

## Effectiveness and inclusivity of audio data collection: Insights from a Cambodia-based assessment

## fidE

This study and visual report has been completed as a part of Jess MacArthur's doctoral research on gender transformations in the WASH sector (UTS HREC REF NO. ETH19-4343), funded by the Australian Government's Water for Women Fund and undertaken in collaboration with iDE Cambodia's SMSU3 program.

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## Summary

| Where did the study take place? | Six provinces in rural Cambodia: Svay Rieng, Siem Reap, Prey Veng, Oddar Meanchey, <br> Kandal and Kampong Thom |
| :--- | :--- |
| When did the study take place? | October 2020 |
| Whose experiences did the <br> study explore? | Field staff members ( $\mathrm{n}=176$ ) of an international civil society organisation |
| What method was being <br> examined? | Self-administered audio recording using smartphones |
| Why was this method being <br> examined? | To understand how women and men experienced the process of participating in the <br> study differently and to make it more inclusive for the future |
| What data collection <br> approaches were used? | Mixed methods, quantitative meta-data results from the responses (n=176) and <br> qualitative interviews ( $\mathrm{n}=19$ ) with a subset of respondents about their participation |
| What data analysis approaches <br> were used? | Quantitative: descriptive statistics, statistical analysis and logical modelling <br> Qualitative: thematic analysis, sentiment analysis |
| What were the key findings? | There were no significant gender differences in the quality, length of response or time <br> taken to complete the survey. However, men were more likely than women to audio <br> record and reported more positive experiences with the process of participation. <br> Additionally 5\% of both women and men (equally) experience some discomfort from <br> the process, but the reasons were different by gender. |
| 1. Introduce audio surveys to respondent groups before conducting the study with <br> a non-sensitive topic to build familiarity with the technique before engaging with |  |
| What are the key <br> recommendations to create a <br> more inclusive process? | 2. Give individuals the choice to audio record or type responses. <br> 3. Provide support mechanisms and training on the audio recording process. |

## Introduction

Transformative research within the SMSU3 project and the Water for Women Fund.


Water for Women is Australia's flagship water, sanitation and hygiene (WASH) program supporting improved health, equality and wellbeing in Asian and Pacific communities through socially inclusive and sustainable WASH projects. Water for Women is delivering 18 WASH projects in 15 countries together with 11 research projects (2018-2022).


Sanitation Marketing Scale-Up Program 3 (SMSU3), a water and sanitation intervention implemented by iDE Cambodia contains multiple funding streams including DFAT's Water for Women fund. The program operates in six rural provinces supporting the promotion and sale of latrines, water filters, faecal sludge management and handwashing systems through private enterprises.

## Background

Trends in Cambodia smartphone use and audio recording surveys

## Research foundations

This study was situated in two different research approaches: transformative research and methodological research.

## transformative research ${ }^{1}$

- A transformative approach to research suggests that research can never be neutral.
- Any discussion of complex issues, such as gender equality, will raise awareness of the issue and therefore research can (and should) be used to transform the status quo.
- Transformative research often engages more interactive techniques and is purposeful about its goal of social change.


## methodological research ${ }^{2}$

- Methodological research is research on the process of research.
- It seeks to understand how to make research better
- This might look at improving transparency or rigor.
- In our case we wanted to explore the effectiveness, inclusivity and potential harm of the research process.


## Smartphone use in Cambodia

## Prevalence and inclusivity



- Cambodia has some of the highest mobile phone access and 3G coverage rates in the world with more phone subscriptions than people (130\%; 2019) ${ }^{1}$
- Photo and video editing is reported as only behind eGaming and Social Media as the top uses of mobile phones in the country ${ }^{2}$
- $48 \%$ (2018) of mobile phones in Cambodia are smartphones ${ }^{3}$
- However, there are significant social gender dynamics that govern women's access and use of mobile phones globally and in Cambodia ${ }^{4}$
- Cambodian women are $20 \%$ less likely than men to own a mobile phone and $62 \%$ of women own mobile phone (2018) ${ }^{3}$

[^0]
## Smartphone use in SMSU3

## Prevalence and inclusivity

During initial planning workshops, one program leader of SMSU3 in Cambodia noted that "smartphone use amongst our team is ubiquitous".

He stated that staff's involvement with an international civil society organisation often indicated a socio demographic with higher phone access and usage for both women and men than the average population.

Additionally, most job tasks in SMSU3 such as sales monitoring require the use of smartphone or tablets, indicating higher digital literacy than the average population.


## Audio recording in research

## Gains in popularity and use

Over the last several years, and spurred on by the pandemic, audio recording has become more popular in selfadministered ${ }^{1}$ surveys as an alternative to face-to-face research.

Audio recording is already common in qualitative face-to-face interviews, as well as through computer audio-recorded interviewing (CARI), unobtrusive digital recording for quality control. ${ }^{2}$

Popular self-administered audio survey ${ }^{3}$ tools include, but are not limited to:

- Phonic
- Snap Surveys
- Question Pro
- Go Survey
- Qwary (video)
- Mote Chrome Extension (Google Forms)

1. Self-administered surveys are completely conducted by the end respondent without an interviewer present. They are self-directed.
2. Thissen, M R, Sattaluri S, McFarlane E, Biemer PP (2008) The Evolution of Audio Recording in Field Surveys. Survey Practice 1 (5). https://doi.org/10.29115/SP-2008-0018.
3. Audio surveys allows users to submit short audio clips rather than type responses. They are primarily used in selfadministered internet-based surveys and replace open-response questions. Audio surveys may be all or partially audio response driven.

## Audio recording in research

Existing explorations on effectiveness

Previous scholarship has identified three reasons why audio surveys are potentially valuable. 1,2

1. Provide participants with opportunity to express their thoughts
2. Foster richer data
3. Empower participants to frame the issue in their own words

[^1]
## Do-no-harm

## in transformative research

- A transformative approach to research suggests that research can never be neutral but should be conducted in a manner that does not bring any harm to participants, and ideally has positive impacts on the lives of participants'.
- Harm is not just physical, but can also be emotional or mental. Participants may face harm related to the content, context and modality of the study.


## Forms of harm

The content of the study...

- reminds people of something
- raises up feelings of
incompetence or inadequacy
- raises up feelings of grief, anger
or consciousness of ongoing
hardships

The context of the study.

- is not private enough and someone overhears sensitive content
- is at a inconvenient time of day and the participant has other pressing concerns

The modality of the study..

- is confusing and causes a participant to stop or leave
- is not culturally appropriate or sensitive to the context

[^2]
## Methodology

A mixed methods approach to exploring effectiveness, inclusivity, and potential harm.

## Research justification and questions

The challenges in mobility caused by COVID-19, have led to a surge in the use of remote and self-administered techniques for data collection including audio surveys.

Cambodia offers a unique case to explore experiences due to the high prevalence of mobile phone usage and broad inclusivity of audio survey techniques.

However, research into the effectiveness and inclusivity of audio surveys is nascent.

- How effective was the use of audio recording for self-administered surveys? (outcomes-focused)
- How 'inclusive' was the use of audio recording for self-administered surveys? (process-focused)
- How did audio recorded responses align with a do-no-harm approach to research?
- How can researchers support the positive uptake of audio surveys in the future?


These insights draw on an audio-based storytelling study around gender transformative change for 176 program staff. The study aimed to evaluate the impact of a gender mainstreaming intervention for field staff of a sanitation marketing program in rural Cambodia. The program is part of the Water for Women fund - Australia's flagship WASH program supporting gender equality and social inclusion.


To collect stories of change, we designed a series of cartoon graphics to elicit stories around a variety of gender-related themes. The study utilised an internet browser form designed for smartphone data collection in Qualtrics and using a Phonic plug in for audio recording. The form included demographic aspects, a critical consciousness scale, story collection, reflection question on the story-sharing process. Census sampling was used for all staff of the program in the field and respondents came from a range of roles-from community mobilizers (sales agents) to program managers.


## Data Collection:

- Respective (backwards looking) stories of change were collected using micronarratives.
- Micro-narratives are short audio or text stories which describe changes that the participants report on.
- Stories were to be true, personal and related to the program.
- Staff used their own phones to share their stories using an online survey format in Qualtrics and Phonic.
- The prompts solicited personal changes related to SMSU3 for all field staff members during October 2020.
- 176 staff participated as several opted out of the study.
- Post-survey reflection interviews were conducted with a subset of respondents ( $\mathrm{n}=19$ )


## Data Analysis:

- Inclusivity of the audio recording process was analysed through reflection responses and meta data from the micronarratives
- Descriptive statistics and statistical analyses were conducted on the decision to type or record, the audio recording quality, length and total survey time
- Thematic and sentiment analysis was conducted on the reflection interviews


## 176 sMSU3 staff participated in the micro-narrative collection. 200 stories of change shared. 19 stories were unusable. <br> 20 sMSU3 staff participated in post-survey interviews.

## Quantitative Results

Using demographic and meta-data from the responses, how effective and inclusive were the audio surveys?

Descriptive and statistical analysis on participant-focused and story-focused outcomes.

## Respondent Demographics

## n=176 staff members

Respondents were almost an equal number of women and men spread across each of the six project locations. $56 \%$ of the respondents were sales agents and most were under 34 years old. Most respondents were Buddhist (90\%) and the sample was split between married (51\%) and single (45\%).


## Critical Consciousness

Critical consciousness (CC) varied across nonmanagement staff within SMSU3. We calculate it on a CC scale of 0-100\%. Higher scores relate to higher CC.

This chart suggests that women had a higher CC score than men. CC was also more stable across job roles for women as compared with men.

We observed that male CC increased with job level. The lowest CC was with male agents and the highest with male managers ( $\mathrm{P}<.001$ ).

Average CC scores by gender and role SMSU field staff ( $\mathrm{n}=176$ )


## Story Responses <br> $\mathrm{n}=182$ stories

Unless otherwise stated


## Men were more likely than women to audio

record. Small effect size; V=0.176, p-value $=0.0259$
However this was also related to job location and staffing dyanmics within the prorgam. Location was significant in the decision to audio record. Small effect size; $V=0.372, p-$ value $=0.000127$

Our observational data suggested that these locational differentces were due to the social and gender dynamics within each office.

Story quality (out of 5) by response type, by gender


Men tended to share higher quality stories ${ }^{1}$ than women. $p$-value $=0.00775$; Effect Size $d=0.404$. Role also had an impact on story quality $p$-value $=0.00716$; Effect Size $f=0.247$.


Role had the largest impact on how long someone took to complete the survey. $p$-value $=0.0356$; Effect Size $d=0.226$ Gender had no statistical connection with the time required.


Overall men were more likely to provide longer responses. p-value $=0.0227$; Effect Size d=0.343

## Quantitative Survey Reflections

## Distress and comfort

Women and men experienced similar levels of mild stress when conducting the survey, with men more fully comfortable than women.


Discomfort was primarily because the questions seemed confusing. Men also described feeling like the questions were very personal and one woman described the technical challenges.


Women and men overall both agreed that they felt safe while dong the survey. However one man did report feeling unsafe.


## Quantitative Survey Reflections

## Audio recording and survey effectiveness ( $\mathrm{n}=176$ people)

Overall, women and men both agreed that the audio recording aspect of the survey was effective, however men were more likely to report that it was not effective at all.

## The majority of participants agreed the survey satisficed a range of positive criteria.

However, clarity, ease and time were the most commonly cited negative aspects of the survey. Qualitative reflections highlighted that this was because most staff were not familiar with long-answer format surveys and were more accustomed to multiple choice surveys. Future iterations could avoid using the word 'survey' to create a new classification and distinguish the approach.

How effective was the audio recording part of the survey? ( $n=140$ )

$■$ Very effective $\square$ Extremely effective $■$ Moderately effective $\square$ Slightly effective $■$ Not effective at all

The survey was...


## Inclusivity (gender differences)

## Statistical Summary

| Outcomes |  | p-value | Effect Size | Notes |
| :--- | :--- | :--- | :--- | :--- |
| Participant <br> -focused <br> outcomes | Audio used | 0.718 ns | 0.0347 <br> (Cramér's V) | There was no statistically <br> significant relationship <br> between Gender and Audio |
|  | Survey time | 0.367 ns | 0.136 <br> (Cohen's d) | There was no statistically <br> significant relationship <br> between Gender and Total Time |
| Analysis <br> was split <br> between <br> participant <br> focused $\uparrow$ <br> and story- <br> focused $\downarrow$ <br> outcomes | Audio <br> quality | Number of <br> re-records | 0.0116 ** | 0.384 <br> (Cohen's d) |

To explore the gender-inclusivity of audio surveys, we then conducted statistical tests to identify the connections between gender and survey outcomes.

Gender was significant for the number of re-records, story quality and story length; men had higher values in all three of these outcomes (indicated in blue).

Men were 1.62 times as likely to record than women when regressed with role, province and age. In other terms men were 62\% more likely to audio record than women. However, the decision to audio record was in fact more connected to role and location than gender.

## Effectiveness

## Statistical Summary

| Group 1 | Group 2 | Test | P-value | Effect Size (Cohen's f) |
| :--- | :--- | :--- | :--- | :--- |
| Story Medium <br> (text audio, <br> both) | Story Length | ANOVA | $<0.00001^{* * *}$ | 0.875 Large effect |
| Story Medium <br> (text audio, <br> both) | Story Quality | ANOVA | $0.000234^{* * *}$ | 0.325 Medium effect |

To explore the effectiveness of audio surveys, we ran statistical analyses on the story-based outcomes: length and quality.

Story quality was graded on scale of 0-5 indicating the number of aspects required for a complete story (who, what, where, when, how).

Both story length and story quality were higher in the audio recording options then for text and both had high significance. Story length also had a large effect size.

This shows that audio was very effective at eliciting longer and better quality responses from participants.

Average story quality (out of 5)


## Story length (number of characters in translated story)



## Statistical Models

Participant focused outcomes

To understand just how important gender was in relation to the other demographic aspects, we create four statistical models exploring gender, role, province and age on the participant-focused outcomes.

All logistic regression models had only moderate or poor fit indicating that gender, role, province and age were not controlling factors in the outcomes. However, province was the most influential factor.

This implies that while gender was important as determined in the qualitative side of the research, there are other intersectional factors which influence outcomes. In particular this results suggest that office dynamics are critical in supporting staff to feel comfortable in the process.

## Audio used

- Logistic regression
- how gender, age, role, and province impacted one's decision to use text or audio
-Cumulatively, the drivers in this model explain a low proportion of Audio
- $n=155$ (Pilot 4 )
- Adjusted $\mathrm{R}^{2}=.13$
- Province accounted for 79\%, age 13\%, role $6 \%$, and gender $3 \%$ of the model.


## Survey time

- OLS logistic regression
- how gender, age, role, and province impacted the time one took to complete the survey
-Cumulatively, the drivers in this model explain a moderate proportion of Total Time
- $\mathrm{n}=155$ (Pilot 4$)$
-Adjusted R2 $=.22$
- $\mathrm{P}<0.00001$ ***
- Province accounted for $72 \%$, age $17 \%$, role $10 \%$, and gender $0 \%$ of the model.


## Audio quality

- OLS logistic regression
- how gender, age, role, and province impacted the quality of the audio recordings as identified by the transcription team
- Cumulatively, the drivers in this model explain a low proportion of Audio - Audio Score
- $\mathrm{n}=155$ (Pilot 4)
- Adjusted R² = -0006
- $P=0.520$
- Province accounted for $63 \%$, role $28 \%$, age $7 \%$ and gender $2 \%$ of the model.


## Number of rerecords

## - OLS logistic regression

- how gender, age, role, and province impacted the number of attempted audio recordings
- Cumulatively, the drivers in this model explain a moderate proportion of Audio Attempted Audio Recordings
- $\mathrm{n}=155$ (Pilot 4)
- Adjusted R ${ }^{2}=0.19$
- $P=0.0000292$ ***
- Province accounted for $52 \%$, role $36 \%$, gender $9 \%$ and age $3 \%$ of the model.

Statistical Models<br>Story focused outcomes

Additionally, to understand just how important gender was in relation to the other demographic aspects, we created two statistical models exploring gender, role, province, age and critical consciousness on the storyfocused outcomes.

These logistic models also had poor or moderate fit as well. Story quality was influenced by a variety of all five aspects. Story length was mostly influenced by province and story medium (text, audio or both).

Similar to the participant-focused outcomes, stories were also less connected to gender than anticipated. Uniquely age had strong impact on story outcomes with older participants having longer and stronger stories.

## Story quality

## - OLS logistic regression

- how gender, age, role, critical consciousness and province impacted the quality of the story
-Cumulatively, the drivers in this model explain a low proportion of Story Quality
- $\mathrm{n}=178$
- Adjusted R2 $=.184$
- $p=315$
- Role accounted for $33 \%$, age $21 \%$, gender $20 \%$, province $19 \%$, and CC $6 \%$ of the model.


## Story length

- OLS logistic regression
- how gender, age, role, critical consciousness and province impacted the quality of the story
-Cumulatively, the drivers in this model explain a moderate proportion of Average Characters for Question
- $\mathrm{n}=178$
-Adjusted R${ }^{2}=.32$
- $p<0.00001^{* * *}$
- Province accounted for $53 \%$, role for $32 \%$, age $7 \%$, gender $6 \%$ and CC $1 \%$ of the model


## Qualitative Results

Using responses reflection interviews and team observations, how effective and inclusive were the audio surveys?

Thematic analysis and sentiment analysis of responses exploring the modality, content and context of the audio survey processes.

## Thematic analysis of reflections on the audio recording process

## Modality -Technology



Observation notes: We had several examples of women who used transcription applications (spoken Khmer to written Khmer) and then copied their typed answers into the survey. When asked, the women shared that they were nervous about 'getting it wrong' in the audio recording and not being able to re-record their responses, so they would prefer to type. However, they didn't really know how to type, so it was easier to audio record and then copy their answers.

Women

Positive
Sentiment


In general, men were more positive about the technological aspects of audio recording than women. Observational data showed that women were nervous about the process and men were more confident.

Thematic analysis of reflections on the audio recording process
Modality - Personal expression


In general, men also spoke about freedom to express themselves, while women were much more hesitant and wanted to organise their thought rather than freely speak.

## Thematic analysis of reflections on the audio recording process

## Content and Context



While we did not specifically ask, freely shared reflections around the content and context were all negative comments around how different the survey was to complete and some felt uncomfortable. Our quantitative data suggest that these findings are not ubiquitous, but did represent an important minority.

## Sentiment analysis of reflections

## on the audio recording process

Of the 19 specific reflections on the recording process ( 11 from men, 8 from women), 10 were positive and 11 were negative. However, there were significant gender distinctions in these reflections, with men being much more positive about the process


## Insights

Bringing together the qualitative and quantitative results, how effective and inclusive were the audio surveys?

## Effectiveness of Audio Recording

Richer data outcomes?

Literature suggests that audio recording has the potential to produce higher quality data.

We explored this through two different variables - story quality and story length. ${ }^{1}$
$32 \%$ of the respondents used audio, $49 \%$ text and 19\% both audio and text for their stories.

Audio performed the best for both story quality ( $p<$ 0.00001 , large effect size) and story length ( $p=0.00234$, medium effect).

Our study aligns with previous scholarship ${ }^{2}$ on the effectiveness for increasing story length and quality through audio recording.

1. In this study we did not look at the number of themes identified in the responses, as another aspect of the study was to explore how different prompts preformed and therefore the results are not comparable.
2. Luff R, Sturgis P (2015) Does Audio-recording Open-ended Survey Questions Improve Data Quality? National Centre for Research Methods. University of Southampton NCRM News. https://www.ncrm.ac.uk/news/show.php?article=5449



## Inclusivity of Audio Recording

## Gender dynamics in audio recording outcomes

We saw statistically significant gendered differences in the number of re-records, the story quality and story length. Men held higher numbers on all three of these outcomes.

The re-records imply that within our sample women are rerecording less frequently. Most likely because they ended up typing.

Story quality and length show that within our sample men record better quality stories and longer stories.

In addition when controlling for role, age and province, province was the most important factor. This suggests that gender was less important than province, role and age in the decision to record, story length and story quality. This highlights the gender differences in staffing of SMSU3 across regions by age and role.

Statistical significance
audio outcomes by gender

| Audio used | ns |
| :--- | :--- |
| Survey time | ns |
| Audio quality | ns |
| Number of re- <br> records | $* *$ |
| Story quality | $* * *$ |
| Story length | $* *$ |

## Inclusivity of Audio Recording

## Gender dynamics in the audio recording process

We also saw gender differences in the perception of the audio recording process, as identified through the qualitative interviews with 19 participants after the audio survey.

Overall, women had more negative perceptions of the audio recording process. Women noted aspects of the content, context and modality of audio recording. Most of their reflections were challenges. Men primarily noted benefits of the audio recording modality.

However, this was deeply connected to the locations, ages and roles that have gender dynamics in the program.

While men highlighted the opportunity to express themselves through the audio recording process, women described wanting to type because they could 'organise [their] thoughts' and 'get it right'.

A more cautious approach to sharing information for women compared to men has also been identified in other research by ISF around women's leadership. ${ }^{1}$


[^3]
## Do-no-harm in audio surveys

## There is scope for further research into types of harm

Of the 171 participants who responded to questions about any stress during the survey, $5 \%$ of women and $5 \%$ of men reported mild stress. The most common reason (10/23) was that the 'questions are confusing'. However two men also mentioned that the 'questions are very personal'. One man also reported not feeling safe during the audio survey. No women reported not feeling safe.

If we are trying to seek transformative change in gender relations, this is another example of considering the experiences of men as well as women.

The do-no-harm literature ${ }^{1}$ primarily focuses on ensuring that no harm comes to those who are potentially disadvantaged or vulnerable. ${ }^{2}$ Our data does not speak to the reasons behind discomfort and therefore, there is need for further research on do-no-harm strategies in the context of personal transformations which require critical consciousness often expressed as discomfort with current beliefs.

This finding aligns with other gender equality scholarship ${ }^{3}$ conducted by ISF in
 Cambodia and Nepal, which highlighted that men were equally likely to experience distress in gender-equality related interviews.

[^4]
# Recommendations and Conclusions 

How can programs support better audio
surveys in the future?

## Recommendations

## Practical ways to support audio surveys in mixed gender groups

## Content

A. Introduce audio surveys with a neutral or non-sensitive topic

## Context

A. Introduce audio surveys in a group learning session
B. Provide hands on 'tech support' for respondents

Modality
A. Provide both text and audio response options
B. Provide clarity on your response length expectations.
C. Test visuals and platforms for participant understanding
D. Allow participants to re-record and playback if possible.

## Conclusions

## Practical ways to support audio surveys in mixed gender groups

In this study we have explored the effectiveness and inclusivity of audio surveys for collecting rich qualitative data asynchronously.

The methodological case study explored experiences of staff members ( $\mathrm{n}=176$ ) of the SMSU3 project through micronarratives (201 stories) that were shared through audio, text or a combination.

Effectiveness and inclusivity of audio surveys was explore through mixed methods and included meta-data from the audio surveys, observations and post-survey reflection interviews.

## Effectiveness

Audio responses elicited longer and higher quality story responses than text.

## Inclusivity

Men shared longer and higher quality stories and women reported more negative perceptions of the audio recording process.
(i)

Do-no-harm
Men were just as likely as women to experience stress and feel unsafe through the audio survey process.


[^0]:    1. International Telecommunication Union (ITU) World Telecommunication/ICT Indicators Database (2019)

    ADA (2020) Mobile device inights report: South and Southeast Asia.
    LIRNEasia. (2018) AfterAccess: ICT access and use in Asia and the Global South (Version 2.0). Colombo: LIRNEasia
    4. Rowntree O and Shanahan M (2020) Connected Women: The Mobile Gender Gap Report 2020.

[^1]:    1. Luff R, Sturgis P (2015) Does Audio-recording Open-ended Survey Questions Improve Data Quality? National Centre for Research Methods. University of Southampton NCRM News.
    https://www.ncrm.ac.uk/news/show.php?article=5449
    2. It should be noted that this is the only such discussion of the use of audio recording for "open response questions' that the author could find.
[^2]:    1. Water for Women Fund, SNV and DFAT, 'Do No Harm' for inclusive WASH: working towards a shared understanding', Learning brief - Systems Strengthening / Leave No One Behind, 2020, Melbourne, Water for Women Fund.
[^3]:    1. ISF-UTS and SNV, Gender transformative leadership in WASH during the COVID-19 pandemic, Research Report, The Hague, SNV, 2021.
[^4]:    1. Garred M, Booth C, and Barnard-Webster K. "Do No Harm \& Gender." Guidance Note. Cambridge, MA: CDA Collaborative Learning Projects, 2018
    2. Liamputtong, P. (2007). Researching the Vulnerable. https://doi.org/10.4135/9781849209861
    3. ISF-UTS (2021). WASH-GEM Validation Study Findings Report
