IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 13, Issue 2 Ser.3 (Mar. – Apr. 2024), PP 45-50
www.iosrjournals.org

Hands In Safe Hands; Hand Hygiene One Way To Prevent Diarrhoea In Young Children, In Port Blair- An Epidemiological Study.

Uzma Rahman[1], P. Vijayachari*, Kannan.T, N. Muruganandam
Icmr-Regional Medical Research Centre, Dollygunj, Port Blair 744101, Andaman And Nicobar Islands, India.

Abstract
Background
Diarrhoea is the passing of loose stools more than three times a day. The wide array of microorganisms responsible for transmitting diarrhoea through faeco-oral route. Hand hygiene (HH) is an act of cleaning hands with bar soap or liquid soap and water to remove dirt or microorganisms that linger on the hands. WHO recommended hand washing (HW) for at least 20 seconds before and after using the toilet, after cleaning the child's bottom, and before cooking and eating. Handwashing was promoted more during COVID-19, while liquid soap was preferred over bar soap. The study was conducted to rule out the relationship between the transmission of diarrhoea and unhygienic practices of handwashing.
Aims: *An epidemiological study on hand and toilet hygiene was conducted in diarrhoeal patients to discuss (1) whether liquid soap is more effective than bar soap and (2) whether diarrhoea can be prevented by acquiring the correct way of washing hands.*
Objective: *To assess the effects of hand washing on diarrhoea episodes in infants and in older children.*
Methodology: *A study was done on 325 children up to 14 years using proforma who were enrolled for evaluation regarding their hand and toilet hygiene practices.*
Results: *The study was done between 2018 and 2022, including 325 patients aged 14 and up. Children aged 1 to 5 years have the highest rate of diarrhoea 64.0% when they wash both hands simultaneously, compared to 60.0% when they washed their contaminated hand. 50% of the cases utilised bar soap for handwashing after defecation, while 33% used liquid soap.*
Conclusion: *Basic, necessary habits are washing your hands after defecation that mitigates the negative effects of diarrhoea on children from both high- and low-income households. Demonstrations were made in order to create awareness and maintain hand and toilet hygiene practices moving forward for better health regarding. This is the first article on toilet hygiene in regard to Port Blair's initiatives to prevent diarrhoea.*
Keywords: *diarrhoea, liquid soap, bar soap, hand and toilet hygiene, health education.*

Date of submission: 01-04-2024 Date of acceptance: 10-04-2024

I. Introduction

Diarrhoea is one of the most prevalent symptoms of gastrointestinal diseases; it is defined as passing loose, watery stools at least three times per day or more than usual [1]. In children, diarrhoea episodes are usually mild and cause electrolyte imbalance and dehydration, depending on the severity of the infection, resulting in death, which can be prevented by replenishing fluids [2]. Microorganisms are causative agents that transmit the infection through the faeco-oral route. It is ranked second globally and third in India, killing 5 million children each year [1]. It is the most common cause of death in children under the age of five due to diarrhoea [4]. 13% of death cases were registered each year between 1990 and 2016, killing 3 million children [5]. Morbidity and mortality risks are increased in developing countries in Africa and Southeast Asian countries; about 75% of these occur during infancy [3]. By 2004, 2.16 million deaths and 4.6 billion cases had been reported worldwide, with over 50% of those deaths occurring in low-income nations [6]. According to a 2016 estimate, diarrhoea results in 1.6 million fatalities annually and is prevented merely by hand washing [7]. Handwashing can cut off the risk of diarrhoea by 30% on average [8]; their previous review from 2002 said 42–47%. [11] A strong approach was initiated by the WHO for the control of diarrhoea [9], which includes hygiene promotion [10] and proper access to water supply for households and communities [11].

PREVENTION OF DIARRHOEA BY HANDWASH: Handwashing is one way of preventing diarrhoea; effective handwashing after defecation plays a vital role in preventing faecal pathogen transmission in nosocomial and among communities. Handwashing etiquette and its impact on infections are major issues [8], as

most people overlook the importance of hygiene [10]. The use of soap is considered the most effective method, but it fails to combat pathogens effectively. WHO has amended certain strategies for the control of diarrhoea, such as providing clean water to households and encouraging communities to adopt hygiene practices, one such activity is hand washing [9]. There are many ways to reduce diarrhoeal disease, and it is important to assess the effectiveness of hand washing [14].

According to the WHO, there was sparse verbal information on hand cleanliness, but no article has been well documented. The new study sheds light on how to improve hand hygiene to reduce diarrhoea episodes by washing hands properly and using liquid handwash over bar soap. The present hand hygiene study was carried out and conducted at children's hospitals (Chirayyu Child Care, INHS Dhanvantri Hospital, Port Blair Andaman Child, and Nicobar Island) in Port Blair (South Andaman).

II. Methodology

Data was collected using a predesigned proforma. Participants were asked about their diarrheal episodes and their method of handwashing, which included (a) cleaning the contaminated hands first after defecation or mixing both hands; and (c) using bar soap or liquid soap for handwashing after defecation or cleaning the children's defecation.

SAMPLE SIZE: A total of 325 children suffering from diarrhoea were surveyed, spanning in age from newborn to 14 years old.

STUDY AREA: The study was carried out at children's hospitals Chirayyu Child Care and INHS Dhanvantri Hospital in Port Blair district, South Andaman.

III. Results

Fig 1: Use Of Bar Soap And Liquid Handwash In Diarrhoea Afflicted Cases

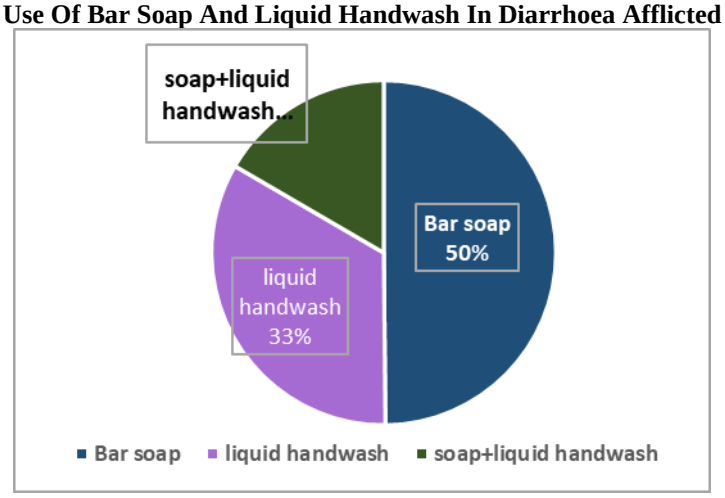

***Fig.1*:** shows that out of 325 diarrhoea cases, 162 (50%) used bar soap, 109 (33%) used liquid soap, and 54 (17%) used both bar soap and liquid soap to wash their hands.

TABLE - 1: THE ASSOCIATION OF AGE WITH THE HANDS USED/WASHED

	Single Hand		Both Hands		Total	
	n	%	n	%	n	%
Age Classification of the Child						
New Born	1	2.9	4	1.4	5	1.5
2-4 Months	1	2.9	3	1.0	4	1.2
5-11 Months	6	17.1	54	18.6	60	18.5
1-5 Years	**21**	**60.0**	**187**	**64.5**	**208**	**64.0**
>5 Years	6	17.1	42	14.5	48	14.8
P-value= 0.814						
GENDER	N	%	N	%	n	%
Female	16	45.7	117	40.3	133	40.9
Male	**19**	**54.3**	**173**	**59.7**	**192**	**59.1**

TABLE - 1: THE ASSOCIATION OF AGE WITH THE HANDS USED/WASHED						
	Single Hand		Both Hands		Total	
	n	%	n	%	n	%
P-value= 0.542						

Table 1: shows a correlation between hand hygiene and diarrhoea in different age groups. The total number of cases in children aged 1–5 years reported more cases of diarrhoea (64.5%, n = 187) when washing both hands together, compared to 60.0% (n = 21) when washing only the contaminated hand.

Age wise distribution on the basis of hand hygiene: The prevalence of diarrhoea was higher in the age groups 5–11 months (18.6%, n = 54), >5 years (14.5%, n = 42), newborns (1.4%, n = 4), and 2-4 months (1.0%, n = 3). In comparison to the cases of washing only contaminated hands, age groups between 5 months and above 5 years had a similar prevalence of 17.1% (n = 6), while age groups of newborns and 2-4 months had a similar prevalence of 2.9% (n = 1). The p value of 0.814 shows no significant correlation between hand hygiene and age groups.

Gender-wise distribution of hand hygiene: male incidence is higher than female, at 59.1% (n = 192) and 40.9% (n = 133), respectively. Males are more likely to wash both hands than to wash only one contaminated hand (59.7% (n = 192) versus 54.5% (n = 19). In females, washing both hands has a higher prevalence than washing one hand (59.7% (n = 173) vs. 54.3% (n = 19). The p value of 0.542 indicates no significant relationship between the two variables.

Fig.2: The Association Of Product With The Hands Washed

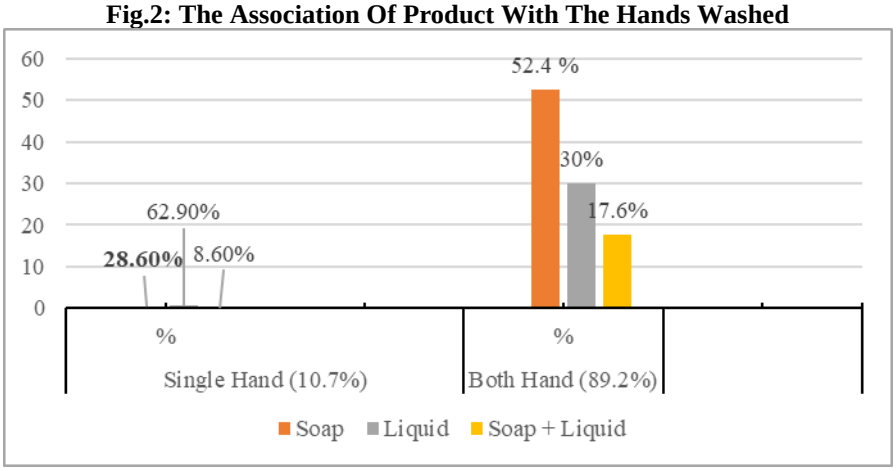

Fig 2: shows the different modes of handwashing after defecation or after cleaning the child's bottom. Of the 325 patients in total, 290 (89.2%) had cleansed combining both hands, whereas 35 (10.7%) had cleansed one hand separately using different products. **Cases washed by combining both contaminated and uncontaminated hands;** out of 290 (89.2%) cases, 152 (52.4%) used bar soap, 87 (30%) used liquid handwash (L.H.), and 51 (17.6%) used both SO and L.H. **Cases that preferred to wash their single hands:** out of 35 (10.7%) cases, 22 (62.9%) have washed their single hands using liquid handwash, 10 (28.6%) used soap, and 3 (8.6%) used both soap and liquid handwash, depending on the availability of the product. The *p value* of 0.001 shows a significant correlation between handwashing and the products of handwashing.

Fig 3: Severity Of Diarrhoeal Cases And The Way Of Washing Hand

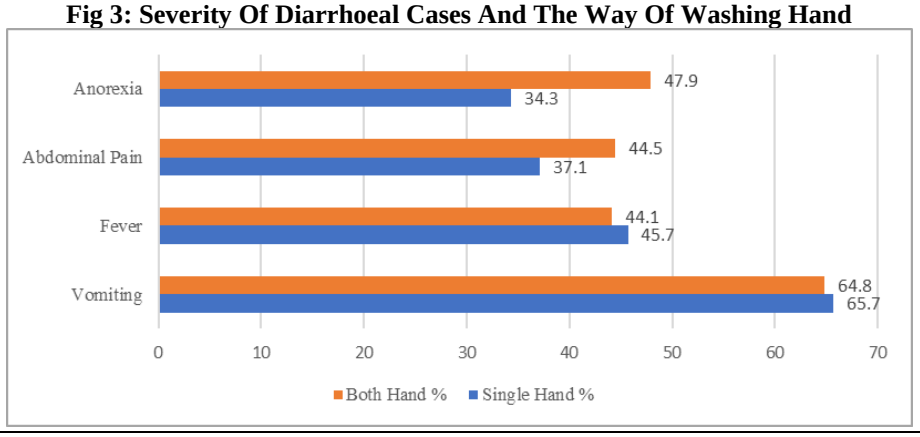

Fig 3*:* shows the severity of diarrhoea depends on whether the infected hand was washed first or if the contaminated and uncontaminated hands were mingled together after defecation. Vomiting and diarrhoea were common in both single and combined handwash cases, at 65.7% (n = 23) and 64% (n = 188), respectively, followed by fever at 44% (n = 128) and 45.7% (n = 16). Abdominal pain and anorexia were more common in those who cleansed both hands with 44.5% (n = 129) and 47.9% (n = 139), compared to those who washed contaminated hands first with 37.1% (n = 12) and 34.3% (n = 12), respectively.

TABLE - 2: THE ASSOCIATION OF CHARACTERISTICS WITH THE PATIENT TYPE

	n	%	Odds Ratio	95% CI	p-value
Water Source – Bore well					
No	320	98.5			
Yes	5	**1.5**	0.868	[0.143, 5.266]	**0.8778**
Water Source – Pond					
No	312	96.0			
Yes	13	4.0	0.378	[0.102, 1.401]	**0.1456**
Water Source – Tap water					
No	100	30.8			
Yes	225	**69.2**	1.297	[0.803, 2.096]	**0.2882**
Water Source - RO Water					
No	323	99.4			
Yes	2	**0.6**	1.307	[0.081, 21.081]	**0.8502**
Boiling					
No	125	38.5			
Yes	200	**61.5**	1.067	[0.680, 1.676]	**0.7771**
Chlorination					
No	175	53.8			
Yes	150	**46.2**	0.901	[0.580, 1.399]	**0.6410**

Table 3 shows the types of water used by the patients for drinking, cooking, and cleaning. Tap water was used the most with 69.2% (225), followed by boiling water with 61.5% (200), chlorination of water with 46.2% (150), and pond water with 4.0% RO water and borewell water with 0.65 and 1.5%, respectively. The p value of all the types of water used showed no significant correlation between the diarrheal patient and hand hygiene.

IV. Discussion

The current study provides a comprehensive understanding of hand hygiene among mother-dependent and older children. Between September 2018 and March 2022, an epidemiological study was conducted in a hospital on 325 diarrheal patients aged 0 to 14 years old. The study was conducted at children's hospitals in India's Port Blair area. To assess hand and toilet hygiene, proforma data were collected using a pre-designed questionnaire.

In the present study, the majority of cases, i.e., 162 (50%) used bar soap, 109 (33%) used liquid soap, and 54 (17%) used both soap and liquid soap to wash their hands after defecation. A similar study was conducted in Bangladesh, where 20% of them used soap and less than 10% of them used ashes since the soap was too expensive for them, where soil or ashes were used as a rubbing agent, 40% of them used soil, 19% used soap, and 81% did not use any resources to cleanse hands after defecation **[15].** In another study in northwest Ethiopia in rural areas, 17% used wood ashes as a cleaning agent after defecation. In their study, they have shown the comparison between soap and wood ashes, as the latter fails to remove potential microorganisms present on the hand but proves to be better than the use of water alone **[16]**.

In this study, children aged 1–5 years reported higher cases of diarrhoea, where 187 (64.5%) mothers informed us that they washed both hands together and 21 (60%) washed contaminated hands first.

In age-dependent parity, the majority of mother-dependent children who washed with both hands had more cases than older ones: 5-11 months (18.6%), over 5 years (14.5%), neonates (1.4%), and 2-4 months (1.0%). The prevalence was 17.1% for those aged 5 months to 5 years, and 2.9% for newborns and those aged 2-4 months. The p value of 0.814 was not statistically significant. In our investigation, the majority of cases used soap and washed both contaminated and uncontaminated hands together; fewer used liquid handwash and washed contaminated hands first; and some used both soap and liquid handwash, depending on the product availability. Transitions from soap to liquid handwashing were recorded before and throughout the COVID-19 pandemic.

The current study also reveals the resource of water used by the patients for drinking, cooking, and cleaning, where tap water was used the most with 69.2% (225), followed by boiling water with 61.5% (200), chlorination of water with 46.2% (150), and pond water with 4.0%, RO water, and borewell water with 0.65 and 1.5%, respectively. The p value of all the types of water used showed no significant correlation between the diarrheal patient and hand hygiene. In a similar study conducted in Thailand, in a village, stored-water quality

was used for all types of activities and found to be contaminated, especially water used for toilets. In their study, it was observed that washing dishes and cooking-related activities were more contaminated with faecal bacteria when dirty utensils used for cooking and eating were left unwashed in the contaminated soak water. Cross-contamination via water handling was an integral part of stored water pollution **[17].**

In our study, severity of diarrhoea was seen in single handwash in the previous symptoms, heralded high levels of abdominal pain and anorexia, with 44.5% and 47.9%, respectively, with those who preferred combining washing both hands in comparison to cases washing contaminated hands first, with 37.1% and 34.3%.

Hand washing is necessary; however, the majority of cases wash combining both their hands after defecation, which is one of the worst habits since contaminated hands must be cleansed first, followed by washing both hands. Of the 325 patients in total, 89.2% cleansed both hands, while 10.7% cleansed contaminated hands first with different products. Hands were washed by mixing: 52.4% of cases used bar soap, 30% used liquid handwash (L.H.), and 17.6% used both.

Cases who washed their contaminated hands first revealed that 62.9% used liquid handwash, 28.6% used soap, and 8.6% used either soap or liquid handwash. The *p value* of 0.001 was statistically significant for handwashing and products of handwashing. A similar study was conducted about 90 women in Bangladesh (a semi-rural area) who were observed washing their hands after defecation. Several ways of handwashing practices were seen in their study, i.e., the cleaning agent, using left or both hands, frequency of rubbing hands, and the amount of water used **[15].** Handwashing can cut off the risk of diarrhea. Their review suggests that 30% on average is explained by Cochrane, and their previous review from 2002 said it was 42–47% **[11].** A recent review by Fewtrell et al. suggested 44% **[18],** and in the best-organised trial, by Luby et al., Pakistan came up with a figure of 53% **[19].**

The data on the utilisation of soap and liquid handwash was posed usually after defecation or after handling children's defecation. For the use of liquid handwash, figures were inflated by 5% only after the declaration of the pandemic; it was a key requirement for keeping away from the COVID-19 infection. affiliation with infection was due to the parents, guardians, or siblings who were already infected with respect to age.

V. Summary

- In Port Blair, families are typically unilineal with 5-6 members, although some households may have up to 14 members. Nuclear families are uncommon. Following defecation, all members often use a single bar of soap for hygiene purposes. The current study focuses on children who contract diarrhoea by the faeco-oral route after coming into contact with infected family members, classmates, or neighbours who have previously had diarrhoea.
- Data on bar soap and liquid soap use were often obtained following defecation or faeces management for children.
- In 2019, the theory of washing hands with soap was twisted when the world was pummelled by the coronavirus infection outbreak. The use of liquid soap data was exaggerated by 5% only after the proclamation of the pandemic, as it was a critical prerequisite for avoiding COVID-19 infection. The association to infection was due to parents/guardians/siblings who were already affected based on age.
- Children under five are more likely to rely on others for daily needs, leading to a higher prevalence of diseases caused by inadequate hand or toilet hygiene habits.

VI. Conclusion

Diarrhoea is a potentially fatal infection that affects millions of children in India and around the world. This study was designed to introduce and educate hospital workers and patients about toilet and hand hygiene. Diarrhoea can spread through family members and carers, especially mothers. Children beyond the age of five may escape infection due to the fact that they are independent. The survey focuses on health promotion and its impact on socioeconomic status, resources of water and practicing good hand and toilet hygiene to decrease the burden of disease among young children. The Regional Director, SEARO said that "Promoting hand hygiene at all levels of health care is also critical. Hand hygiene, a very simple action, is well accepted to be one of the primary modes of reducing health care-associated infection and of enhancing patient safety" [20]. The year 2019 marks a censorious reminder for the world due to COVID-19, that hand washing is a simple & cost-effective step to save lives. "Hands in safe hands" a phrase to set a new atmosphere for the mothers to get educated on toilet and hand hygiene as child can only be healthy if they are in safe hands.

References

[1] World Health Organization, The Evolution Of Diarrhoeal And Acute Respiratory Disease Control At Who, Who, Geneva, 1999, Https://Www.Ncbi.Nlm.Nih.Gov/Pmc/Articles/Pmc6816052/ Accessed June 2009.

[2] Chen J, Wan Cm, Gong St, Et Al. Chinese Clinical Practice Guidelines For Acute Infectious Diarrhea In Children. World J Pediatr. 2018; 14:429–36. [Pubmed] [Google Scholar] [Ref List]

[3] Boschi-Pinto, C, Velebit, L. And Shibuya, K. (2008). Estimating Child Mortality Due To Diarrhoea In Developing Countries. Bulletin Of The World Health Organization ; Vol. 86, No. 9 ; P. 710-717.

[4] Diarrhoeal Disease Fact Sheet . *World Health Organization. March 2024.* Https://Www.Who.Int/News-Room/Fact-Sheets/Detail/Diarrhoeal-Disease

[5] Lakshminarayanan, S. And Jayalakshmy, R. (2015) Diarrheal Diseases Among Children In India: Current Scenario And Future Perspectives. Journal Of Natural Science, Biology, And Medicine, 6, 24-28; Https://Doi.Org/10.4103/0976-9668.149073

[6] Who (2008a). The Global Burden Of Disease: 2004 Update. Geneva, World Health Organization; Https://Www.Who.Int/Publications/I/Item/9789241563710

[7] Burden Of Disease From Inadequate Water, Sanitation And Hygiene For Selected Adverse Health Outcomes: An Updated Analysis With A Focus On Low- And Middle-Income Countries, Annette Prüss-Ustün, Jennyfer Wolf, Jamie Bartram, Thomas Clasen, Oliver Cumming, Matthew C. Freeman, Bruce Gordon, Paul R. Hunter, Kate Medlicott, And Richard Johnston; Https://Pubmed.Ncbi.Nlm.Nih.Gov/31088724/

[8] Regina I Ejemot-Nwadiaro, John E Ehiri, Dachi Arikpo, Martin M Meremikwu, And Julia A Critchley, Hand-Washing Promotion For Preventing Diarrhoea; Monitoring Editor: Cochrane Infectious Diseases Group ; Https://Www.Ncbi.Nlm.Nih.Gov/Pmc/Articles/Pmc8094449/

[9] Feachem Rg, Hogan Rc, Merson Mh. Diarrhoeal Disease Control: Reviews Of Potential Interventions. Bull World Health Organ 1983; 61:637–40.

[10] Clasen T, Roberts I, Rabie T, Schmidt W, Cairncross S. Interventions To Improve Water Quality For Preventing Diarrhoea. Art. No.: Cd004794. Doi: 10.1002/14651858.Cd004794.Pub2.

[11] Curtis V, Cairncross S, Yonli R. Domestic Hygiene And Diarrhoea—Pinpointing The Problem. Trop Med Int Health 2000; 5:22–32

[12] Weekly Epidemiological Record, Vol. 83, No. 47, 21 November 2008

[13] Rabie T, Curtis V. Handwashing And Risk Of Respiratory Infections: A Quantitative Systematic Review. Trop Med Int Health 2006; 11:258–67.

[14] Cave B, Curtis V. Effectiveness Of Promotional Techniques In Environmental Health. Study No 165. Well Resource Centre. London: Dfid, 1999.

[15] B. A. Hoque, M. J. Alam, Msc And M. S. Islam, Post-Defecation Handwashing In Bangladesh: Practice And Efficiency Perspectives Phd International Centre For Diarrhoeal Diseases Research, Bangladesh (Icddr, B), Gpo Box 128, Dhaka 1000, Bangladesh Public Health (1995), 109, 15-24 ~ 1995 The Society Of Public Health

[16] Zemichael Gizaw, Alemayehu Worku Yalew, Bikes Destaw Bitew, Jiyoung Lee, Michael Bisesi. Effects Of Local Handwashing Agents On Microbial Contamination Of The Hands In A Rural Setting In Northwest Ethiopia: A Cluster Randomised Controlled Trial Bmj Open 2022;12: E056411. Doi:10.1136/ Bmjopen-2021-056411.

[17] J. V. Pinfold. Faecal Contamination Of Water And Fingertip Rinses As A Method For Evaluating The Effect Of Low-Cost Water Supply And Sanitation Activities On Faeco-Oral Disease Transmission. I. A Case Study In Rural North-East Epidemiol. Infect. (1990), 105, 363-375; Doi: 10.1017/S0950268800047956; Https://Www.Ncbi.Nlm.Nih.Gov/Pmc/Articles/Pmc2271899/

[18] Fewtrell L, Kay D, Enanoria W, Haller L, Kaufmann R, Colford Jm. Water, Sanitation And Hygiene Interventions To Reduce Diarrhoea In Developing Countries; A Systematic Review And Meta-Analysis. Lancet Infect Dis 2005;5:42–52.

[19] Luby S, Agboatwalla M, Feikin D Et Al. Effect Of Handwashing On Child Health: A Randomised Controlled Trial. The Lancet 2005;366:225–33

[20] Handwashing An Effective Tool To Prevent Covid-19, And Other Diseases,15 October 2020, News Release, Who-Searo (World Health Organization South East-Asia Region)