Research Article

Water, Sanitation and Hygiene (WASH) in Schools of Asia

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ABSTRACT:

Introduction: There are frequently no water facilities, sanitary facilities, or hygiene programs in many Asian schools.

Objective: To ascertain the water, sanitation, and hygiene (WASH) programs impact in schools across Asia, a thorough study of the literature was conducted.

Methodology: PubMed and Google Scholar, among other web sources, were used to extract the data. PRISMA guidelines were adhered to throughout the whole search process. Nine publications in all that satisfied the established inclusion criteria were examined.

Results: Even while some analyses failed to find significantly increases in statistical gains in improving health or showed that benefits depend on the type and context of therapies, several research have shown that students with diseases do better than the general population. According to several studies, there have been changes to WASH knowledge, attitudes, and practices, such as not using soap while washing hands.

Conclusions: It is necessary to do more research to find out how school-based WASH initiatives could help in improving the habit of good hygiene in community and extended family member health. Even while adopting WASH programming in schools does not guarantee success, making sure that there is enough promotion of sanitation, clean water and hygiene approach has the potential to dramatically increase inclusion, equity, health, and education.

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INTRODUCTION:

Hand hygiene, approach to clean water for drinking, and better sanitation were unfinished business for the century and are still top goals under SDG 6[1]. Most frequently occurring infectious diseases, such as typhoid, diarrhea, and hepatitis, are brought on by inadequate access to clean water, bad hygiene habits, and unsanitary conditions, especially in low socioeconomic countries.[2], Studies show that maintaining human health depends on appropriate sanitation practices, having approach to clean water for drinking, and providing adequate services for good hygiene.[3] The system of primary healthcare oversees all the important factors for improving healthcare and planning services for families, such as vaccination, cleanliness, infectious disease prevention, sanitation, etc.[4], One of the major tactic for lowering diseases that are related to medical treatment are using proper hand hygiene.[5] facilities of suitable water, sanitation, and hygiene (WASH) in schools, the following features are present: a dependable water framework that gives clean and enough water, particularly for drinking and to wash hands; a suitable amount of latrines for children and teachers that are discreet, safeguarded, clean, and acceptable for both genders; water application and facilities to wash hands, including a nearby latrine; and persistent hygiene promotion[6].In an ideal world, authorities would pay special attention to everyone, especially young children, girls who are menstruation, and kids with disabilities. However, poor WASH conditions exist in numerous low-income Asian nations, which negatively affects wellness and school involvement[7]. According to a UNICEF survey, just 51% of schools in Asia have reach to clean sources of water, and only 45% have sufficient sanitation.

Worldwide, WASH programs in schools focus to accomplish a number of goals, including the ones outlined as follows: decrease in the diarrhea prevalence and other diseases related to hygiene; improve student involvement and their performance in class; and change the practices of hygiene by parents and siblings by empowering kids to become change agents in their homes and communities. However, the results of studies looking at how well WASH program in school initiatives work have been blended. The outcome of prior reviews of two studies looking at the effects of WASH interventions in schools were contradictory[7,9]. Although Joshi and Amadi's[9] study only accepted research (n = 15) dispersed between 2009 and 2012, it also had a worldwide emphasis and included studies from North America and Europe. The majority of the included research (n = 41) in the analysis by Jasper et al.[7] originated in high- and middle-income countries (such the US and the UK).

This study's goal is to look at peer-reviewed journal papers that have been written about WASH in Asian countries' schools. The review is centered on an intervention-based study and its main findings, which include schoolchildren's health (including diarrhea and other disease related to hygiene), Changes in the incidence of diseases and hygiene practices among school-age children, their families, and the community, as well as changes in enrollment and student participation in the classroom, as well as WASH knowledge, attitudes, and hygiene practices. The verdict additionally takes into account the intercession constancy's under-expo-

sed signal. The article also identifies promising and understudied topics for further study.

MATERIALS AND METHODS:

This research complied with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) standards. Following online databases were looked up by us: PubMed, google scholar till June 2023. The keywords used were "WASH" or “hygiene” or "hand hygiene" or “water” or "hand wash" AND school or attendance AND "Asia”. The references in the papers were carefully checked for content of significance. No deadlines were set for publishing. A school-based WASH intervention in Asia was also evaluated in the peer-reviewed studies that made up the collection. The WASH intervention comprised efforts to provide water, better sanitation (better bathrooms, menstrual facilities), and actions to alter people's hygiene habits (such educating them how to use soap while washing their hands and how to keep their surroundings clean). It included the distribution of drinking water as well. Results related to education (such as attendance at school and dropout rates), hygiene behavior, knowledge, and attitude, and health (such as WASH-related diseases) are among those that have been documented. A few studies additionally showed intervention devotion or adherence to intercession conveyance regulations (either as a "exposure" or a "outcome"). We only considered stories that focused on Asian countries. The survey was only open to publications with theoretical foundations and English language articles. To assure data integrity, all databases were initially thoroughly searched using specialized search techniques, and duplicate research were eliminated. A list of relevant papers was then created for further evaluation. Following previously set inclusion and exclusion criteria, the remaining papers' titles and abstracts underwent a rigorous assessment in the first phase. The second phase involved evaluating the studies' applicability by reading the entirety of the pertinent publications, and any research considered unnecessary were disregarded.

Following a thorough inspection, we classified the publications and retrieved relevant data from each research. We next structured the retrieved data to better reflect (i) the first author, (ii) sample size, (iii) nation, (iv) context (community and facility based, rural and urban), (v) screening approach and diagnostic criteria, (viii) age ranges, and other factors. The research that was not included in the analysis were all carefully recorded and documented.

RESULTS:

In the first literature search, 1260 studies were gathered. 2200 records were found after duplicate studies and studies conducted for other reasons were eliminated. By going over the titles and abstracts, 1800 suitable papers were eliminated (Fig. 1). On the remaining 400 studies, the entire text was retrieved. 200 reports were reviewed in the screening stage to determine their eligibility, and 190 articles were removed after reading the entire text in compliance with the inclusion and exclusion criteria. Finally, this systematic review comprised a total of 10 papers. Between 1995 and 2022, studies in many nations, including those in the Asian area, were published. Table1 provides an overview of the major conclusions and study features.

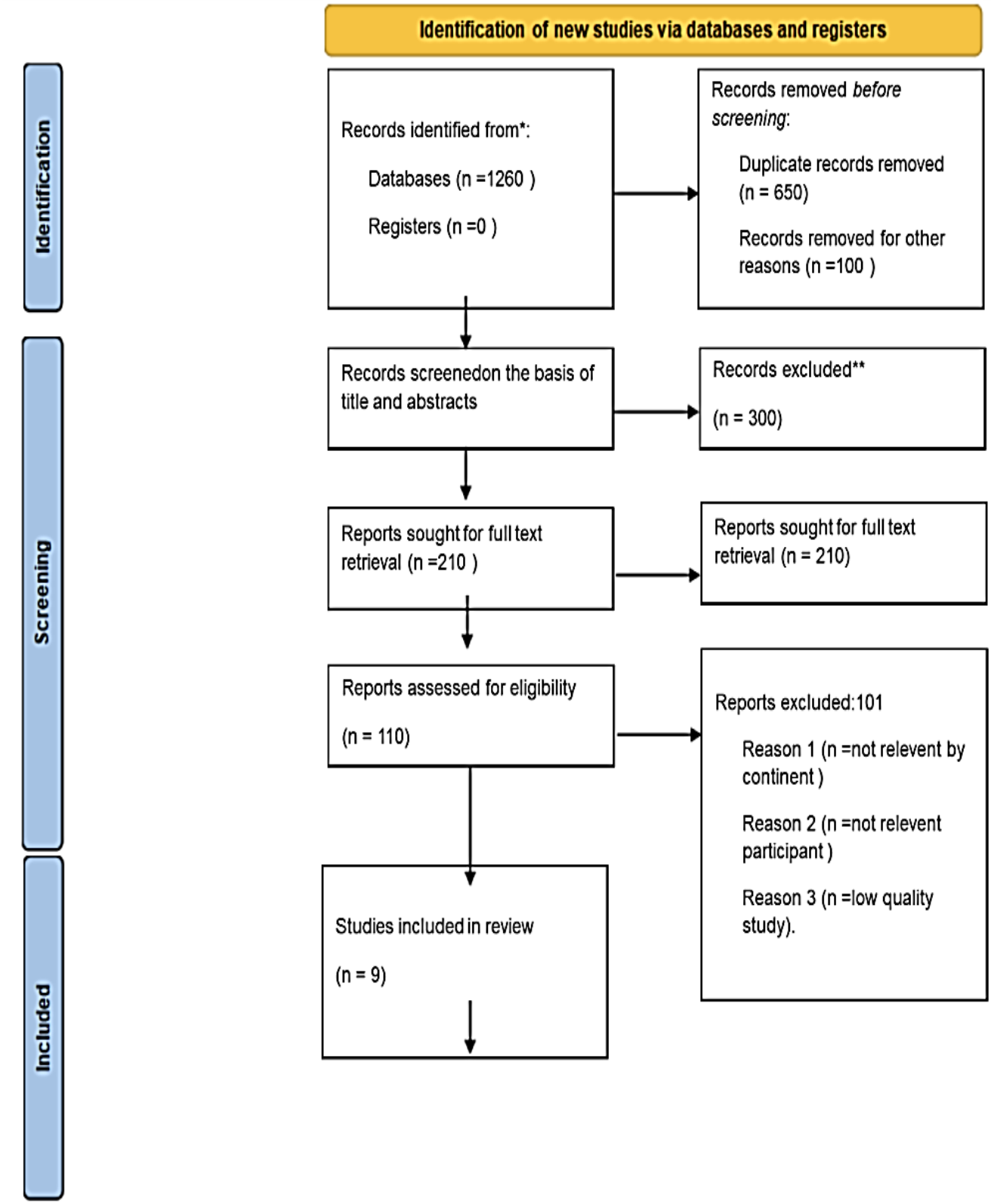

Fig. 1: Data Collection Procedure Flowchart

Table 1 lists the outcomes measured in the papers that were included (n = 9).

Number	Authors	Country	Study Design	Sample Size	Intervention	Outcome Measure	Findings
1	Bieri FA, Gray DJ, Williams GM, Raso G, Li YS, Yuan L, He Y, Li RS, Guo FY, Li SM, McManus DP.[10]	China	Cluster-randomized trial	38 schools	A programme for health education containing animated movie on Soil Transmitted Helminthes's, a broch-ure, a teacher training session, and an essay competition was sent to randomly selected schools, whereas a control displayed a health awar-eness poster.	Infection rates from soil transmitted helminths, awareness of these parasites, self- reported hygiene practises, and observed hand-washing habits	A health education initiative helped students develop better hygiene practises, learn more about STHs, and experience a 50% decrease in STH infection in just one academic year.
2	Bowen et al. 2007[11]	China	Cluster randomized trial	87 primary schools	Regular government hygiene education (such as a yearly reminder to wash your hands before and after using the lavatory) is a good way to control this. Standard intervention: ongoing government education with a handwashing campaign. expanded intervention: in addition to routine soap, peer hygiene monitors, and government education.	rate of student absence	The number of days and episodes of student absenteeism were dramatically decreased in schools that offered both a standard and enhanced hand-washing promotion progr-amme and soap.
3	Dujister et al. 2017 [12]	Cambodia, Indonesia and Lao PDR	Non-randomized clustered controlled trial	At baseline, there were 1847 public elementary school stud-ents; at follow - up, there were 1499.	The "FIT programme" at the school offers daily group soap handwashing, fluoride toothpaste teeth brushing, biennial deworming, and group handwashing in groups facilities.	Weight, dental health, and parasitological state of youngsters.	Oral health (odontogenic infe-ction) prevalence, STH infection prevalence, and thinness preva-lence did not substantially differ bet-ween intervention and con-trol schools, follow-up, or base-line. There was a considerable reduction in dental caries.
4	Dreibelbis et al. 2016[13]	Bangladesh	before and post-interventio n research	2 elementary schools (514 and 220 pupils)	Economical cues that encourage soap based hand washing are often referred to as environmental cues to change behaviour. The use of nudges includes paving brightly coloured pathways from restrooms to handwa-shing stations and leaving footprints on routes to guide children to those locations.	Handwashing with soap (HWWS)	The day after nudges were stopped, HWWS rose from 4% to 68%, and at two and six weeks after intervention, it rose even higher to 74%. Nudgebased interventions might improve HWWS among school children.

5	Grover et al. 2018 [14]	Bangladesh	Cluster-randomised trial	20 government schools.	Given one of the following four interventions: Building the infrastru-ucture for handwashing can be done in one of two ways: concurrently or sequentially. High-intensity HE and infrastructure development occu-rring simultaneously Infrastructure for sequential handwashing and HE	rates of soap-based handwashing (HWWS) after a bathroom visit e.	The HE intervention and the nudge intervention both had an equivalent impact on raising HWWS after toileting five months after the intervention. Sequential HE delivery consider-ably underper-formed simultan-eous HE delivery, and there was no discernible difference between sequential and simultaneous nudge intervention delivery.
6	UNICEF 1994 .[15]	Bangladesh	Cross-sectional	228 schools	Construction quality, rates of WASH infrastructure use, maintenance of WASH facilities, student knowledge of WASH, and student cleanliness habits.	School attendance among girls	Following intervention, it was discovered that girls were attending school more frequently.
7	Oster E, Thornton R[16]	Nepal	Randomize d control trial	198 teenage girls and their moms; 4 schools in rural Chitwan , Nepal.	Teenage girls in rural Nepal are given menstruation cups.	Attendance in school and test results.	There is no proof that menstrual technology influences exam results or attendance at school. Menstrual technology may help with blood control, but it doesn't seem to lessen cramps and exhaustion.
8	Freeman MC, Clasen T[17]	India	Randomize control trail	classrooms of 200 schools	The intervention consisted of distributing commercial water purifiers to classrooms in 200 schools and educating kids, parents, and teachers on fundamental hygiene and water treatment practises.	to enhance the quality of drinking water for kids in schools by encouraging southern Indian homes to adopt better drinking water practises.	There was no proof that the intervention increased knowledge of or use of efficient water purification techniques at home.
9	Paul R. Hunter At all[18]	Cambodia	A Quasi-Experiment al Study	8 schools	Filtration and UV disinfection had both been used to clean the water. Using generalised estimating equations and the negative binomial model, weekly absence rates were compared across all schools.	We calculated absence rates for eight schools, four of which got a daily 20 L container of purified water.	The provision of free water was significantly correlated with lower absenteeism (incidence rate ratio: 0.39; 95% confidence interval: 0.27–0.56). A significant interaction between getting free water and season, as well as a strong link with season (wet vs dry), were also seen.

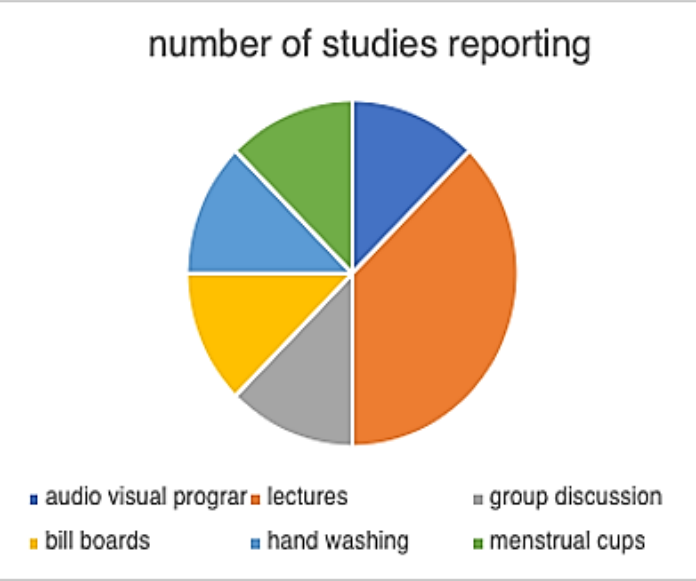

Fig.2: Pie chart showing results

Within the group that got a STH schooling bundle intervention, the recurrence of contamination with STHs was 50% lower than in the benchmark group (4.1% versus 8.4%, p 0.001) among Chinese children who were younger. In an assessment of a hand-washing promotion program in primary schools of china, Bowen et al. 2007[11] noted that there is a low incidence of diarrheal sickness in both the intervention and control groups to find inferable improvements in frequency. A study on hand-hygiene interventions in primary schools of China found that the standard intervention (a handwashing program) reduced absentee episodes by 44% and days of absence by 27%, while the extended intervention decreased absentee episodes by 42% and days of absence by 54%.In a wide-country research, Dujister et al.[12] discovered that, at baseline and follow-up, there was little difference in the prevalence of STH between intervention schools (Which provided deworming and enhanced Hand-washing) and control schools.[12]

To change hygiene habits and lower the risk of WASH-related illnesses, the WASH framework and tools are unquestionably essential beginning points. It has been demonstrated that latrines development on its alone, without other water- and hygiene-related interventions, is unsuccessful at eradicating diarrheal illness. The results of an intervention to promote hand washing among kids in two primary classes in a rural Bangladesh are discussed by Dreibelbis et al. in[13]. There are specific areas for hand washing in the two schools. Two signals were used: the first called for well delineated, exquisitely painted routes bringing students to the hand-washing stations and imprints on stations, while the second called for imprints on the pathways directing students to the handwashing stations. Soap was available, and water capacity containers were periodically topped off. A few schools were also visited. HWWS was low at baseline (4%), but once the nudges ended, it rose to 68% the next day and to 74% two weeks and six weeks after the intervention. The highly increased rates of handwashing found after the intervention indicate that poking may have a long-lasting effect on hygiene practices.

Improving WASH conditions in schools may lower student absence by helping (particularly for girls who are menstruating) and lowering disease transmission [16]. Using a non-experimental survey methodology, an intensive WASH intervention in Bangladeshi schools was assessed. The findings revealed that (depending on the school) girls' absences from class dropped by 9–12%. Several intervention experiments

found little evidence of an impact on attendance. Feminine cups, which are silicone cups used inside for menstrual flow executives, were examined in a study with a small sample of school students in Nepal[11]. The invention, according to the review, had no impact on students' test results or attendance at school. The author hypothesizes that this is because the technology only helped with management of blood and ignored cramps, which were frequently cited as the main cause of absences. However, the study did contain certain flaws, including self-reporting of menstrual cup use and a failure to include the water and sanitation infrastructure already present in schools.

Several studies have concluded that school-based WASH interventions have no effect on students' school presence [16], despite some data outlined by UNICEF that better hand-washing with soap at school, the availability of sanitary pads, and well sustained and hygienic latrines can reduce the rates of absentees in school [15].

Absenteeism was reduced and regions of strength were found thanks to the free water provided (incidence rate ratio = 0.39; 95% CI, 0.27-0.56). However, there were benefits to having a certain season (wet vs. dry), and the relationship between the season and receiving free water was quite strong. It was discovered that the water supplier was not upholding his end of the bargain and was not providing enough water each week at one of the intervention schools. We found a significant correlation between absenteeism and the number of water bottles supplied each week at this school (IRR = 0.98 95%CI 0.96-1.00).[13]

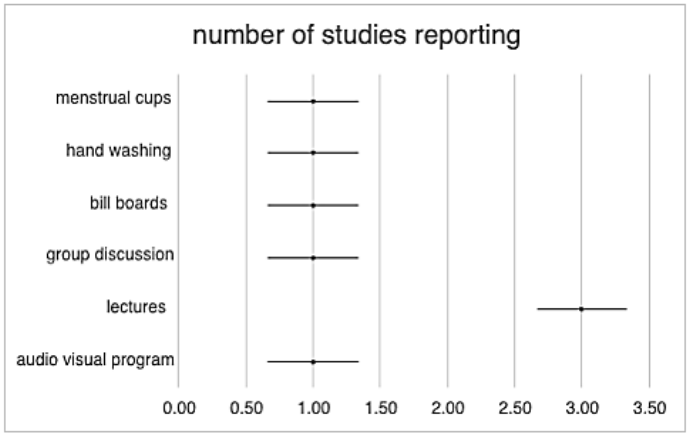

Fig. 3: Forest plot showing results from systematic review of the literature.

DISCUSSION:

The WHO saw projects at schools as a cost-effective way to deliver interventions when it launched the Global School Health Initiative[19–21]. The study in China by Bieri FA et al.[10] revealed that the efficacy in preventing contamination with soil transmitted helminths among the Chinese school children is 50%, putting the children at high risk for contamination with soil-communicated helminths.

In research conducted by Bowen et al. in 2007[11], the conventional program to promote handwashing was evaluated. More than 20 million grade school kids in 550 metropolitan districts throughout China have been receiving the standard handwashing-promotion program examined in this study since roughly 1999. Children who received the extended handwashing intervention and soap had significantly fewer incidents and absence days over the course of the five-month perception period than the children who did not. Prior research on the connection between handwashing and wellbeing was limited to evaluations of handwashing

campaigns delivered to a small number of kids[22]. The importance of an effective, large-scale handwashing promotion program in less developed countries may be attributed to a number of factors. Particularly among children, these regions endure a heavy burden of respiratory and diarrheal illness and death. More than 10 million children under the age of five died in 2000.Around 22% of these deaths in the countries with the highest child mortality rate were caused by diarrheal disease, and 21% by pneumonia.[23] It is likely that up to 1,000,000 of these lives may be spared with appropriate handwashing intervention[19].

In their 2017 [12] study, Dujister et al. evaluated the Fit for School Program's effects over a two-year period on the parasitological, weight, and dental health status of children attending grade schools in Cambodia, Indonesia, and Lao PDR. According to the study, the FIT intervention significantly slowed down the progression of paediatric dental caries (by 24% at normal). No significant decreases in the incidence of STH infection and slenderness were seen due to specified circumstances that were not anticipated prior to the investigation, but this does not mean that the intervention was ineffective. The core of the FIT programme is the planning of a series of fundamental interventions inside the educational setting to promote good hygiene practices and treat some of the most prevalent paediatric diseases in Southeast Asia. The FIT intervenetions, namely washing hands with soap and brushing teeth with fluoride-containing toothpaste semi-annual de-hermitization, and improved WASH foundation, are indisputably backed by sufficient evidence for each of their individual feasibility for advancing child health in controlled settings[25].

According to Dreibelbis et al. 2016[13].The proof of-idea experiment, simple evidence shows that inexpensive nudges can cause significant behavioral changes and lead to an increase in handwashing rates among school -age children. The high incidence of observed handwashing at two weeks and a half month (74%) following the intervention indicates that ecological nudges can alter behavior over the long term. In contrast to covert video surveillance alone, the inclusion of an observer increased handwashing rates by around 10% in research conducted in Kenya[26]. To reduce reaction, future research will test hand-washing behavior using camcorders.

According to research by Grover et al. published in 2018[14] in Bangladesh, where he compared the proportion of primary school kids in rural Bangladesh who wash their hands with soap after using the restroom. Five months after the intervention, a high-intensity hygiene education intervention and a nudge intervention were equally effective in changing supported handwashing behavior. At either the baseline or any of the post-intervention data collection rounds, there was little to no difference between the nudge intervention and the HE intervention. Prior investigations into the reliability of organized handwashing observation, the ongoing gold standard for handwashing perceptions, discovered enormous expansions in handwashing behavior in around 20% of observed households[27]. While unquestionably fewer than 20% of observations revealed unambiguous signs of reaction.

In order to evaluate the influence of benefits and peer effects on technology adoption, Oster E. and Thornton

R.[16] used data from the randomized distribution of menstruation cups in Nepal, one of the few intervention studies in Asian countries that focuses on menstrual hygiene awareness in schools. Numerous qualitative and/or descriptive studies have focused on the hurdles of managing menstrual hygiene (MH) in school settings (example pessimist behaviors, a lack of understanding about health and sexuality, restrictive amenities, and privacy)[23]. This research looked at how menstruation started and was handled in Asian nations. To raise awareness and promote the adoption of efficient POU water treatment in the home, Freeman MC, and Clasen T [17] conducted study in India using an experimental design to investigate the advantages of school-based water quality treatments. The mere delivery of hygiene or any other education in a school-based environment is not a guarantee that knowledge will change, much less behavior, as earlier research has proven that teachers are well aware of.[11]

CONCLUSION:

It's important to comprehend how school-based WASH efforts affect education and health. Governments and donors may find it simpler to provide funding for school-based WASH efforts as a result, and organizations may be able to better plan and implement interventions[28]. WASH intervention research in Asian countries school settings is both costly and difficult. It may be argued that there is no longer a need for more extensive epidemiological investigations on how Wins affects diarrhea in students given the growing body of research[28]. The disparate effects of various Wins program types on overall health and educational outcomes, as well as the extent to which students act as change agents in larger communities, the significance of independent variables like gender and socioeconomic status, and the effects of targeted initiatives on menstrual hygiene management and girls' school attendance, still need to be better understood. To guarantee universal access to WASH in Schools, political will, funding, and effective intervention delivery are necessary, particularly in Asian nations.

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