

## Research Paper

# Immediate influences of hygiene education sessions on handwashing behaviors of selected Nepali students

Govinda Prasad Devkota, Sheri Bastien , Petter D. Jenssen ,  
Manoj K. Pandey, Bhimsen Devkota and Shyam Krishna Maharjan

### ABSTRACT

Appropriate handwashing can prevent 50–70% of water and foodborne infections. However, schoolchildren who are in the formative stage of life, particularly in low-income countries like Nepal, are deprived of such a lifesaving skill. This study investigates the effectiveness of a school-based participatory action research intervention to promote handwashing with soap among basic level community school students in Nepal. Teachers, the school management committee, the participatory action research committee, and child-club members actively participated in designing and implementing the intervention. This study employed a semi-structured interview with the headteacher, five focus group discussions, and spot observations during 50 handwashing with soap events involving students, to collect the data. This study assesses the handwashing situation of students before and after the intervention. As part of the intervention, participatory teaching methods such as singing, drawing, showing a video, games, and demonstrations were used. Findings from basic level students who actively participated in hygiene sessions and increased their handwashing with soap before meals and after toilet use were used as a comparison to baseline. Participants reported that the intervention was perceived positively, pragmatic, and cost-effective. This intervention study concluded that handwashing behaviors improved because of the influence of sensitization sessions and demonstrations about handwashing. However, some predominant issues in the teaching of handwashing practices include limited hygiene contents in the curriculum and the practical use of teaching and learning activities. The lack of availability of soap at handwashing stations is the main barrier in sustaining handwashing behaviors in schoolchildren.

**Key words** | behavior change, handwashing with soap, hygiene education, sustainability

### HIGHLIGHTS

- This is the first study in Nepal on HWWS issue in a school setting from the PAR approach. It has paved the way for a new paradigm of research in the future.
- The findings from this study show that participants themselves have taken ownership, which can be a strong basis for sustainable behavior change.
- This study provided some important solutions to make HWWS in school sustainable and motivation for practical teaching.

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**Govinda Prasad Devkota** (corresponding author)  
Graduate School of Education,  
Tribhuvan University,  
Kathmandu, Nepal  
E-mail: [govindaprasad.devkota@mrc.tu.edu.np](mailto:govindaprasad.devkota@mrc.tu.edu.np)

**Sheri Bastien**   
Department of Public Health Science,  
Norwegian University of Life Sciences,  
Norway  
and  
Cumming School of Medicine,  
University of Calgary,  
Calgary, Canada

**Petter D. Jenssen**   
**Manoj K. Pandey**  
Faculty of Environmental Sciences and Natural  
Resource Management,  
Norwegian University of Life Sciences,  
As, Norway

**Bhimsen Devkota**  
NORHED/Rupantaran Project,  
Tribhuvan University,  
Kathmandu, Nepal

**Shyam Krishna Maharjan**  
Central Department of Education,  
Tribhuvan University,  
Kathmandu, Nepal

## INTRODUCTION

Hand hygiene is considered to be one of the fundamental requirements for human health and sustainable development (Mekonnen Aga Kinati & Shifera 2018). The proportion of pupils using hand washing with soap (HWWS) and water facilities on the school premises is a global indicator of the Sustainable Development Goals (Hutton & Varughese 2016). It is a low cost, yet effective measure in preventing illness (Wichaidit *et al.* 2019). Appropriate handwashing can prevent 50–70% of water and foodborne infections (Lee Hong & Kim 2015). Many studies indicate that HWWS can reduce diarrhea morbidity, respiratory infections, and all types of diseases by 44, 23, and 40% respectively (Eseoghene & Ujiri 2013; Saboori *et al.* 2013).

In Nepal, only a mere half of households surveyed (48%) had soap and water facilities and 16% of them used water and other cleansing agents (e.g., ash, mud, and sand). Also, 17% used only water, and the remaining 2% applied soap without water at handwashing stations (HWSs). Overall, 14% of households did not have water and other cleansing agents (Ministry of Health 2016).

Correct and consistent handwashing with soap involves vigorous rubbing together of lathered fingers, fingertips, areas between the fingers, hands, and arms for at least 10–20 s (Okello *et al.* 2019). Nepal's school WASH guidelines (UNICEF 2012; Government of Nepal 2018) and the Hygiene and Sanitation Master Plan (2011) suggest handwashing as rubbing hands with clean water and soap and then drying the hands in the air instead of drying hands with individual disposable towels or tissue paper (Adhikari 2017).

Schools are seen as a cost-effective and sustainable setting for developing hygiene behaviors (Bresee Caruso Sales Lupele & Freeman 2016). This paper presents our experience working with schoolchildren and the changes that occurred in their hand hygiene behaviors, using participatory action research.

## METHODS

### Research design and methods

We used qualitative PAR methodology in three phases: needs assessment, intervention design, and follow-up. (PAR is a

research approach that involves researchers and the research participants as co-researchers actively taking part in designing the intervention, implementing, and evaluating it together.) It aims to empower and include the participants in decision-making and encourages them to take ownership of the outcome of the intervention as co-researchers (Thanh Xuan Rheinländer Ngoc Hoat Dalsgaard & Konradsen 2013). We made a real-time observation of the students' handwashing behaviors from a distance of 30 m, and handwashing alone from 10 m. The observation was recorded in the observation checklist during the short break and mid-day snack breaks (Figure 1).

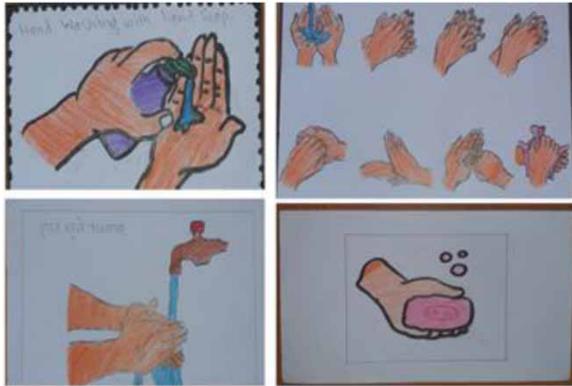
At the initial stage, the twenty-one-member PAR committee was formed. The PAR members, teachers, and the child-club members actively participated in the intervention activities.

### Intervention

The intervention focused on raising students' knowledge, as well as the proper techniques of handwashing at critical times. A handwashing event was organized on 15th October on the occasion of Global Hand Washing Day (Challenge 2009; Pittet Allegranzi & Boyce 2009) at the school. We observed in our initial school visits that students ate food with dirty hands. We shared our observations with the head-teacher, teachers, the school management committee, PAR committee members, and students. We developed a plan to organize a hygiene education session and a handwashing



Figure 1 | Formation of PAR Committee.



**Figure 2** | A sketch drawn by the students on handwashing.

event in the school. The hygiene education session stressed the importance of HWWS and the consequences of not washing hands properly. In this phase, student and teacher made posters, pamphlets, slogan cards, message cards charts, videos, drawings, stories, and songs related to HWWS were used to learn the technique of HWWS (Figure 2).

The sensitization, in each grade, took two periods (90 min) per month for 6 months. This session was started with singing the song of *Michi Michi* (*rubbing and rinsing hands*) followed by demonstration of six steps of handwashing with soap (Figure 3).

### Participants

One community school from Chitwan was purposively selected, whereas incidental sampling was applied for the selection of handwashing visits within one week's timeframe. The students, teachers, SMC/PAR committee members, and child-club members were selected voluntarily. (Child-club



**Figure 3** | Handwashing with Soap Demonstration Class.

means the students' council formed from among the students that focus on the rights and welfare of the children in school.) An in-depth interview was conducted with the headteacher. Altogether, five focus group discussions (FGDs) (including students, teachers, SMC/PAR committee members, child-club members), and 50 student observations (grade 4–8, 10 years old) on handwashing practices were made.

### Methods and tools of data collection

The data were collected using observation, FGDs, and in-depth interviews. Reflective notes were recorded, and photographs were taken. Also, the knowledge students gained from hygiene education sessions and the changes in handwashing behaviors before and after the intervention were assessed.

### Data analyses

The semi-structured in-depth interview with the headteacher and all FGDs were tape-recorded and the recordings were transcribed into the Nepali language first, then translated into English. The data were analyzed using a thematic content analysis approach (Green & Thorogood 2018).

### Ethical considerations

Ethical approval was obtained from the Nepal Health Research Council (NHRC), agreement number 2016Q2A04. Written informed consent was obtained from the headteachers, teachers, and students. Similarly, assent was taken from the students who participated in the FGDs and the observation during the need assessment and follow-up study.

## FINDINGS

The findings of the study are presented in five thematic areas.

### Transformation in hygiene education

Before the intervention, teachers used lectures while teaching without using instructional materials. The class was

found passive though the national curriculum framework emphasizes activity-oriented and material-focused methods of teaching (CDC 2019). After the intervention, classroom teaching changed to a child-centered approach.

*'Before the intervention, teachers would not spend more than 5–10 minutes of lecturing, without teaching materials. Nowadays, a minimum of 2 periods (90 minutes) per month is allocated for hygiene education especially on HWWS using interesting methods like singing, drawing, displaying videos, using message charts, and demonstration on HWWS'* (FGD, boy students).

The post-intervention interview with the headteacher revealed that students actively participated both in theoretical and practical hygiene sessions.

*'The intervention using the participatory material focused on teaching, using motivational activities was highly effective'* (IDI, Headteacher).

The child-club member stated their full and active participation thus:

*'Child-club takes the lead in cleaning the facilities and to ensure proper use. For example, the child-club sometimes looks after the handwashing facilities by cleaning the handwashing station, toilets, and making sure there are sufficient water and soap'* (FGD child club).

### Perceptions of handwashing intervention

The research participants considered hygiene sessions a foundation for promoting students' handwashing behavior. After the intervention, students actively participated in hygiene sensitization sessions.

FGD with teachers indicated this:

*'Handwashing rates were low in the school before the hygiene sessions, students undervalued the importance of washing their hands with soap after toilet use and before meals, but nowadays, they don't require a constant reminder to wash their hands with soap. They are pleased to prepare teaching materials and participate in a demonstration of HWWS'* (FGD, teacher).

The student FGD revealed that they were very happy about the initiation of HWWS intervention. Teaching and learning strategies, content coverage, and their hygiene behavior were completely changed as compared to pre-intervention behaviors. One student stated:

*'The sessions were motivating factors for our behavioral change. Now we have increased involvement and school administration and teachers manage to handwash'* (FGD, girl student).

FGD with SMC and PAR committee members stated:

*'Very happy! The HWWS intervention is now helping us and our students to become very healthy, while also handling things more hygienically. Training to build the capacity of teachers is highly appreciated'* (FGD, SMC/PAR).

### Soap management alternatives

One of the major challenges in HWWS was to find a remedy in properly managing soap for handwashing. Discussion with the stakeholders suggested that creating a 'soap fund' by collecting a rupee from the students and teachers was the best solution to manage soap in school. That means about 25 rupees per month were collected from a student, which was enough to buy soap. Managing the soap in such a way was perceived as a more participatory, sustainable, and student-owned initiative. In the FGD participants also discussed government funding, family support for soap thus:

*'Regular soap management in school could be possible if the government provides funds to support school activities, there should be a fund for buying soap for books'* (FGD, SMC/PAR committee member).

### Sustainable HWWS in school

Research participants expressed their willingness to adopt sustainable handwashing practices in school before meals and after using the toilet. All research participants stressed the need to find sustainable solutions for HWWS in school. Making soap available throughout school hours was a challenge as stated by the headteacher.

**Table 1** | Handwashing observation data (pre–post-intervention)

Theme	Pre-intervention	Post-intervention
Availability of soap at handwashing stations (HWSs)	Water: Enough running water at all HWSs and toilets. Soap: There were few HWSs and no provision of soap in HWSs and toilets.	Water: Enough potable running water at all HWSs and toilets. Soap: There were more HWSs after intervention than before and each HWSs and toilet had soap in soap holders.
Soap used to wash hands	No student washed their hands with soap and water, even before mid-day snack and after toilet use.	Almost all girl students washed hands with soap and water before mid-day snack and after toilet use. However, few boy students used soap for handwashing.
Handwashing skills	No girl/boy students washed their hands according to WHO recommended six steps. Generally, handwashing was done only with water, no rubbing and rinsing hands thoroughly. Students did not spend time drying hands after washing.	Almost all girls and most of the boys washed their hands following the WHO recommended six steps. Mostly, handwashing was done with soap and water by rubbing and rinsing hands thoroughly. Comparatively better handwashing by senior grades than the junior grades. Hands were dried in air.
Time is taken to wash their hands	None of the students used more than 12 s for handwashing. In comparison to boys, girls washed their hands for a little longer.	Students washed their hands with soap and water for 10–20 s.

*‘Ensuring there is soap at the handwashing stations throughout the day is one of the greatest challenges the school faces. The school would ensure to buy and provide soap for handwashing from the nominal fees of students’ (IDI, Headteacher).*

The child-club members suggested that changing behavior was a difficult task. They felt that there was a need for continuous sensitization activities for a long time to sustain hand hygiene behavior in the students.

*‘HWWS is a behavior that cannot be adopted in a one-day activity. Activities that can create awareness and foster a strong commitment can lead to the desired sustainable hygiene behavioral change in school’ (FGD, a female child-club member).*

### Handwashing practices

Observation findings show that at the time of the pre-intervention survey, there was no provision of soap at handwashing points but after the intervention, each of the HWSs had soap in a soap holder. The post-observation revealed that handwashing practice increased after the

educational sessions based on the WHO recommended six steps of handwashing with soap.

Handwashing behaviors were comparatively better among girls and senior grade students. Sometimes, the boys who did not use soap for handwashing saying that their hands were clean and it would take longer for them to wash hands with soap (Table 1).

### DISCUSSION

The qualitative findings of this study reveal that implementing participatory action-based teaching and learning methods that influence individual choices result in behavioral change in students. The study findings before the intervention showed that the theory-based, insufficient contents, and methods were inadequate to ensure handwashing with soap. This was improved with the introduction of context-based hygiene education sessions. After the intervention, students increased ownership of the new knowledge and transformed their behavior.

The student FGDs and observation data indicate that they were visibly excited and happy with HWWS sessions. The students, teachers, child-club members, SMC/PAR

committee members had positive views of the HWWS intervention. This indicates that students exposed to the educational intervention were more likely to associate the place where they wash their hands with the actual practice of handwashing (Thanh Xuan *et al.* 2013). Likewise, several studies regarding hand hygiene promotion through participatory methods in school settings showed that classroom engagement with practical and demonstration approaches can change students' hygiene behavior and that students and teachers are enthusiastic about action-oriented lessons due to clear goals and observable results (Dreibelbis Kroeger Hossain Venkatesh & Ram 2016; Wichaidit *et al.* 2019).

This study found that the management of soap and enough water at HWSs and toilets is the predominant factor in maintaining hand hygiene in schools. Other studies show similar findings in terms of systematic soap management at schools (UNICEF 2012). Likewise, a study conducted in public and private schools located in the Sunsari district of Nepal corresponds with the data from this study finding that they did not have convenient HWSs with enough water and soap, though the stakeholders, including school management, teachers, and students, were ready to give attention to creating a healthy school environment with healthy students (Rai Sah Rijal & Pokharel 2015).

Our study shows that handwashing is completely a personal activity that is influenced mainly by teaching-learning activities in school. It was in line with another study (Curtis Danquah & Aunger 2009), stating effective teaching and learning initiatives with hardware (HWSs, soap, water) management, developing HWWS as a habit, a strong commitment, and motivational types of recognition with rewards help the sustainability of HWWS in schools. These findings also correspond with a study in Kenya (Saboori *et al.* 2013) that found the lack of soap in schools as an impediment to students' habit formation. It is suggested that school administrators consider water and soap management and institutional accountability a key to promote the sustainability of HWWS in school. However, the lack of funds and a strong commitment to hygiene promotion serve as an impediment to the sustainability of HWWS. Likewise, the passive teaching and learning methods used to convey hygiene messages in school

curriculums and the low integration of hand hygiene facilities and resources in schools compromise the sustainability of HWWS by the students at school (Thanh Xuan *et al.* 2013).

This study was limited to one action school and covered around 200 students. It was proposed that a minimum of three cycles of repeated interventions could be used to create sustainable hygiene behavior and establish participants' ownership of the intervention. This intervention study was conducted twice and over a short period. Therefore, the results of this study may not be generally applicable to other community schools in Nepal.

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## CONCLUSION

This study suggests that students' handwashing behaviors could be improved through skills-based hygiene education. Management of soap at HWSs could also be done with the active involvement of students and parents. There is potential for collaboration with soap manufacturers, local governments, and possible new social enterprises for the availability of soap in school.

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## AUTHORS' NOTE

This study is a part of the first author's doctoral dissertation.

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## DATA AVAILABILITY STATEMENT

All relevant data are included in the paper or its Supplementary Information.

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