to healthcare workers on

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the importance of hand hygiene and the correct procedures. The WHO safe lives: clean your hands campaign focuses on increased education and awareness of hand hygiene on healthcare. Infectious diseases outbreaks such as influenza can severely impact populations, learning and welfare of individuals in a community. Establishing good hand hygiene practices at a young age is a key to preventing the spread of infectious diseases. Hand hygiene as one of the protocols observed under Covid – 19 requires education at every level for its effective implementation to combat the virus. Education on Covid – 19 became intense when the pandemic was on the surge in Ghana and worldwide. Areas of education on the Covid – 19 at the study areas and in Ghana includes the media, schools, institutions, churches, cinema houses, bars, mosques, homes, streets, ceremonial gatherings like weddings, funerals etc. This is still on going in Ghana as the Covid – 19 is picking up in Ghana and at the study areas. A total number of 95 respondents representing 79.2% of the sample space affirmed that, education level on Covid – 19 is about 90% good as it helped them practice the hand washing protocol effectively. 25 people indicating 25.8% thinks the education level wasn't enough hence the need for more education as the Covid – 19 cases has started shooting up in Ghana as can again be seen in **Fig. 14**. Good hand hygiene on Covid – 19 among healthcare workers and citizens is the foundation for Covid – 19 prevention and control in Ghana and at the study areas. During the Covid – 19 in Ghana and worldwide, healthcare workers were at the receiving end as most of them died of the Covid – 19 trying to help citizens within the study area. Educating citizens and everyone about the importance of hand hygiene protocol under Covid – 19 and advising on how to wash hands effectively could have a substantial impact on the rate of Covid virus infections. Concerning the ratio statistics for hand hygiene education level under Covid - 19 to Information about other pandemics, the price related differential is 1.080 and the coefficient of dispersion is 0.218. Out of 120 sampled respondents, 111 respondents representing 92.5% says hand hygiene is a good protocol to practice under Covid – 19 to help combat the virus. 9 respondents representing 7.5% does not see hand washing as a good practice under Covid – 19.

**Table 22: Hand Hygiene Education Level Under Covid - 19**

| | | |
|---|---|---|
| N | Valid | 120 |
| | Missing | 0 |
| Mean | | 1.21 |
| Median | | 1.00 |
| Mode | | 1 |
| Std. Deviation | | .408 |
| Variance | | .166 |
| Minimum | | 1 |
| Maximum | | 2 |
| Sum | | 145 |

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| | | |
|---|---|---|
| Percentiles | 25 | 1.00 |
| | 50 | 1.00 |
| | 75 | 1.00 |

**Table 23: Hand Hygiene Education Level Under Covid - 19**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 95 | 79.2 | 79.2 | 79.2 |
| | No | 25 | 20.8 | 20.8 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

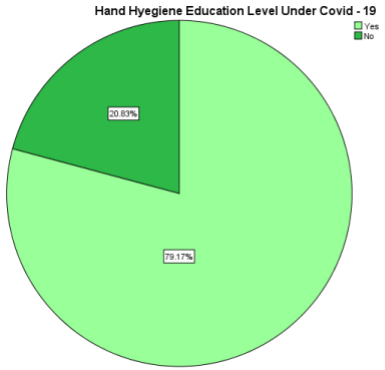


**Fig. 14: Percentage level of education during the Covid – 19 Pandemic**

**Table 24: Ratio Statistics for Hand Hygiene Education Level Under Covid - 19 / Information about other Pandemics**

| Price Related Differential | Coefficient of Dispersion | Coefficient of Variation Median Centered |
|---|---|---|
| 1.080 | .218 | 42.7% |

**Table 25: Hand Hygiene Good Protocol statistics**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 111 | 92.5 | 92.5 | 92.5 |
| | No | 9 | 7.5 | 7.5 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

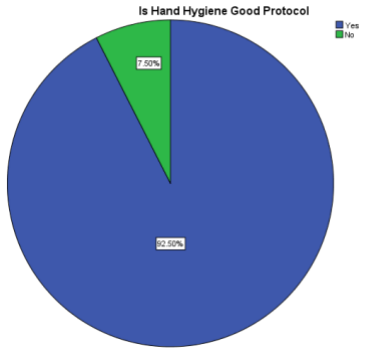


**Fig 15: Chart showing percentage of correspondence as to whether hand hygiene is good protocol**

**Table 26: Correlations hand hygiene education level and information about Covid – 19 Pandemic**

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| | | Hand Hygiene Education Level Under Covid - 19 | Information about other Pandemics |
|---|---|---|---|
| Hand Hygiene Education Level Under Covid - 19 | Pearson Correlation | 1 | .111 |
| | Sig. (2-tailed) | | .225 |
| | N | 120 | 120 |
| Information about other Pandemics | Pearson Correlation | .111 | 1 |
| | Sig. (2-tailed) | .225 | |
| | N | 120 | 120 |

Considering the psychological impact of Covid – 19 on people after sampling the 120 people within the study areas, various views and opinions was obtained. The questionnaire sort to identify the kind of psychological and treat effect Covid – 19 hand on them to practice hand hygiene to stay safe. 28 respondents representing 23.3% said they feared death and the possibility of exiting the earth hence the need to practice hand hygiene. A percentage said watching the Covid – 19 sickness, associated hearth disease, coughing, breathing inabilities and all other associated problems on health pressured them to practice Covid – 19. The number which gave this reason is 31 representing 25.8%. 5 respondents attributed it to mental illness and thinking because of isolations and other effects that may result if they don't practice the hand hygiene. Fear also gripped a percentage as they watch the death rate and the way people are being buried in countries like South Africa, USA, England, Brazil, Ghana etc. The number of respondents in this case is 19 representing 30.8%. 19 respondents representing 15.8% said nothing motivated them to practice the hand hygiene within the study areas as can be seen in **Fig. 13**.

**Table 27 Psychological impact of Covid - 19**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Death | 28 | 23.3 | 23.3 | 23.3 |
| | Sickness | 31 | 25.8 | 25.8 | 49.2 |
| | Mental illness and thinking | 5 | 4.2 | 4.2 | 53.3 |
| | Fear | 37 | 30.8 | 30.8 | 84.2 |
| | Nothing | 19 | 15.8 | 15.8 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

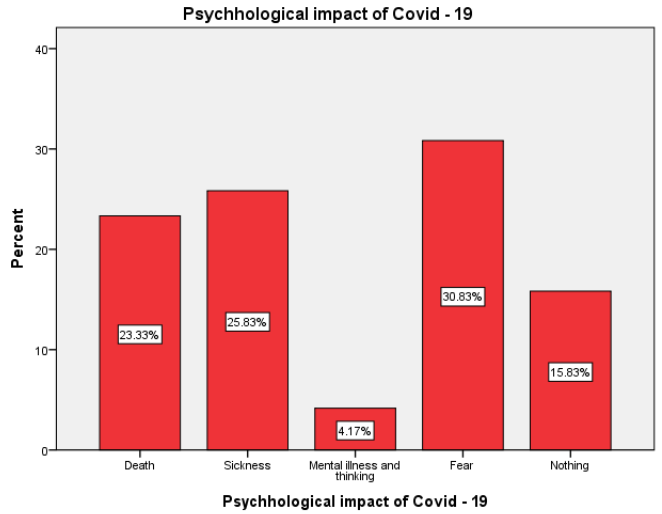


**Fig. 13: Chart showing psychological impacts of Covid – 19 on individuals during the pandemic**

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### 4.5 History of Pandemics, use of hand sanitizer and hand hygiene after use.

A pandemic is an epidemic of an infectious disease that has spread across a large region, for instance multiple continents or worldwide, affecting a substantial number of individuals. A wide spread endemic disease with a stable number of infected individuals is not a pandemic. Throughout history, there have a number of pandemic of diseases such as smallpox. The most fatal pandemic in recorded history was the black death (also known as Plague) which killed an estimated 75 – 200 million people in the 14$^{th}$ century. (ABC, 2008; BBC, 2001; Deleo et. al., 2005). List of pandemics and epidemics with at least one (1) million deaths includes black death, Spanish flu, plague of Justinian, HIV/AIDS global epidemic, current COVID – 19, third plague pandemic, Cocoliztli epidemic of 1545 – 1548, Antonine plague, 1520 Mexico smallpox, 1918 – 1958 influenza, Hong Kong flu, 735 – 737 Japanese smallpox, 1772 – 1773 Persian plague, Naples plague, 1846 – 1860 Cholera, 1629 – 1631 Italian (Wikipedia, 2022).

Upon sampling 120 respondents from the study areas, 95 people out of 120 respospondents detailed the knowledge and views about pandemics that have confounded the world before at a percentage of 79.2%. Whiles 25 respondents implying 20.8% of the sample space said they have no ideas about pandemics that have happened before except the Covid – 19 under review as depicted in **Table 28** and in **Fig. 14** below.

**Table 28: Information about other Pandemics**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 95 | 79.2 | 79.2 | 79.2 |
| | No | 25 | 20.8 | 20.8 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

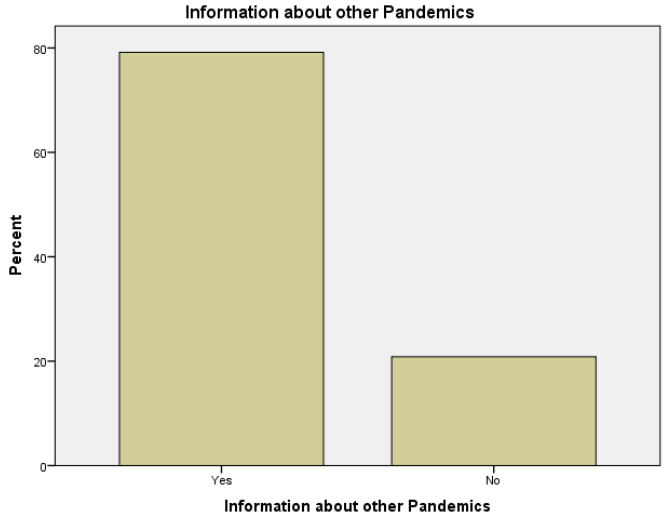


**Fig 14: Have information about other pandemics indication**

Three major protocols have been observed so far in this Covid – 19 period namely hand hygiene, social distancing and wearing of nose mask. This research work looks at the first protocol which is hand hygiene and how it has been observed as recommended by WHO in order to curb the Covid – 19. The use of sanitizers also goes with the hand hygiene where in place of hand washing, one can use the sanitizer or Alcohol based handrub (ABBHR). Individuals within the study area have been using the hand sanitizer with all seriousness whiles observing the hand hygiene protocol. The research work considered use of sanitizer especially the duration and frequency of usage to wash away the virus from the hand. After sampling from

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the study area, 28 respondents representing 23.3% (**Table 28**) indicated that, they use the sanitizer every 15 minutes to rub the hands to remove the virus and take away any microorganism on the hand. Doing this is irrespective of either getting the hand in contact with any person or individual or not. 57 people at a percentage of 47.5% said the use of sanitizer is done after every 30 minutes. The use of sanitizer every hour was by 15 respondents at a percentage of 12.5% in order to rub away any microorganism including the Covid – 19 virus. 15 respondents indicating 12.5% of the sample space said sanitizer use is in every 2 hours because of the nature of work they are doing. Others don't use the sanitizer at all throughout the day apart from practicing the hand hygiene. The percentage of respondents who do not use the sanitizer at all is 4.2% as depicted in **Fig. 17**. Observation during the surge gave a clear indication of usage and understanding of hand sanitizer. This was affirmed as individuals were seen carrying the hand sanitizers of various sizes and practicing its usage. Some individuals even use it every one (1) minute, five (5) minutes, ten (10) minutes because of the fear and tremor associated with the Covid – 19 and what was happening on the international stage as people were dying at a faster rate.

Waterless hand sanitizer provides several advantages over hand washing with soap and water. However, they are not effective if organic matter (dirt, food, or other material) is visible on hands.

Benefits of waterless hand sanitizers includes;

- Require less time than hand washing
- Act quickly to remove Covid virus on hands
- Are more accessible than sinks
- Reduce Covid virus counts on hands
- Do not promote antimicrobial resistance
- Are less irritating to skin than soap and water
- Some can even improve condition of skin

**Table 29: Use of Hand Sanitizer during Covid - 19**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 15mins | 28 | 23.3 | 23.3 | 23.3 |
| | 30mins | 57 | 47.5 | 47.5 | 70.8 |
| | One hour | 15 | 12.5 | 12.5 | 83.3 |
| | 2 hours | 15 | 12.5 | 12.5 | 95.8 |
| | None at all | 5 | 4.2 | 4.2 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

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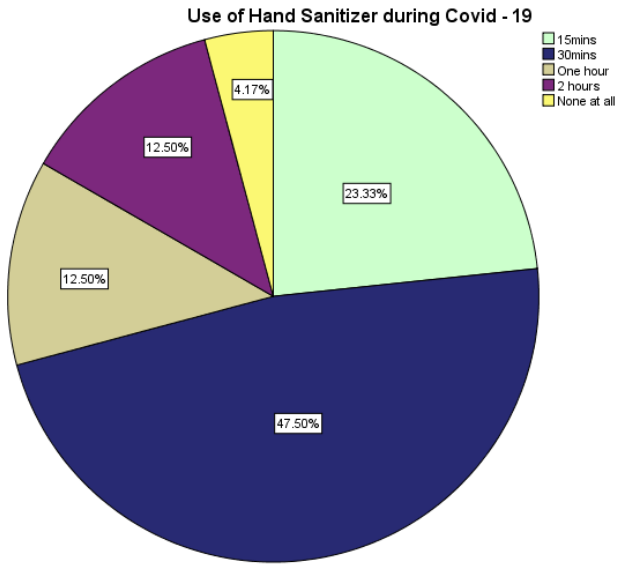


**Fig 17: Sanitizer usage during Covid – 19 Protocol**

Another variable monitored, measured and analyzed is the practice of hand hygiene after a series use of the hand sanitizer at the home, street and especially at the working environment.
Washing hands with soap and water mechanically removes pathogens and dissolves the oily membrane on a virus which, in effect, causes the virus to expel its contents. Laboratory data demonstrate that alcohol-based hand rub formulations with the recommended alcohol concentrations will inactivate the virus that causes COVID-19.

Respiratory viruses like coronavirus disease (COVID-19) spread when mucus or droplets containing the virus get into your body through your eyes, nose or throat. Most often, this happens through your hands. Hands are also one of the most common ways that the virus spreads from one person to the next. During a global pandemic, one of the cheapest, easiest, and most important ways to prevent the spread of a virus is to wash your hands frequently with soap and water. Hence the need to practice hand hygiene at all times especially in the time of Covid – 19 by all. **Table 30** gives a clear picture of respondent's views and opinions on hand washing after frequent use of hand sanitizer. It can be seen that 47 respondents wash their hands every 3 minutes use of hand sanitizer representing 39.2%. At a percentage of 27.5% coming from 33 respondents at the study area, washing is done after every 5 minutes use of the hand sanitizer. This is done to deactivate the Covid – 19 virus. After every 10 minutes use of the sanitizer, washing is also done to remove any microorganism or Covid virus by a percentage of the sampled space. This was affirmed by 14 respondents giving a percentage of 11.7%. Others do not wash the hands at all but just make use of the sanitizer throughout the day until bathing. This group makes a percentage of 2.5%. 10% forms the others which comprises of people who think once you bath at home, there is no need of hand washing or sanitizing. For instance, a patient coming to a health facility was asked to wash the hands but responded that, he just bathed from the house so no need to wash hands. During the Covid – 19 surge and up till January 2022, hand washing equipments have been installed at homes, entrances and inside to schools and institutions in order to practice hand hygiene and curb the Covid – 19 virus. It is therefore expected of

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every individual including workers and school children to make use of the hand washing facility both at entry and inside the school or working environment. From **Fig. 18**, it can be inferred that individuals within the study areas fears for the life or afraid of the Covid – 19 and its associated problems hence the need to be serious about the hand washing, hence the need for washing the hands with water and soap after every 3 minutes use of the hand sanitizer.

**Table 30: Frequency of Hand Washing after Sanitizer use**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 3mins | 47 | 39.2 | 39.5 | 39.5 |
| | 5mins | 33 | 27.5 | 27.7 | 67.2 |
| | 10mins | 10 | 8.3 | 8.4 | 75.6 |
| | 15mins | 14 | 11.7 | 11.8 | 87.4 |
| | None at all | 3 | 2.5 | 2.5 | 89.9 |
| | Other | 12 | 10.0 | 10.1 | 100.0 |
| | Total | 119 | 99.2 | 100.0 | |
| Missing | System | 1 | .8 | | |
| Total | | 120 | 100.0 | | |

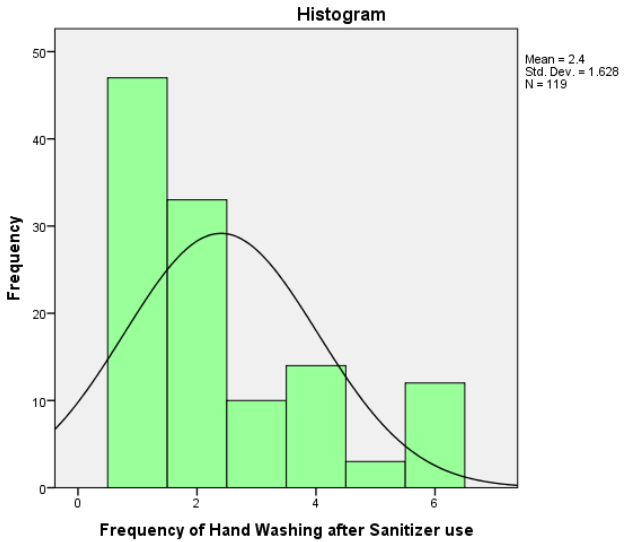


**Fig 18: Hand washing period after series use of hand sanitizer**

### 4.6 Installed hand hygiene Facility and money handling against hand hygiene practices

The research work also sorted to investigate whether all homes within the study area installed hand hygiene facility in the various homes for hand washing when the Covid – 19 was on the surge. Installing hand hygiene facility in the homes ensures that all families are in a position to wash their hands adequately by complying with the WHO hand washing guidelines as stated above in order to stay safe of the Covid virus. The veronica bucket and standing pipe system is the two main forms of hand washing facilities that is installed by all individuals within the study area to propagate the hand washing protocol. By judging the sample space of 120 respondents, 108 representing 90% makes use of Veronica bucket

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whiles 12 respondent representing 10% use standing pipes in the homes to practice hand hygiene during the Covid – 19 surge within the study areas and in Ghana. This constitutes the nature of the water system used in washing the hand under Covid – 19 hand hygiene protocol. From questionnaires sampled, 70 respondents representing 58.3% (**Table 31**) out of the 120 individuals indicated yes for installing hand washing facility in their homes. The Veronica bucket serves as a simple way to encourage proper hand washing using flowing water. Bekoe in an interview stated that the bucket was originally made to help her and her colleagues wash their hands under running water after each lab session.

The bucket is also used in other African countries like Nigeria. It is common in places such as schools, hospitals, churches and in areas with no running taps. It has become very popular in Ghana following the outbreak of the novel coronavirus (COVID-19) as citizens engage in frequent hand washing to stem its spread. In Ekiti State, Nigeria, the governor Kayode Fayemi directed all public places to provide running tap water or Veronica buckets "to encourage frequent handwashing" as part of the measures to contain COVID-19. (Graphic.com.gh; www.msn.com; *www.globalcommunitiesgh.org)*.

**Table 31: Hand Hygiene Facility at Home**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 70 | 58.3 | 58.3 | 58.3 |
| | No | 50 | 41.7 | 41.7 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

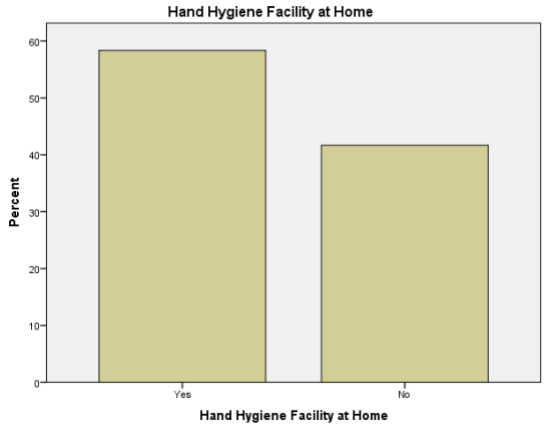


**Fig 19: Hand washing facility installed at Home**

**Table 32: Hand Hygiene and Money Handling**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Do wash after handling money | 86 | 71.7 | 71.7 | 71.7 |
| | Do not wash after handling money | 10 | 8.3 | 8.3 | 80.0 |
| | Do wash after days' work | 17 | 14.2 | 14.2 | 94.2 |
| | Do not wash at all | 7 | 5.8 | 5.8 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

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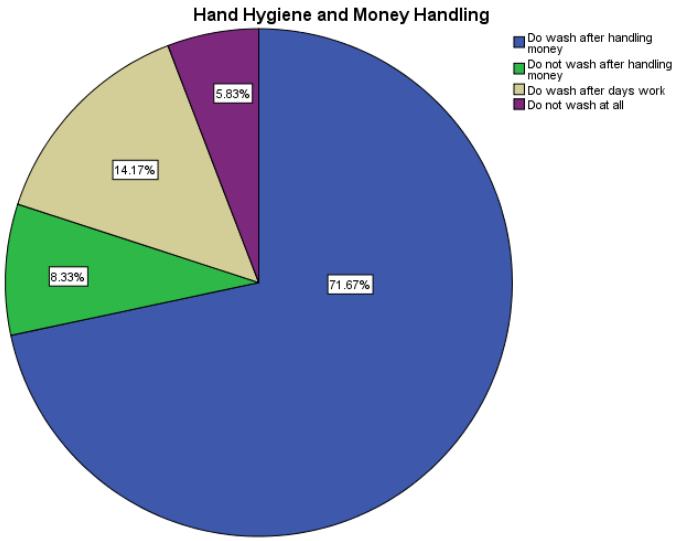


**Fig 20: Hand hygiene and money handling status as indicated by correspondence**

### 4.7 Mass hand sanitizer distribution and factors contributing to effective hand hygiene practices in public settings.

The mass distribution of alcohol based hand sanitizer impacted the Covid – 19 at the study areas and the economy in a positive way. This is because the drastic dramatic negative effect of Covid 19 on countries like China, USA, England, South Africa, Brazil and other countries did not happen in Ghana. Even though Ghana recorded cases of Covid – 19 and still recording, it cannot be compared to the drastic effect on the countries named above. Various governmental, churches, individuals, private entities and non-governmental organization embarked on mass distribution of hand sanitizers to various health facilities and organizations to help curb the Covid virus. Some distributions was also to individuals within communities including the study area. This helped the practicing of the use of hand sanitizer considering the mid income country we have as Ghana with the poor communities. The greater percentage of individuals living in this poor communities lacks the ability to buy hand sanitizers on regular basis to buttress hand washing protocol. A percentage of 90 coming from 108 respondents indicated that mass distribution of hand sanitizers by various organizations contributed to hand deactivation of the virus and other microorganisms within the study area and in Ghana. 12 respondents representing 10% said otherwise when judging the mass distribution of hand sanitizer as depicted in **Table 33**.

**Table 33: Effect of Mass Distribution of Hand Sanitizer on Covid 19**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 108 | 90.0 | 90.0 | 90.0 |
| | No | 12 | 10.0 | 10.0 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

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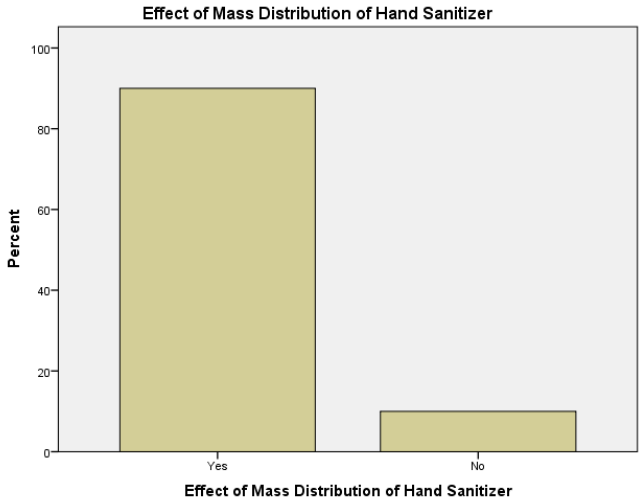


**Fig 21: Effects of mass distribution of sanitizer on Covid - 19**

Hand hygiene practices in public settings have a number of contributing factors which will inform workers or observers to practice hand hygiene. For all workers and healthcare implementers to be safe and free from the Covid virus, each individual need to observe the hand hygiene protocol following all guidelines. Some people think implementing the hand hygiene require enforcement bodies before it can be practiced or observed effectively. Some key factors which contributed to effective hand hygiene in public settings were considered. These includes provision of hand hygiene facilities, continuous practice of hand washing by workers, history about pandemics and its tremendous effect likely to result, being affected with diseases and other factors. After sampling 120 individuals from the study areas, 62 respondents representing 51.7% indicated that, provision of hand hygiene (HH) facilities will motivate workers to practice the hand hygiene in public settings. They have the notion that seeing is believing, so once the facility is installed at the work place, they will see it and this will serve as a remembrance to practice hand hygiene. 10 respondents given a percentage of 8.3% ascribe their reasons to continuous washing by other people within the institution as they regular hand washers will serve as guards and motivators for them to practice hand hygiene. 43 respondents representing 35.8% said the fear of the pandemic and its associated problems implanted fear in them, hence the reason to practice hand hygiene effectively at the work place.

**Table 34: Hand Hygiene effectiveness contributing Factor in Public Settings**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Provision of HH facilities | 62 | 51.7 | 51.7 | 51.7 |
| | Continuous washing by people | 10 | 8.3 | 8.3 | 60.0 |
| | Pandemics | 43 | 35.8 | 35.8 | 95.8 |
| | Being infected with disease | 4 | 3.3 | 3.3 | 99.2 |
| | Other | 1 | .8 | .8 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

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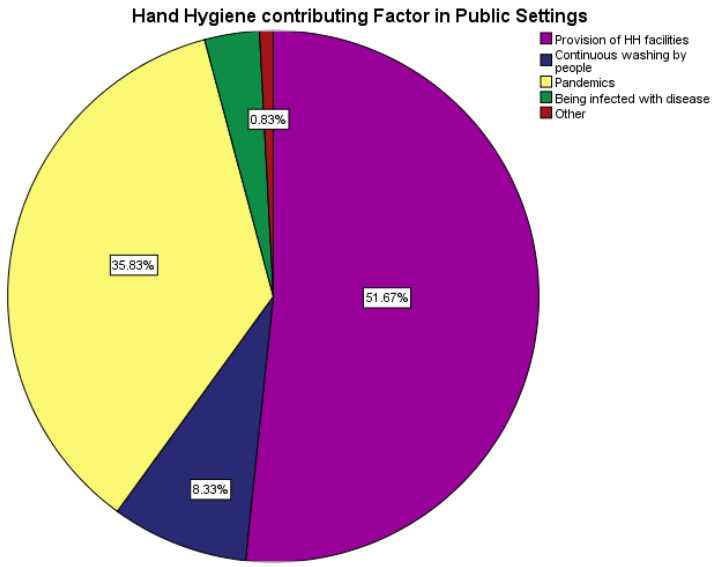


**Fig 22: Hand hygiene contributing factors in Public Settings**

### 4.8 Hand hygiene in Public settings

Other good hand hygiene contributing factors were explored by the investigating team to identify hand hygiene compliance parameters resulting in its effectiveness and reducing the Covid – 19 infection within the study areas and Ghana as a whole. Some of these parameters includes;

- What factors(s) is or are contributing to the practice of hand hygiene in public settings?
- How does hand hygiene practice during pandemic results in reduced morbidities in society?
- What challenges is your firm/school facing in implementing hand hygiene policies or practices?
- What can be used to describe the contamination of hands in public settings?

Respondent's views and opinions on the above questioning parameters were obtained. Considering the first question, respondents indicated that, the fear to fall sick, the fear of being isolated and to die, the hands getting infected with the virus motivated them to practice hand hygiene within the working environment. Others attributed their practice to reasons such as;

- Public education
- Availability of hand washing facility in the public settings
- The fear of getting infected
- No hand hygiene, not entry into the public settings
- Continuous use of sanitizer resulting in virus infections
- Hand shaking within the public settings
- Adequate soap and water in working environment
- Reduce the risk of getting infected with the virus
- Covid – 19 protocol practice is a personal hygiene
- Presence of veronica bucket serving as a reminder
- Poor hand hygiene compliance
- Torching surfaces due to the nature of work

Respondents also answered question two stated above under this section to share their views and opinions. They indicated we need reduction in morbidities due to hand hygiene practice simply because hand hygiene helps to keep the hands clean and safe away from any infectious diseases. Other reasons includes;

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- Use of alcohol based sanitizers or handrub
- Washing hands with soap and water always under running water or use of veronica bucket in washing
- Effective washing of hands and sanitizing regularly
- Good hand hygiene practice reduce infections from the virus
- Hand hygiene practice breaks the chain of contamination to prevent or minimize and control the spread of the virus to the next person
- Good hand hygiene practice inhibit the activity of the virus and associated infections since the soaps used in washing contain chemicals that deactivates the virus
- Quality hand hygiene reduces infections
- Good hand hygiene practice kills or deactivates any microorganism or virus that hands gets into contact with

Thirdly, respondents share their views and opinions challenges their firms are facing in implementing the hand hygiene protocols or practices. The responses from individuals within the study areas includes;

- Lack of hand washing facilities
- Inadequate veronica buckets, soap, tissue paper
- Ignorance and poor education on hand hygiene
- Wasting of tissue paper, water and soap
- Breakdown of hand washing facility
- Low level of compliance to hand hygiene protocol
- Lack of funds/logistics constraints which will not promote hand hygiene practice
- Stealing of soaps, tissue paper , sanitizers and other hand washing materials from installed points and stores in schools and working institutions.

Final parameters measured includes the actions that can result in the contamination of hands within the public settings. Some of the activities that can lead to the contamination of hands in public settings includes;

- Shaking of hands and handling money
- Coming into contact with Covid infected person
- Handling of food or water handed over from an infected person
- Improper way of hand handwashing or not following the WHO recommended guidelines
- Handling of door hands in the public settings
- Touching surfaces especially when working
- Sneezing and coughing into the palms
- Visiting the toilets and washrooms and not washing the hands after

## 5 CONCLUSION

Covid – 19 a pandemic which devastated the world wiping millions of lives out of planet earth will continue to cause this havoc as it's on the surge if hand hygiene is not practiced effectively. Notwithstanding all the three protocols; hand hygiene, wearing of face mask and social distancing should be observed seriously. Ghana's cases is rising because of the mentality that Covid – 19 isn't going to cause overwhelming problems in Ghana again. With this in

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mind, the protocols to be observed are no more held in high esteem. The three main protocols recommended by WHO are; hand hygiene, wearing of face mask and social distancing (2m apart). This research work with hand hygiene as the focus is still being practiced in homes, at bars, in churches, state and private institutions, streets but on a lighter note. But hand hygiene was seriously practiced under stringent guidelines recommended by WHO within the study areas and in Ghana when Covid – 19 was on the surge in 2020. In Ghana, from January 2020 to January 2022, there have been 152,729 confirmed cases of COVID-19 with 1,336 deaths (*source: WHO*). Research findings from the study area indicates that Ghanaians adhered to the Covid – 19 protocols especially the three; wearing of face mask, hand hygiene and social distancing. Covid – 19 cases is still surging in Ghana and therefore the need to still adhere and practice the protocol for utmost protection against the Covid – 19 virus. It is very necessary to follow the eight steps of hand washing as given by WHO in order to achieve effective hand hygiene as depicted in **Fig. 2**. Covid – 19 is still with us as Ghanaians and within the study area requiring of us to master and practice the hand hygiene in order to curb Covid – 19. This should be done always together with other protocols until Covid – 19 becomes like any of the pandemic that has impacted the world before. Again until a very effective vaccine that controls and help manage the Covid – 19 is obtained just like HIV/AIDs management for the welfare of mankind.

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