BUKTI KORESPONDENSI

Judul	:	Lessons Learned From Telephone-Based Data Collection for Health and Demographic Surveillance Systems During the COVID-19 Pandemic in Indonesia
Jurnal	:	Global Health: Science and Practice
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No	Tanggal	Perihal/Keterangan
1	29-09-2022	Submit manuskrip ke Jurnal Global Health: Science and Practice
2	29-09-2022	Draft manuskrip *submited*
3	13-12-2023	Korespondensi review 1
4	26-01-2024	Perbaikan manuskrip sebagai respon review 1
5	06-02-2024	Manuskrip *accepted*
6	13-02-2024	Korespondensi review 2 setelah *accepted*
7	19-02-2024	Perbaikan manuskrip sebagai respon review 2
8	01-03-2024	Article published

History Manuskrip

History for Manuscript Number: GHSP-D-22-00446
Prima Dhewi Ratrikaningtyas (INDONESIA): "Lessons Learned From Telephone-Based Data Collection for Health and Demographic Surveillance Systems During the COVID-19 Pandemic in Indonesia"

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Correspondence History

Correspondence Date	Letter	Recipient	Revision
Mar 01 2024 10:03AM	Author Notice - Article published	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	1
Feb 28 2024 10:37AM	PROD - Author Task Completion for Proofs	Sonia Abraham, MA	
Feb 26 2024 08:49AM	PROD - Author Task Assignment for Proofs	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	
Feb 19 2024 03:33AM	PROD - Author Task Completion for Copyedits	Sonia Abraham, MA	
Feb 13 2024 06:35PM	PROD - Author Task Assignment for Copyedits	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	
Feb 06 2024 01:03PM	Editor Decision - Accept	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	1
Jan 26 2024 11:11AM	Author Submits Revision Confirmation	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	1
Jan 26 2024 11:10AM	PDF Built and Requires Approval	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	1
Jan 19 2024 06:56AM	Author Revision First Reminder	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	0
Jan 10 2024 01:04PM	Author Revision Due Date Changed	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	0
Jan 05 2024 06:31AM	Author Revision First Reminder	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	0
Dec 13 2023 09:28AM	Editor Decision - Revision 1	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	0
Dec 04 2023 08:45PM	Author Notice - Generic Letter	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	0
Jun 02 2023 04:01PM	Author Notice - Peer Review Delayed	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	0
Jan 20 2023 05:48PM	Author Notice - Peer Review	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	0
Jan 12 2023 10:24AM	PDF Built and Requires Approval	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	0
Nov 29 2022 10:18AM	Author Notice - Return for Revisions	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	0
Sep 29 2022 11:21PM	Author Submits New Manuscript Confirmation	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	0
Sep 29 2022 11:19PM	PDF Built and Requires Approval	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	0
Sep 29 2022 10:11PM	PDF Built and Requires Approval	Prima Dhewi Ratrikaningtyas, Ph.D., M.D.	0

1	**29-09-2022**	**Bukti submit manuskrip dan draft manuskrip**

View Letter

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Date:	Sep 29 2022 11:21PM
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From:	"GHSP Journal" editorialoffice@ghspjournal.org
Subject:	Submission Confirmation for %ARTICLE_TITLE%

Dear Mrs Ratrikaningtyas,

Thank you for your interest in the Global Health: Science and Practice journal.
Your submission entitled "LESSONS LEARNED FROM TELEPHONE-BASED DATA COLLECTION FOR HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEMS DURING THE COVID-19 PANDEMIC IN INDONESIA" has been received.

Your manuscript will be shared with our editors for screening. Due to the unusually high volume of manuscripts we are receiving, it will take 6-8 weeks to let you know whether it will move on for peer review.

Note: Please add our email address to your safe list so our messages do not go to your spam/junk mail. Also, if you haven't heard from us, please check the correspondence associated with your submission. It is a menu item under the "Action Links" related to your submission.

Thank you for submitting your work to Global Health: Science and Practice.

Kind regards,

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Managing Editor
Global Health: Science and Practice

In compliance with data protection regulations, you may request that we remove your personal registration details at any time. (Use the following URL: https://www.editorialmanager.com/ghsp/login.asp?a=r). Please contact the publication office if you have any questions.

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Global Health: Science and Practice

Lessons Learned From Telephone-Based Data Collection for Health and Demographic Surveillance Systems During the COVID-19 Pandemic in Indonesia

--Manuscript Draft--

Manuscript Number:	GHSP-D-22-00446
Full Title:	Lessons Learned From Telephone-Based Data Collection for Health and Demographic Surveillance Systems During the COVID-19 Pandemic in Indonesia
Short Title:	Lessons from Health and Demographic Surveillance System during the Pandemic
Article Type:	Field Action Report
Manuscript Classifications:	Epidemiology; Asia-East; Research
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Please provide a statement indicating the role each author played in the research or program, and preparation of the manuscript.	Prima Dhewi Ratrikaningtyas : Conceptualization, Writing - Original Draft, Writing - Review & Editing, Methodology. Luthfi Azizatunnisa : Conceptualization, Writing - Review & Editing. Amirah Elyza Wahdi : Writing - Review & Editing. Agung Nugroho : Writing - Review & Editing. Yayuk Hartriyanti : Writing - Review & Editing. Lutfan Lazuardi : Conceptualization, Writing - Review & Editing. Fitrina Mahardani Kusumaningrum : Conceptualization, Writing - Original Draft. Vena Jaladara : Writing - Review & Editing. Aviria Ermamilia : Writing - Review & Editing. Septi Kurnia Lestari : Conceptualization, Writing - Original Draft, Writing - Review & Editing. Ratri Kusuma Wardani : Conceptualization, Writing - Original Draft, Resources, Visualization. Rahsunji Intan Nurvitasari : Writing - Original Draft, Resources. Alfianto Hanafiah : Writing - Original Draft, Resources. Putri Tiara Rosha : Writing - Original Draft, Resources, Visualization. Fatwa Sari Tetra Dewi : Conceptualization, Writing - Review & Editing, Methodology.
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Optional: Please enter acknowledgements. You may cut and paste this from a word processing file but any formatting will be lost. The acknowledgements will not be visible to peer reviewers. Please note that acknowledgements should not be included in the uploaded manuscript file as they may contain information that will identify authors.	This paper used Sleman HDSS (Health and Demographic Surveillance System) wave six version 10.0.0. The Sleman HDSS data collection has been primarily funded by the Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia. The researchers would like to express gratitude to the Sleman Regency Government, who permitted the team to conduct the longitudinal survey in Sleman Regency territory.
All authors must complete the ICMJE Uniform Disclosure Form for Potential Conflicts of Interest which can be downloaded from: www.icmje.org/disclosure-of-interest/. Though each author must complete the form, the forms do not need to be submitted to the GHSP journal. Instead, they should be kept on file by the corresponding author in the event that a question arises regarding the funding or	Yes

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I confirm that the manuscript has been submitted solely to this journal and is not published, in press, or submitted elsewhere.	Yes
I confirm that the research meets all appropriate and applicable ethical guidelines in both the US and the study country(ies).	Yes
I confirm that I have read and understand the author guidelines.	Yes
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Funding Information:	Universitas Gadjah Mada (51/UN1/FKKMK/PPKE/PT/2002) — Not applicable
Abstract:	Sleman Health and Demographic Surveillance System (HDSS) is a longitudinal survey to collect demographic, social, and health changes in Sleman Regency, Special Region of Yogyakarta, Indonesia, held routinely since 2014. To conduct field data collection during the COVID-19 pandemic in Indonesia, we need to adjust our method. This report aimed to describe the Sleman HDSS data collection strategy during the pandemic and its opportunities. Sleman HDSS completed a feasibility study and adjusted the Standard Operational Procedures (SOP), then Sleman HDSS managed the sixth wave of data collection via a telephone interview in September-October 2020. This study involved ten interviewers equipped with an e-HDSS-hybrid-based data collection application installed on an Android-based tablet as an instrument for data collection. The sample targeted was 5,064 households. We divide the interview process into several stages: initial contact, interview consent request, household module interview, and individual module interview. Research information and requests for interview consent were delivered verbally or through text/chat by the interviewer. Confirmation of respondents' identity, verbal informed consent, and respondents' statement of consent was recorded as proof of respondents' participation in this study. The telephone-based data collection successfully interviewed 1,674 households (33% response rate) in 17 sub-districts. We could deal with the pandemic conditions by changing the data collection strategy so that longitudinal surveys can still be carried out and we could get the latest data from the population. Compared to face-to-face interviewing, data collection via telephone is sufficiently practical. The telephone interview is a safe data collection method during the pandemic. Local wisdom can be used as social capital to help increase the response rate in the data collection process. We need a specialized strategy to increase the response rate, including checking

	phone number activation, improving the way of building rapport and initiating good engagement.
Keywords:	data collection; longitudinal survey; telephone-based survey, Sleman Health and Demographic Surveillance System
Author Comments:	We hope this paper can be considered for publication in Global Health Science and Practice.
Suggested Reviewers:	Deepak Paudel USAID Nepal DPaudel@usaid.gov He wrote a similar paper, field action report entitled "Successful use of tablet personal computers and wireless technologies for the 2011 Nepal Demographic and Health Survey" which became one of our references in writing this paper.
Opposed Reviewers:	
Manuscript Region of Origin:	INDONESIA
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Cover letter

Prima Dhewi Ratrikaningtyas
Department of Biostatistics, Epidemiology and Populastion Health
Universitas Gadjah Mada
Yogyakarta Special Region, Indonesia

September 23, 2022

Dear Mr. Stephen Hodgins, MD, MSc, DrPH,

We wish to submit a field action report entitled “Lessons Learned From Telephone-Based Data Collection For Health And Demographic Surveillance Systems During The Covid-19 Pandemic In Indonesia” for consideration by Global Health: Science and Practice.

We confirm that this work was original and has not been published elsewhere, nor is it currently under consideration for publication elsewhere.

In this paper, we reported on how to conduct a longitudinal survey in a pandemic situation. This is significant because many obstacles are faced and strategies must be adjusted.
In response to the editors' input, here are some revisions from us:

1. *Please reflect on the implications of the differences in your sample (shown in Table 2) when done by phone.*
   →we added seventh-wave data (after the pandemic) in Table 2 to clarify the comparison of data obtained by telephone with data obtained through face-to-face interviews
2. *Please discuss the issue of low response rate and its consequences for generalization more thoroughly*.
   → We explained the low response rate and its implications by adding seventh-wave data to Table 2 and adding explanations from several references.

We believe that this manuscript is appropriate for publication by Global Health: Science and Practice because demographic and health longitudinal surveys are one of the issues that support global health in accordance with the scope of this journal. This study shares valuable experiences when we continued to collect data for routine longitudinal surveys during the pandemic that can be adopted for another region.

We have no conflicts of interest to disclose.
Please address all correspondence concerning this manuscript to me at primadhewi@ugm.ac.id
Thank you for your consideration of this manuscript.

Sincerely,
Prima D. Ratrikaningtyas

Title:

LESSONS LEARNED FROM TELEPHONE-BASED DATA COLLECTION FOR HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEMS DURING THE COVID-19 PANDEMIC IN INDONESIA

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LESSONS LEARNED FROM TELEPHONE-BASED DATA COLLECTION FOR HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEMS DURING THE COVID-19 PANDEMIC IN INDONESIA

Key Findings

- The COVID-19 pandemic opens the opportunity to change the method of collecting population research data from face-to-face interviews to telephone-based ones
- Social capital can be used to expedite the data collection process
- During the pandemic, researchers can deliver research information, obtain consent verbally or via chat, and obtain proof through telephone record/text/chat.

Key Implications

- Before conducting a telephone-based interview, the researchers suggested conducting a feasibility study to discover the respondents' characteristics and conduct a data collection trial.
- A longitudinal study in Indonesia should collect respondent contact numbers and update them frequently to ensure they are still active.

Messages

- A telephone interview might be conducted by considering several elements: connection strength, interview length and duration, the cost impact on respondents, telephone owned by respondents, and capabilities to interact by telephone (limited for the older age or respondents with disabilities).
- Initial contact is necessary to develop good engagement with the respondents. The initial contact can be implemented by sending a brief message that includes standardized study information and inquiring about the respondent's willingness to participate in this study.
- We encouraged increasing telephone literacy in the community, especially for research activities.

Abstract

Sleman Health and Demographic Surveillance System (HDSS) is a longitudinal survey to collect demographic, social, and health changes in Sleman Regency, Special Region of Yogyakarta, Indonesia, held routinely since 2014. To conduct field data collection during the COVID-19 pandemic in Indonesia, we need to adjust our method. This report aimed to describe the Sleman HDSS data collection strategy during the pandemic and its opportunities. Sleman HDSS completed a feasibility study and adjusted the Standard Operational Procedures (SOP), then Sleman HDSS managed the sixth wave of data collection via a telephone interview in September-October 2020. This study involved ten interviewers equipped with an e-HDSS-hybrid-based data collection application installed on an Android-based tablet as an instrument for data collection. The sample targeted was 5,064 households. We divide the interview process into several stages: initial contact, interview consent request, household module interview, and individual module interview. Research information and requests for interview consent were delivered verbally or through text/chat by the interviewer. Confirmation of respondents' identity, verbal informed consent, and respondents' statement of consent was recorded as proof of respondents' participation in this study. The telephone-based data collection successfully interviewed 1,674 households (33% response rate) in 17 sub-districts. We could deal with the pandemic conditions by changing the data collection strategy so that longitudinal surveys can still be carried out and we could get the latest data from the population. Compared to face-to-face interviewing, data collection via telephone is sufficiently practical. The telephone interview is a safe data collection method during the pandemic. Local wisdom can be used as social capital to help increase the response rate in the data collection process. We need a specialized strategy to increase the response rate, including checking phone number activation, improving the way of building rapport and initiating good engagement.

Keywords: data collection, longitudinal survey, telephone-based survey, Sleman Health and Demographic Surveillance System

Background

As the demand for healthcare services rises, interest in longitudinal population studies is increasing. A longitudinal population study is valuable to identify trends in health services, factors related to health services, and their impact on improving physical and mental health.[1] Previous studies established the importance of population-based longitudinal studies to monitor COVID-19 and its effects.[2] The Sleman Health and Demographic Surveillance System (HDSS) is a longitudinal survey system that collects demographic data, social, and health status changes in Sleman Regency, Special Region of Yogyakarta, Indonesia. We chose Sleman Regency as the HDSS location since Sleman Regency could represent both urban and rural areas. Also, Sleman Regency has a relatively high life expectancy and a high prevalence of non-communicable diseases (NCDs) and its risk factors. Sleman HDSS aims to produce high-

quality data as the basis for educational activities and policymaking to improve the Sleman Regency's health quality. Sleman HDSS used a quantitative method for the longitudinal survey.

It involved 5,147 households in 216 clusters (184 urban and 32 rural) in 80 selected villages in Sleman Regency. Details regarding Sleman HDSS design are available elsewhere.[3]

Figure 1. The Sleman Health and Demographic Surveillance System (Sleman HDSS) location. (A) Yogyakarta province in Indonesia (B) Sleman Regency (green color area), Yogyakarta Province. © **OpenStreetMap Contributor.** This map is licensed under the Creative Commons Attribution-ShareAlike 2.0 License (CC By-SA). For further information, please visit http://www.openstreetmap.org/copyright.

In March 2020, the Director-General of the World Health Organization (WHO) declared the Coronavirus Disease 2019 (COVID-19) caused by the SARS-CoV-2 virus as a global pandemic.[4] The government announced the first case of COVID-19 in Indonesia on March 2nd, 2020. This condition prompted the Indonesian government to stop COVID-19 transmission through Regulation No. 21 of the year 2020 on Large-Scale Social Restrictions, which involved

closing schools and offices, limitations on religious activities, and restriction of any activities in public spaces or facilities, including face-to-face data collection.[5]

Data collection during a pandemic is essential to monitor the impact of COVID-19 on the economic sector,[6,7] healthcare service access,[8,9] changes in health-related behaviors[10] and mental health.[11–13] The Sleman HDSS team designed a strategy for collecting data during the pandemic. One of the proposed strategies was replacing face-to-face interviews with phone interviews. Several large-scale household surveys have been conducted via phone interviewing[14,15] because it enables high-frequency data collection in a shorter time and is more cost-effective.[16,17] Based on a previous study that surveyed household information technology (IT) utilization patterns at Sleman Regency in 2019 (400 households), 92.75% owned cellular phones, 7.29% owned cable telephones, and 49.75% of respondents used the Internet to access social media applications, such as WhatsApp and Instagram.[18] Phone-based data collection can collect valid and reliable data.[16,17,19] However, several factors need to be considered when designing phone-based data collection, including contact availability,[17,20] completion, response rate, demographic representative,[20]costs,[14] data consistency, and bias minimization.[17] This article aimed to describe Sleman HDSS's experience in conducting the sixth wave survey during the pandemic using phone-based data collection in 2020 and to share lessons that could be learned. This article describes the processes and activities adjusted during the current COVID-19 pandemic, including preparation, data collection, and data management.

The Preparation

The preparation step encompasses the preparation stages before data collection, such as literature review, field situation evaluation, feasibility study, Standard Operating Procedure (SOP) development, and study instrument preparation (questionnaire and e-HDSS-hybrid-based data collection application). We did the literature review to find information regarding telephone interviews and implementing data collection during the pandemic. Then, we

developed our SOP for the data collection via telephone. Next, we conducted a feasibility study to explore HDSS respondents' perceptions of data collection via telephone using a qualitative method with a rapid assessment procedure. Twenty-four respondents were interviewed in-depth via telephone, including households, heads of the village, and researchers with experience in conducting telephone interviews.

The feasibility study revealed that the respondents preferred face-to-face interviews over telephone interviews. However, the pandemic conditions did not give us much choice in data collection methods. A telephone interview could be implemented by considering several factors, including connection strength, the interview time and duration, cost impact to respondents, respondents' telephone ownership, and the ability to communicate by telephone. Results showed that the respondents expect interviews to be conducted in their free time for an interview duration of about 20 to 30 minutes.

Initial contact with respondents is a crucial part of engaging with the respondents. The feasibility study result suggested sending a short message that included standardized study information and asking for the respondent's willingness to participate in this study. The interviewer's credentials should be proved by displaying the Sleman HDSS attributes in the interviewer's contact profile and showing a letter of assignment during the initial contact with respondents. Several respondents' contact numbers on the Sleman HDSS database were invalid/inactive. As a result, the feasibility study recommends double-checking the respondents' numbers with the community's stakeholders.

Thus, in the adjusted SOP, the initial contact had to ensure that the number called was the number of the Sleman HDSS respondent's household members and active. In addition, the Sleman HDSS team adjusted the SOP for distributing an interview incentive (telephone or Internet credits/e-money) and changed the informed consent to verbal informed consent. We summarized the changes in the data collection strategies in Table 1.

Table 1. Changes in data collection strategy

No	Item changed	Original plan	Pandemic adjustment
1.	Interview method	Face-to-face	Via telephone
2.	Interview duration	60 minutes	20 minutes
3.	Reward	Gift	Phone/Internet credit or e-money
4.	Measurement module	Yes	No
5.	Modules using extra tools	Yes	No
6.	Regular modules	16 modules	13 modules
7.	Additional modules	None	2 modules
8.	Informed Consent Agreement	Signed	Recording, text message

Wave 6 data collection used the e-HDSS application installed on an Android-based tablet. E-HDSS is a hybrid Android-based application that met the Sleman HDSS data collection needs.[3]

This application is equipped with several supporting features, such as a voice recording feature, automatically showing questions that met the predetermined rule such as respondent characteristics and question skipping pattern, automatically generating identity (ID) numbers, and recalling basic demographic data from the Sleman HDSS database.

We made several adjustments in the e-HDSS application to facilitate the phone-based interviewing. The new version of e-HDSS is equipped with a respondent identity confirmation form for initial contact, to ensure that those who will be interviewed by telephone are really the intended respondents. Additionally, there was an emergency save button to ensure that the recorded interview data is saved if the interview is abruptly ended due to technical problems.

Our field team comprises two supervisors and ten interviewers who have been given intensive training on the interview module and how to use the e-HDSS application.

The Process

Data Collection

We conducted the data collection in September-October 2020. Usually, Sleman HDSS requests permission for field data collection by visiting the local leaders (the sub-district head office, head of the village, and head of the sub-village). Due to the COVID-19 restrictions, data collection permission in 2020 was requested by mail and by contacting the local leaders via telephone or WhatsApp.

We divide the interview process into several stages: initial contact, interview consent request, household module interview, and individual module interview. Initial contact aimed to confirm that the telephone number was active and owned by the Sleman HDSS respondent. The interviewer contacted the respondents listed in the interview list through text messages or WhatsApp messages to explain the aim of the interview. Afterward, the interviewer confirmed the potential respondents' identities by requesting respondents' full names and addresses. The interviewer explained the survey procedure and confirmed the respondents' willingness to participate if both name and address data matched. If the name and address did not match, the interviewer would double-check with the database and report it as the wrong number.

Research information and requests for interview consent were delivered verbally or through text/chat by the interviewer. Confirmation of respondents' identity, verbal informed consent, and respondents' statement of consent was recorded as proof of respondents' participation in this study. Subsequently, the interviewer would send text reminders concerning the data collection time and confirm the preferred communication mode. After we confirmed the respondent's identity and received consent, we proceeded to the interview stage.

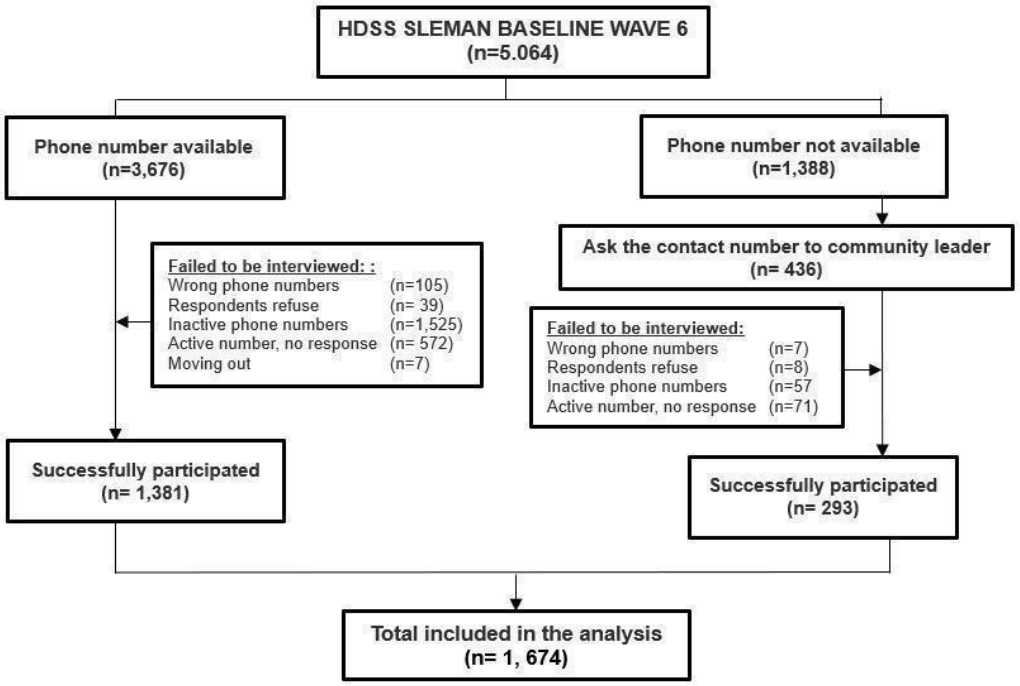

Figure 2. The respondents' participation flow.

In collecting data via telephone, 1,674 households were successfully interviewed for the household question module (Response Rate: 33%), and for the individual question module, there were 1,525 respondents successfully interviewed (Response Rate: 33%). The main reasons for the initial failed contact were an inactive number (66%), respondents who did not respond (26%), and misdialed numbers (5%). The strategy used to minimize interview failures involved contacting the respondent at least three times at different times, contacting other family members, and asking for help from community leaders such as the Head of the sub-village or Health Cadre to inform the respondent concerned.

Table 2 shows a comparison between respondents' characteristics in Sleman HDSS's fifth wave in 2019 (face-to-face interview), sixth wave in 2020 (phone interview) and seventh wave in 2021 (face-to-face interview). The proportion of household wealth status, level of education,

current employment, number of household members and head of household's age were significantly different between waves.

Table 2. Comparison of the Sleman HDSS respondents' characteristics between face-to face interviews (fifth and seventh waves) and phone-based interviews (sixth wave)

Characteristics	Wave 5 (face to face) (n=4,889)	Wave 6 (phone-based) (n=1,674)	Wave 7 (face to face) (n=4,529)	*p* -value
Household wealth index				**0.000**
Low	40.53% (1,945)	30.72% (497)	40.72% (1,733)	
Medium	41.65% (1,999)	43.94% (711)	42.76% (1,820)	
High	17.82% (855)	25.34% (410)	16.52% (703)	
Homeownership status				**0.244**
Private property	72.52% (3,418)	70.48% (1,120)	72.50% (3,085)	
Rent/other	27.48% (1,295)	29.52% (469)	27.50% (1,295)	
Age of head of household				**0.000**
Less than 20 years old	0.04% (2)	0.00% (0)	0.02% (1)	
Early adulthood (20-40 years old)	12.66% (619)	13.20 (221)	10.38% (470)	
Middle adulthood (41-60 years old)	53.10% (2,596)	58.42% (978)	52.47% (2,376)	
Late adulthood (>60 years old)	34.20% (1,672)	28.38% (475)	37.12% (1,681)	
Head of household educational level				**0.000**
Low (no education and elementary school)	32.20% (1,570)	21.72% (363)	31.09% (1,408)	
Middle (junior and senior high school)	53.20% (2,594)	57.99% (969)	54.93% (2,488)	
High (diploma and higher education)	14.60% (712)	20.29% (339)	13.98% (633)	
Employment of Head household				**0.001**
Stay-at-home parent and student	3.60% (176)	3.58% (60)	4.64% (210)	
Unemployed	10.21% (499)	9.20% (154)	11.28% (511)	
Employees and workers	41.93% (2,050)	44.21% (740)	41.44% (1,877)	
Retired	9.53% (466)	10.10% (169)	9.78% (434)	
Entrepreneur	17.55% (858)	18.40% (308)	16.56% (750)	
Service	4.48% (219)	4.42% (74)	4.15% (188)	
Farmer-Livestock	11.68% (571)	8.42% (141)	10.60% (480)	
Other	1.02% (50)	1.67% (28)	1.55% (70)	
Region				**0.231**
Urban	82.80% (4,048)	84.47% (1,414)	82.95% (3,757)	
Rural	17.20% (841)	15.53% (260)	17.05% (772)	

Number of household members				**0.000**
1-2 people	17.63% (862)	13.98% (234)	17.66% (800)	
3-5 people	64.94% (3,175)	68.70% (1,150)	63.26% (2,865)	
> 5 people	17.43% (852)	17.32% (290)	19.08% (864)	
Communicable Diseases Modules				
Dengue fever	0.35% (67)	0.22% (15)	0.11% (19)	
CBR	7.85	11.3	6.99	
CDR	0.008	0.010	0.010	

**Chi-square test.*

Data collection via telephone was viable for HDSS Sleman's respondents despite the challenges and lower response rate. The response rate was influenced by two factors: the respondent's contactable via telephone and the respondent's willingness to participate.[14] Sleman HDSS has designed various strategies to increase the response rate, such as counting adjusting call time according to respondents' profession, call-backs up to five times, and sending reminder messages through the WhatsApp application. However, the HDSS response rate was only around 38%, but with a satisfactory cooperation rate (only 2% refused). Subsequent studies are needed to investigate different methods to improve response rates from respondents with active numbers but who did not respond (the non-response rate was about 15%).

Despite a low response rate, phone-based data collection generally shows little bias from non-response on lifestyle, health and demographic questions.[21] A detailed analysis of the relationship between non-response rates and non-response bias from 30 published studies found that the response rate alone was not a very good indicator of the magnitude of non-response bias.[22,23]

Data Management

Sleman HDSS ensured that the quality of data produced had met the standard through several methods: (1) using data collecting application (e-HDSS), (2) spot-check, (3) cross-check, and (4) data cleaning. The spot-check process intends to ensure the data collection process is following the SOP. Before the pandemic, supervisors conducted the spot-check by observing

interviewers during the face-to-face interviews in respondents' houses, then supervisors recorded the results of their observations on the form provided. Meanwhile, during the COVID-19 pandemic, supervisors did spot checks by listening to recordings of the interviews. They performed spot checks at the beginning of the data collection process (first week of September) and in the middle of data collection (first week of October). To check for any miss match was conducted to see the compatibility between the respondent's answers and the data entered by the interviewers into the questionnaire. The cross-check procedure involved listening to the interview recording and matching the recording with the data uploaded to the Sleman HDSS server. Around 5% of household interview recordings were randomly selected for cross-checking.

There was no difference in data cleaning methods before and after the pandemic. The Sleman HDSS data manager handled data cleaning from initial contact reports, and daily interview reports, cleaning the interview data including data completion check, validation rules check, and double-checking data with previous wave data, as well as data tabulation. The cleaning process aimed to find any errors in the questionnaire filling process. The interviewer asked to confirm an error filling or data for correction. After the data were cleaned and met the established standard, the data manager would release the dataset for the data analysis process. The Sleman HDSS Sleman sixth wave data was released on July 17th, 2021.

The opportunity for phone-based interviews during the pandemic

a. No direct contact with respondents

   Data collection using the telephone can be done without making physical contact with respondents so it is very appropriate during this pandemic.[24] Data collection by telephone can be applied as a response to pandemic events and complements face-to-face interview data.[25]

b. Routine survei was still being conducted during pandemic

During the pandemic, many activities are hindered, including activities that involve community participation. We can still conduct Sleman HDSS annual longitudinal survey during the pandemic despite the challenges.

c. Use of Social capital

We take advantage of existing social capital to facilitate the implementation of the survey. Coleman (1988) in a book: [*Understanding Social Capital*] by Santoso, defines social capital as trust, norms, reciprocity and networks between individuals.[26] The social capital we use is as follows:

1. Trust: Respondents' participation is indirectly influenced by trust in Universitas Gadjah Mada (UGM), the oldest state university in Indonesia. When the respondent knew that this survey was conducted by UGM, the respondent responded well. UGM's credibility makes respondents believe that this survey can be trusted and is useful for the community.
2. Norms: social norms apply where respondents are reluctant to refuse the interview for fear of being considered disrespectful after getting permission from the hamlet or local officials. In addition to those, interviewers were asked to maintain politeness, speak at a calm tempo, and add sufficient "small talk" to maintain rapport even when there is no face-to-face interaction.
3. Reciprocity: In the consent, it was explained that this survey would contribute to the health sector, especially in the Sleman area, so that respondents felt that there would be reciprocity and were then willing to participate in the survey.
4. Network: data collection using telephone utilizing social networks owned by HDSS Sleman starting from contact or communication to the sub-district, village, hamlet head, to ask for the respondent's cell phone number.

The Challenges for phone-based interviews

a. Respondents frequently change their phone number

One of the significant challenges in phone interviews is the availability of respondents' contact numbers of 5,604 households, 3,676 (72.59%) had their contact numbers stored in the HDSS database. The HDSS team also requested aid from local community figures to provide additional 436 households contact numbers. Based on Regulation of Communication and Informatics Minister of Indonesia, no. 14 of the year 2017 on Telecommunication Service Customer Regulation, each customer can only register a maximum of three different numbers for every Citizenship Identity Number.[27] However, many customers own over three different numbers and frequently change numbers, resulting in difficulty for Sleman HDSS to track which number is currently active.[28]

b. Local culture influences phone-based interview

The Javanese are the largest ethnic group in Sleman Regency and uphold their socio-cultural manners. Generally, the polite way to ask for help is through face-to-face communication, and specifically, direct communication for research interviews is preferred. This cultural factor is one of the causes of the low response rate.

c. Respondents' telephone literacy

The percentage of the population using cellular phones continued to increase until 2019, reaching 63.53%. Ownership of Internet access in households also followed this gain in cellular phone usage (73.75%). Social media dominates the purpose of Internet use (87.20%), followed by news (69.20%) and entertainment access (62.13%). In addition, the population aged 25-49 years dominated internet access users (48.33%).[29] From this description, we can observe that cellular phones have not been maximized in terms of functions and in terms of age groups. Using cell phones to take online surveys is not yet common in Indonesian society. Data

collection via telephone requires careful technical skills and preparation in using the telephone from both the researcher and the respondent.[30]

Conclusions and Recommendations

COVID-19 has prompted a shift in data collection methods for population surveys from face-to-face interviews to telephone-based interviews, creating many opportunities that can be learned from for conducting surveys elsewhere. This method is sufficiently safe to be conducted during the pandemic. Sleman HDSS also gained much information about the limitations of telephone surveys and how to overcome them, which could also help improve our research strategies in the post-pandemic era. Social capital and improvement in gadget literacy can be considered as an effort to increase the response rate for data collection by telephone.

Abbreviations:

CATI: Computer-Assisted Telephone Interviewing

COVID-19: Corona Virus Disease 2019

e-HDSS: electronic Health and Demographic Surveillance System; hybrid android-based application

HDSS: Health and Demographic Surveillance System

ICF: Informed Consent Form

ID: respondent's identity number

LIC: Low-Income Countries

LMIC: Low Middle-Income Countries

NCD: Non-Communicable Disease

NIK: Citizenship Identity Number (*Nomor Induk Kependudukan*)

RT: *Rukun Tetangga*; Indonesia's lowest administration division

RW: *Rukun Warga*; division of sub-villages, consists of several RT

SOP: Standard Operational Procedures

SPV: interviewer's supervisor

WHO: World Health Organization

Competing interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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2	**13-12-2023**	**Korespondensi review 1**

View Letter

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Lessons Learned From Telephone-Based Data Collection for Health and Demographic Surveillance Systems During the COVID-19 Pandemic in Indonesia
Global Health: Science and Practice

Dear Mrs Ratrikaningtyas,

I am writing to inform you that your manuscript has been peer reviewed. The reviewers had useful questions and suggestions. We encourage you to revise your paper to address their feedback. For your guidance, editors' (if applicable) and reviewers' comments are appended to the end of this email.

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Editors' comments:

Reviewer 2 noted that it was not clear if independent IRB approval was obtained. You must provide an adequate response for us to consider publishing this.

Reviewers' comments:

Reviewer #1:

I suggest that the authors focus on the lessons learned and put more emphasis on the concept of social capital, which has a strong relationship with the success of telephone-based data collection. The respondent's social media literacy doesn't seem to have a correlation with the success of telephone-based data collection.

Reviewer #2:

The manuscript focuses on very important and emerging topic of alternative to face-to-face interviews. This summarizes how different methods were followed between the waves. However, the manuscript feels to be incomplete. I suggest authors and editors to consider following points :

1) Response rate was drastically different (only about 30% in telephonic interviews). Though the reasons for such was mentioned, it would also be good how this might affect results considering selection bias and profile of those agreeing to respond.

2) Please mentioned if any ethical review and clearance was done. Verbal informed consent was mentioned but it is not clear if any review by the independent IRB was obtained. Follow-up through local leaders or use of social capital was mentioned, but it might raise some concerns on confidentiality of personal information. Also it was mentioned that the call was recoded but were all respondents aware on the recording aspects and was it mentioned specifically during the verbal consent?

3) Change of phone number and/or inactive number seems to be a major challenge. It raises some questions on feasibility of study when even the phone numbers are not available and options in such cases is to be explored. This might be beyond the scope of this manuscript but worth mentioning this aspect.

4) Table 1 shows difference between Face to Face and telephone interviews, but it is not clear if the data on telephone interviews were in actual or estimated numbers. For example, it would be good to report average and range of duration of telephone interviews. What time (morning, evening, day) was found to be most feasible and preferred one by the respondents? Will the respondent prefer multiple contacts (for confirmation, for consent, for interview, etc) or a limited contacts? Some of those interesting and useful details are missing in the manuscript.

5) Overall, very useful topic but it would benefit from further details and reorganization of the content of the manuscript.

3	**26-01-2024**	**Perbaikan manuskrip sebagai respon review 1**

Global Health: Science and Practice

Lessons Learned From Telephone-Based Data Collection for Health and Demographic Surveillance Systems During the COVID-19 Pandemic in Indonesia

--Manuscript Draft--

Manuscript Number:	GHSP-D-22-00446R1
Full Title:	Lessons Learned From Telephone-Based Data Collection for Health and Demographic Surveillance Systems During the COVID-19 Pandemic in Indonesia
Article Type:	Field Action Report
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Manuscript Region of Origin:	INDONESIA
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	Vena Jaladara
	Yayuk Hartriyanti
	Fatwa Sari Tetra Dewi
Abstract:	Sleman Health and Demographic Surveillance System (HDSS) is a longitudinal survey to collect demographic, social, and health changes in Sleman Regency, Special Region of Yogyakarta, Indonesia, held routinely since 2014. To conduct field data collection during the COVID-19 pandemic in Indonesia, we need to adjust our method. This report aimed to describe the Sleman HDSS data collection strategy during the pandemic and its opportunities. Sleman HDSS completed a feasibility study and adjusted the Standard Operational Procedures (SOP), then Sleman HDSS managed the sixth wave of data collection via a telephone interview in September-October 2020. This study involved ten interviewers equipped with an e-HDSS-hybrid-based data collection application installed on an Android-based tablet as an instrument for data collection. The sample targeted was 5,064 households. We divide the interview process into several stages: initial contact, interview consent request, household module interview, and individual module interview. Research information and requests for interview consent were delivered verbally or through text/chat by the interviewer. Confirmation of respondents' identity, verbal informed consent, and respondents' statement of consent was recorded as proof of respondents' participation in this study. The telephone-based data collection successfully interviewed 1,674 households (33%

	response rate) in 17 sub-districts. We could deal with the pandemic conditions by changing the data collection strategy so that longitudinal surveys can still be carried out and we could get the latest data from the population. Compared to face-to-face interviewing, data collection via telephone is sufficiently practical. The telephone interview is a safe data collection method during the pandemic. Local wisdom can be used as social capital to help increase the response rate in the data collection process. We need a specialized strategy to increase the response rate, including checking phone number activation, improving the way of building rapport and initiating good engagement.
Additional Information:	
Question	**Response**
Please provide a statement indicating the role each author played in the research or program, and preparation of the manuscript.	Prima Dhewi Ratrikaningtyas : Conceptualization, Writing - Original Draft, Writing - Review & Editing, Methodology. Luthfi Azizatunnisa : Conceptualization, Writing - Review & Editing. Amirah Elyza Wahdi : Writing - Review & Editing. Agung Nugroho : Writing - Review & Editing. Yayuk Hartriyanti : Writing - Review & Editing. Lutfan Lazuardi : Conceptualization, Writing - Review & Editing. Fitrina Mahardani Kusumaningrum : Conceptualization, Writing - Original Draft. Vena Jaladara : Writing - Review & Editing. Aviria Ermamilia : Writing - Review & Editing. Septi Kurnia Lestari : Conceptualization, Writing - Original Draft, Writing - Review & Editing. Ratri Kusuma Wardani : Conceptualization, Writing - Original Draft, Resources, Visualization. Rahsunji Intan Nurvitasari : Writing - Original Draft, Resources. Alfianto Hanafiah : Writing - Original Draft, Resources. Putri Tiara Rosha : Writing - Original Draft, Resources, Visualization. Fatwa Sari Tetra Dewi : Conceptualization, Writing - Review & Editing, Methodology.
Please enter the teaser message. In one or two sentences (no more than 50 words), describe the main message of the manuscript including the significance for action. This message will appear on the Table of Contents page as additional information about your manuscript.	The COVID-19 pandemic opens the opportunity to change the method of collecting population research data from face-to-face interviews to telephone-based ones. This study shares valuable experiences when we continued to collect data for routine longitudinal surveys during the pandemic that can be adopted for another region.
Optional: Please enter acknowledgements. You may cut and paste this from a word processing file but any formatting will be lost. The acknowledgements will not be visible to peer reviewers. Please note that acknowledgements should not be included in the uploaded manuscript file as they may contain information that will identify authors.	This paper used Sleman HDSS (Health and Demographic Surveillance System) wave six version 10.0.0. The Sleman HDSS data collection has been primarily funded by the Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia. The researchers would like to express gratitude to the Sleman Regency Government, who permitted the team to conduct the longitudinal survey in Sleman Regency territory.
I confirm that the research meets all appropriate and applicable ethical guidelines in both the US and the study country(ies).	Yes
Please provide the number of words in the	2793

main body of the manuscript.		
I confirm that I have read and understand the author guidelines.	Yes	
Based on the ICMJE Uniform Disclosure Form, please declare any competing interests for the submitted work for you and your coauthors. If there are no competing interests, please indicate "None declared."	none declared	
Please tell us how you heard about GHSP?	We were looking for several alternative reputable journals on scimago and we think GHSP is the right journal for publication of our paper	
I confirm that the author team includes authors whose PRIMARY affiliation is in low- and middle-income countries?	Yes	
I confirm that the research meets all appropriate and applicable ethical guidelines in both the US and the study country(ies) and that IRB/ethical review compliance is detailed in the manuscript.	Yes	
I confirm that I have access to the data that is reported in this manuscript.	Yes	
Funding Information:	Universitas Gadjah Mada (51/UN1/FKKMK/PPKE/PT/2002)	Not applicable
Author Comments:	We hope this paper can be considered for publication in Global Health Science and Practice.	

Prima Dhewi Ratrikaningtyas
Department of Biostatistics, Epidemiology and Populastion Health
Universitas Gadjah Mada
Yogyakarta Special Region, Indonesia

September 23, 2022

Dear Mr. Stephen Hodgins, MD, MSc, DrPH,

We wish to submit a field action report entitled “Lessons Learned From Telephone-Based Data Collection For Health And Demographic Surveillance Systems During The Covid-19 Pandemic In Indonesia” for consideration by Global Health: Science and Practice.

We confirm that this work was original and has not been published elsewhere, nor is it currently under consideration for publication elsewhere.

In this paper, we reported on how to conduct a longitudinal survey in a pandemic situation. This is significant because many obstacles are faced and strategies must be adjusted.
In response to the editors' input, here are some revisions from us:

1. *Please reflect on the implications of the differences in your sample (shown in Table 2) when done by phone.*
   →we added seventh-wave data (after the pandemic) in Table 2 to clarify the comparison of data obtained by telephone with data obtained through face-to-face interviews
2. *Please discuss the issue of low response rate and its consequences for generalization more thoroughly*.
   → We explained the low response rate and its implications by adding seventh-wave data to Table 2 and adding explanations from several references.

We believe that this manuscript is appropriate for publication by Global Health: Science and Practice because demographic and health longitudinal surveys are one of the issues that support global health in accordance with the scope of this journal. This study shares valuable experiences when we continued to collect data for routine longitudinal surveys during the pandemic that can be adopted for another region.

We have no conflicts of interest to disclose.
Please address all correspondence concerning this manuscript to me at primadhewi@ugm.ac.id
Thank you for your consideration of this manuscript.

Sincerely,
Prima D. Ratrikaningtyas

Title:

LESSONS LEARNED FROM TELEPHONE-BASED DATA COLLECTION FOR HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEMS DURING THE COVID-19 PANDEMIC IN INDONESIA

Author:

Prima Dhewi Ratrikaningtyas[a,d], Lutfan Lazuardi[b,d], Agung Nugroho[c,d], Amirah Elyza Wahdi[a,d], Rahsunji Intan Nurvitasari[d], Luthfi Azizatunnisa[d,e], Alfianto Hanafiah[d], Septi Kurnia Lestari[d], Ratri Kusuma Wardani[d], Putri Tiara Rosha[d], Aviria Ermamilia[d,f], Fitrina Mahardani Kusumaningrum[d,e], Vena Jaladara[d,e], Yayuk Hartriyanti[d,f], Fatwa Sari Tetra Dewi[d,e]

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GHSP Author Reflexivity Checklist		
Manuscript title: Lessons Learned From Telephone-Based Data Collection For Health And Demographic Surveillance Systems During The Covid-19 Pandemic In Indonesia		
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Corresponding author: Prima Dhewi Ratrikaningtyas		
	Yes	**No**
1. Does the authorship include individuals whose PRIMARY affiliation is in the country/ies where the research/program activity was done? If no, please explain.	✓	
2. Is the leadership, contribution, and ownership of this work by individuals from this/these country/ies recognized within the authorship?	✓	
3. Is the leadership, contribution, and ownership of this work by each author correctly represented in the author contributions statement describing each author's role in the research or program and preparation of the manuscript?	✓	
4. Does the manuscript describe how this research or program experience addresses local program and/or policy priorities?	✓	
5. Have the authors shared what is reported in this manuscript with in-country stakeholders OR do the authors have a plan for how what is reported in this manuscript will be shared with in-country stakeholders? Please briefly describe (200 words or fewer): After each wave is completed, we report the results of the survey data analysis to the Sleman Regency regional government as input for the latest data regarding the demographic and health conditions of the Sleman Regency population. We also report the survey results to the Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada for budget accountability	✓	
6. Does the manuscript describe how individuals in this/these countries were involved in study or program design and/or implementation?	✓	
7. Does the manuscript include acknowledgement of other individuals who contributed to the research, program, or other aspects of this		✓

manuscript, but who are not recognized as authors, as well as a brief description of these individuals' respective contributions?		

Response to Reviewer:

Question/Comments	Response	Changes Made
Reviewer 1: I suggest that the authors focus on the lessons learned and put more emphasis on the concept of social capital, which has a strong relationship with the success of telephone-based data collection. The respondent's social media literacy doesn't seem to correlate with the success of telephone-based data collection.	We have emphasized how social capital can be built from social services. The stakeholder engagement division reported that around 91 community services had been carried out since the first wave in HDSS clusters in Sleman Regency, such as providing health education and training.	Line 262-266
Reviewer 2:		
1. Response rate was drastically different (only about 30% in telephonic interviews). Though the reasons for such was mentioned, it would also be good how this might affect results considering selection bias and profile of those agreeing to respond.	Table 2 shows that many respondents were from upper socio-economic groups. The higher the education or economic level, the better the literacy. Apart from that, the higher a person's economic status, the less frequently they change their telephone number	
2. Please mentioned if any ethical review and clearance was done. Verbal informed consent was mentioned but it is not clear if any review by the independent IRB was obtained. Follow-up through local leaders or use of social capital was mentioned, but it might raise some concerns on confidentiality of personal information. Also it was mentioned that the call was recoded but were all respondents aware on	1. The verbally informed consent procedure for Sleman HDSS was approved by the Medical and Health Research Ethics Commission, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada with approval number KE/FK/0586/EC/2020 and it was mentioned in the verbal consent that the call was recorded. 2. In the context of the Indonesian bureaucracy, there must be written	Line 134-140

the recording aspects and was it mentioned specifically during the verbal consent?	permission from local leaders for security and smooth data collection. However, we ensure that respondent data is confidential and not known to local leaders or other parties	
3. Change of phone number and/or inactive number seems to be a major challenge. It raises some questions on feasibility of study when even the phone numbers are not available and options in such cases is to be explored. This might be beyond the scope of this manuscript but worth mentioning this aspect.	The COVID-19 pandemic has affected the lives of many people in low-middle income countries, including Indonesia. To understand the impact of the pandemic on the population, we conducted a survey that collected data on both household and individual levels. In individual level, we focused on the social economic status, health access, mental well-being, physical activity and smoking behavior of the respondents. We recognize that the household-level data may not be representative of the whole population, so we also analyzed the individual-level data to capture the variations among different individuals.	Line 263-270
4. Table 1 shows difference between Face to Face and telephone interviews, but it is not clear if the data on telephone interviews were in actual or estimated numbers. For example, it would be good to report average and range of duration of telephone interviews. What time (morning, evening, day) was found to be most feasible and preferred one	We decided to change Table 1 from " Changes in data collection strategy" with "Recapitulation of telephone interview results"	Line 188-205

by the respondents? Will the respondent prefer multiple contacts (for confirmation, for consent, for interview, etc) or a limited contacts? Some of those interesting and useful details are missing in the manuscript.		
5. Overall, very useful topic but it would benefit from further details and reorganization of the content of the manuscript.	Thank you for your comments. We appreciate the detailed review that you have provided. We have made some changes to address your inputs.	

LESSONS LEARNED FROM TELEPHONE-BASED DATA COLLECTION FOR HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEMS DURING THE COVID-19 PANDEMIC IN INDONESIA

Key Findings

- The COVID-19 pandemic opens the opportunity to change the method of collecting population research data from face-to-face interviews to telephone-based ones
- Social capital can be used to expedite the data collection process
- During the pandemic, researchers can deliver research information, obtain consent verbally or via chat, and obtain proof through telephone record/text/chat.

Key Implications

- Before conducting a telephone-based interview, the researchers suggested conducting a feasibility study to discover the respondents' characteristics and conduct a data collection trial.
- A longitudinal study in Indonesia should collect respondent contact numbers and update them frequently to ensure they are still active.

Messages

- A telephone interview might be conducted by considering several elements: connection strength, interview length and duration, the cost impact on respondents, telephone owned by respondents, and capabilities to interact by telephone (limited for the older age or respondents with disabilities).
- Initial contact is necessary to develop good engagement with the respondents. The initial contact can be implemented by sending a brief message that includes standardized study information and inquiring about the respondent's willingness to participate in this study.
- We encouraged increasing telephone literacy in the community, especially for research activities.

Abstract
Sleman Health and Demographic Surveillance System (HDSS) is a longitudinal survey to collect demographic, social, and health changes in Sleman Regency, Special Region of Yogyakarta, Indonesia, held routinely since 2014. To conduct field data collection during the COVID-19 pandemic in Indonesia, we need to adjust our method. This report aimed to describe the Sleman HDSS data collection strategy during the pandemic and its opportunities. Sleman HDSS completed a feasibility study and adjusted the Standard Operational Procedures (SOP), then Sleman HDSS managed the sixth wave of data collection via a telephone interview in September-October 2020. This study involved ten interviewers equipped with an e-HDSS-hybrid-based data collection application installed on an Android-based tablet as an instrument for data collection. The sample targeted was 5,064 households. We divide the interview process into several stages: initial contact, interview consent request, household module interview, and individual module interview. Research information and requests for interview consent were delivered verbally or through text/chat by the interviewer. Confirmation of respondents' identity, verbal informed consent, and respondents' statement of consent were recorded as proof of respondents' participation in this study. The telephone-based data collection successfully interviewed 1,674 households (33% response rate) in 17 sub-districts. We could deal with the pandemic conditions by changing the data collection strategy so that longitudinal surveys can still be carried out and we could get the latest data from the population. Compared to face-to-face interviewing, data collection via telephone is sufficiently practical. The telephone interview is a safe data collection method during the pandemic. Local wisdom can be used as social capital to help increase the response rate in the data collection process. We need a specialized strategy to increase the response rate, including checking phone number activation, improving the way of building rapport, and initiating good engagement.

Keywords: data collection, longitudinal survey, telephone-based survey, Sleman Health and Demographic Surveillance System

Background

As the demand for healthcare services rises, interest in longitudinal population studies is increasing. A longitudinal population study is valuable to identify trends in health services, factors related to health services, and their impact on improving physical and mental health.[1] Previous studies established the importance of population-based longitudinal studies to monitor COVID-19 and its effects.[2] The Sleman Health and Demographic Surveillance System (HDSS) is a longitudinal survey system that collects demographic data, social, and health status changes in Sleman Regency, Special Region of Yogyakarta, Indonesia. We chose Sleman Regency (Figure 1) as the HDSS location since Sleman Regency could represent both urban and rural areas. Also, Sleman Regency has a relatively high life expectancy and a high prevalence of

non-communicable diseases (NCDs) and their risk factors. Sleman HDSS aims to produce high-quality data as the basis for educational activities and policymaking to improve the Sleman Regency's health quality. Sleman HDSS used a quantitative method for the longitudinal survey. It involved 5,147 households in 216 clusters (184 urban and 32 rural) in 80 selected villages in Sleman Regency. Details regarding Sleman HDSS design are available elsewhere.[3]

In March 2020, the Director-General of the World Health Organization (WHO) declared the Coronavirus Disease 2019 (COVID-19) caused by the SARS-CoV-2 virus as a global pandemic.[4] The government announced the first case of COVID-19 in Indonesia on March 2nd, 2020. This condition prompted the Indonesian government to stop COVID-19 transmission through Regulation No. 21 of the year 2020 on Large-Scale Social Restrictions, which involved closing schools and offices, limitations on religious activities, and restriction of any activities in public spaces or facilities, including face-to-face data collection.[5]

Data collection during a pandemic is essential to monitor the impact of COVID-19 on the economic sector,[6,7] healthcare service access,[8,9] changes in health-related behaviors[10] and mental health.[11–13] The Sleman HDSS team designed a strategy for collecting data during the pandemic. One of the proposed strategies was replacing face-to-face interviews with phone interviews. Several large-scale household surveys have been conducted via phone interviewing[14,15] because it enables high-frequency data collection in a shorter time and is more cost-effective.[16,17] Based on a previous study that surveyed household information technology (IT) utilization patterns at Sleman Regency in 2019 (400 households), 92.75% owned cellular phones, 7.29% owned cable telephones, and 49.75% of respondents used the Internet to access social media applications, such as WhatsApp and Instagram.[18] Phone-based data collection can collect valid and reliable data.[16,17,19] However, several factors need to be considered when designing phone-based data collection, including contact availability,[17,20] completion, response rate, demographic representative,[20]costs,[14] data consistency, and bias minimization.[17] This

article aimed to describe Sleman HDSS's experience in conducting the sixth wave survey during the pandemic using phone-based data collection in 2020 and to share lessons that could be learned. This article describes the processes and activities adjusted during the current COVID-19 pandemic, including preparation, data collection, and data management.

The Preparation

The preparation step encompasses the preparation stages before data collection, such as literature review, field situation evaluation, feasibility study, Standard Operating Procedure (SOP) development, and study instrument preparation (questionnaire and e-HDSS-hybrid-based data collection application). We did the literature review to find information regarding telephone interviews and implementing data collection during the pandemic. Then, we developed our SOP for the data collection via telephone. Next, we conducted a feasibility study to explore HDSS respondents' perceptions of data collection via telephone using a qualitative method with a rapid assessment procedure. Twenty-four respondents were interviewed in-depth via telephone, including households, heads of the village, and researchers with experience in conducting telephone interviews.

The feasibility study revealed that the respondents preferred face-to-face interviews over telephone interviews. However, the pandemic conditions did not give us much choice in data collection methods. A telephone interview could be implemented by considering several factors, including connection strength, the interview time and duration, cost impact to respondents, respondents' telephone ownership, and the ability to communicate by telephone. Results showed that the respondents expect interviews to be conducted in their free time for an interview duration of about 20 to 30 minutes.

Initial contact with respondents is a crucial part of engaging with the respondents. The feasibility study result suggested sending a short message that included standardized study information and asking for the respondent's willingness to participate in this study. The

interviewer's credentials should be proved by displaying the Sleman HDSS attributes in the interviewer's contact profile and showing a letter of assignment during the initial contact with respondents. Several respondents' contact numbers on the Sleman HDSS database were invalid/inactive. As a result, the feasibility study recommends double-checking the respondents' numbers with the community's stakeholders.

Thus, in the adjusted SOP, the initial contact had to ensure that the number called was the number of the Sleman HDSS respondent's household members and active. In addition, the Sleman HDSS team adjusted the SOP for distributing an interview incentive (telephone or Internet credits/e-money) and changed the informed consent to verbal informed consent. Before starting the interview, we explained the purpose and methods of our research to all the participants. We also asked them if they were willing to have their voices recorded during the interview. Only those who gave their consent will be recorded, and we repeated the consent questions at the beginning of the recording as a confirmation. The verbally informed consent procedure for Sleman HDSS was approved by the Medical and Health Research Ethics Commission, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada with approval number KE/FK/0586/EC/2020

Wave 6 data collection used the e-HDSS application installed on an Android-based tablet. E-HDSS is a hybrid Android-based application that meets the Sleman HDSS data collection needs.[3] This application is equipped with several supporting features, such as a voice recording feature, automatically showing questions that met the predetermined rule such as respondent characteristics and question skipping pattern, automatically generating identity (ID) numbers, and recalling basic demographic data from the Sleman HDSS database.

We made several adjustments in the e-HDSS application to facilitate the phone-based interviewing. The new version of e-HDSS is equipped with a respondent identity confirmation form for initial contact, to ensure that those who will be interviewed by telephone are really

the intended respondents. Additionally, there was an emergency save button to ensure that the recorded interview data is saved if the interview is abruptly ended due to technical problems.

Our field team comprises two supervisors and ten interviewers who have been given intensive training on the interview module and how to use the e-HDSS application.

The Process

Data Collection

We conducted the data collection in September-October 2020. Usually, Sleman HDSS requests permission for field data collection by visiting the local leaders (the sub-district head office, head of the village, and head of the sub-village). Due to the COVID-19 restrictions, data collection permission in 2020 was requested by mail and by contacting the local leaders via telephone or WhatsApp.

We divide the interview process into several stages: initial contact, interview consent request, household module interview, and individual module interview. Initial contact aimed to confirm that the telephone number was active and owned by the Sleman HDSS respondent. The interviewer contacted the respondents listed in the interview list through text messages or WhatsApp messages to explain the aim of the interview. Afterward, the interviewer confirmed the potential respondents' identities by requesting the respondents' full names and addresses. The interviewer explained the survey procedure and confirmed the respondents' willingness to participate if both name and address data matched. If the name and address did not match, the interviewer would double-check with the database and report it as the wrong number.

Research information and requests for interview consent were delivered verbally or through text/chat by the interviewer. Confirmation of respondents' identity, verbal informed consent, and respondents' statement of consent was recorded as proof of respondents' participation in this study. Subsequently, the interviewer would send text reminders concerning the data

collection time and confirm the preferred communication mode. After we confirmed the respondent's identity and received consent, we proceeded to the interview stage.

In collecting data via telephone, 1,674 households were successfully interviewed for the household question module (Response Rate: 33%), and for the individual question module, there were 1,525 respondents successfully interviewed (Response Rate: 33%). The main reasons for the initial failed contact were an inactive number (66%), respondents who did not respond (26%), and misdialed numbers (5%). The strategy used to minimize interview failures involved contacting the respondent at least three times at different times, contacting other family members, and asking for help from community leaders such as the Head of the sub-village or Health Cadre to inform the respondent concerned.

There are 1665 rows in the original data recapitulation for wave 6, however in the audio file processing, only 1644 rows are involved. This is due to 19 recordings excluding interview time and 2 recordings containing unanswered calls. Table 1 shows the information and duration of interviewed data collection by phone. The mean duration of the interview was 31.73 minutes (SD 43.13 minutes). Most respondents were successfully interviewed only once (90.39%), and the most frequently chosen time for the interview was afternoon (43.67%).

Table 2 shows a comparison between respondents' characteristics in Sleman HDSS's fifth wave in 2019 (face-to-face interview), sixth wave in 2020 (phone interview) and seventh wave in 2021 (face-to-face interview). The proportion of household wealth status, level of education, current employment, number of household members and head of household's age were significantly different between waves.

Data collection via telephone was viable for HDSS Sleman's respondents despite the challenges and lower response rate. The response rate was influenced by two factors: the respondent's contactable via telephone and the respondent's willingness to participate.[14] Sleman HDSS has designed various strategies to increase the response rate, such as counting and adjusting call

time according to respondents' profession, call-backs up to five times, and sending reminder messages through the WhatsApp application. However, the HDSS response rate was only around 38%, but with a satisfactory cooperation rate (only 2% refused). Subsequent studies are needed to investigate different methods to improve response rates from respondents with active numbers but who did not respond (the non-response rate was about 15%).

Despite a low response rate, phone-based data collection generally shows little bias from non-response on lifestyle, health and demographic questions.[21] A detailed analysis of the relationship between non-response rates and non-response bias from 30 published studies found that the response rate alone was not a very good indicator of the magnitude of non-response bias.[22,23]

Data Management

Sleman HDSS ensured that the quality of data produced had met the standard through several methods: (1) using a data collecting application (e-HDSS), (2) spot-checking, (3) cross-checking, and (4) data cleaning. The spot-check process intends to ensure the data collection process is following the SOP. Before the pandemic, supervisors conducted the spot-check by observing interviewers during the face-to-face interviews in respondents' houses, and then supervisors recorded the results of their observations on the form provided. Meanwhile, during the COVID-19 pandemic, supervisors did spot checks by listening to recordings of the interviews. They performed spot checks at the beginning of the data collection process (first week of September) and in the middle of data collection (first week of October). To check for any miss match was conducted to see the compatibility between the respondent's answers and the data entered by the interviewers into the questionnaire. The cross-check procedure involved listening to the interview recording and matching the recording with the data uploaded to the

Sleman HDSS server. Around 5% of household interview recordings were randomly selected for cross-checking.

There was no difference in data cleaning methods before and after the pandemic. The Sleman HDSS data manager handled data cleaning from initial contact reports, and daily interview reports, cleaning the interview data including data completion check, validation rules check, and double-checking data with previous wave data, as well as data tabulation. The cleaning process aimed to find any errors in the questionnaire filling process. The interviewer asked to confirm an error filling or data for correction. After the data were cleaned and met the established standard, the data manager would release the dataset for the data analysis process.

The Sleman HDSS Sleman sixth wave data was released on July 17th, 2021.

The opportunity for phone-based interviews during the pandemic

a. No direct contact with respondents

   Data collection using the telephone can be done without making physical contact with respondents so it is very appropriate during this pandemic.[24] Data collection by telephone can be applied as a response to pandemic events and complements face-to-face interview data.[25]

b. Routine survey was still being conducted during pandemic

   During the pandemic, many activities are hindered, including activities that involve community participation. We can still conduct the Sleman HDSS annual longitudinal survey during the pandemic despite the challenges. The COVID-19 pandemic has affected the lives of many people in low-middle income countries, including Indonesia.

   To understand the impact of the pandemic on the population, we conducted a survey that collected data on both household and individual levels. In individual level, we focused on the social economic status, health access, mental well-being, physical activity and smoking behavior of the respondents. We recognize that the household-

level data may not be representative of the whole population, so we also analyzed the individual-level data to capture the variations among different individuals.

c. Use of Social capital

We take advantage of existing social capital to facilitate the implementation of the survey. Coleman (1988) in a book: [*Understanding Social Capital*] by Santoso, defines social capital as trust, norms, reciprocity and networks between individuals.[26] The social capital we use is as follows:

1. Trust: Respondents' participation is indirectly influenced by trust in Universitas Gadjah Mada (UGM), the oldest state university in Indonesia. When the respondent knew that this survey was conducted by UGM, the respondent responded well. UGM's credibility makes respondents believe that this survey can be trusted and is useful for the community. Apart from that, the HDSS survey is longitudinal so it requires long-term collaboration with the community, for this reason, HDSS routinely holds activities to familiarize and strengthen bonds with respondents such as community service by HDSS researchers as well as UGM lecturers.

2. Norms: social norms apply where respondents are reluctant to refuse the interview for fear of being considered disrespectful after getting permission from the hamlet or local officials. In addition to those, interviewers were asked

to maintain politeness, speak at a calm tempo, and add sufficient "small talk" to maintain rapport even when there was no face-to-face interaction.

3. Reciprocity: In the consent, it was explained that this survey would contribute to the health sector, especially in the Sleman area, so that respondents felt that there would be reciprocity and were then willing to participate in the survey.
4. Network: data collection using telephone utilizing social networks owned by HDSS Sleman starting from contact or communication to the sub-district, village, hamlet head, to ask for the respondent's cell phone number.

The Challenges for Phone-based Interviews

a. Respondents frequently change their phone number

One of the significant challenges in phone interviews is the availability of respondents' contact numbers of 5,604 households, 3,676 (72.59%) had their contact numbers stored in the HDSS database. The HDSS team also requested aid from local community figures to provide an additional 436 household contact numbers. Based on the Regulation of Communication and Informatics Minister of Indonesia, no. 14 of the year 2017 on Telecommunication Service Customer Regulation, each customer can only register a maximum of three different numbers for every Citizenship Identity Number.[27] However, many customers own over three different numbers and frequently change numbers, resulting in difficulty for Sleman HDSS to track which number is currently active.[28]

b. Respondents' telephone literacy

The percentage of the population using cellular phones continued to increase until 2019, reaching 63.53%[7]. Social media dominates the purpose of Internet use (87.20%) [7]. Using cell phones to take online surveys is not yet common in Indonesian society. On the other hand, telephone surveys mean that respondents are not directly met face to face so it is easier for

respondents to refuse/ignore messages to participate in the survey. Data collection via telephone requires careful technical skills and preparation in using the telephone from both the researcher and the respondent.[30]

Conclusions and Recommendations

COVID-19 has prompted a shift in data collection methods for population surveys from face-to-face interviews to telephone-based interviews, creating many opportunities that can be learned from conducting surveys elsewhere. This method is sufficiently safe to be conducted during the pandemic. Sleman HDSS also gained much information about the limitations of telephone surveys and how to overcome them, which could also help improve our research strategies in the post-pandemic era. Social capital and improvement in gadget literacy can be considered as an effort to increase the response rate for data collection by telephone.

Abbreviations:

CATI: Computer-Assisted Telephone Interviewing

COVID-19: Corona Virus Disease 2019

e-HDSS: electronic Health and Demographic Surveillance System; hybrid android-based application

HDSS: Health and Demographic Surveillance System

ICF: Informed Consent Form

ID: respondent's identity number

LIC: Low-Income Countries

LMIC: Low Middle-Income Countries

NCD: Non-Communicable Disease

NIK: Citizenship Identity Number (*Nomor Induk Kependudukan*)

RT: *Rukun Tetangga*; Indonesia's lowest administration division

RW: *Rukun Warga*; division of sub-villages, consists of several RT

SOP: Standard Operational Procedures

SPV: interviewer's supervisor

WHO: World Health Organization

Competing interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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LESSONS LEARNED FROM TELEPHONE-BASED DATA COLLECTION FOR HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEMS DURING THE COVID-19 PANDEMIC IN INDONESIA

Figure 1. The Sleman Health and Demographic Surveillance System (Sleman HDSS) location. (A) Yogyakarta province in Indonesia (B) Sleman Regency (green color area), Yogyakarta Province. © **OpenStreetMap Contributor.** This map is licensed under the Creative Commons Attribution-ShareAlike 2.0 License (CC By-SA). For further information, please visit http://www.openstreetmap.org/copyright.

LESSONS LEARNED FROM TELEPHONE-BASED DATA COLLECTION FOR HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEMS DURING THE COVID-19 PANDEMIC IN INDONESIA

Table 1. Recapitulation of telephone interview results

Variables	Total of Respondents (n = 1644)
	n (%)
Interview Frequency per Respondent	
• One time	1486 (90.39)
• More than one time	158 (9.61)
Time of Interview	
• In the morning	342 (20.80)
• At Noon	718 (43.67)
• In the afternoon	584 (35.52)
Duration of Interview	
• <20 minutes	348 (21.17)
• 20-30 minutes	518 (31.51)
• >30 minutes	778 (47.32)

Table 2. Comparison of the Sleman HDSS respondents' characteristics between face-to face interviews (fifth and seventh waves) and phone-based interviews (sixth wave)

Characteristics	Wave 5 (face to face) (n=4,889)	Wave 6 (phone-based) (n=1,674)	Wave 7 (face to face) (n=4,529)	*p* -value
Household wealth index				**0.000**
Low	40.53% (1,945)	30.72% (497)	40.72% (1,733)	
Medium	41.65% (1,999)	43.94% (711)	42.76% (1,820)	
High	17.82% (855)	25.34% (410)	16.52% (703)	
Homeownership status				**0.244**
Private property	72.52% (3,418)	70.48% (1,120)	72.50% (3,085)	
Rent/other	27.48% (1,295)	29.52% (469)	27.50% (1,295)	
Age of head of household				**0.000**
Less than 20 years old	0.04% (2)	0.00% (0)	0.02% (1)	

Early adulthood (20-40 years old)	12.66% (619)	13.20 (221)	10.38% (470)	
Middle adulthood (41-60 years old)	53.10% (2,596)	58.42% (978)	52.47% (2,376)	
Late adulthood (>60 years old)	34.20% (1,672)	28.38% (475)	37.12% (1,681)	
Head of the household educational level				**0.000**
Low (no education and elementary school)	32.20% (1,570)	21.72% (363)	31.09% (1,408)	
Middle (junior and senior high school)	53.20% (2,594)	57.99% (969)	54.93% (2,488)	
High (diploma and higher education)	14.60% (712)	20.29% (339)	13.98% (633)	
Employment of the Head of the household				**0.001**
Stay-at-home parent and student	3.60% (176)	3.58% (60)	4.64% (210)	
Unemployed	10.21% (499)	9.20% (154)	11.28% (511)	
Employees and workers	41.93% (2,050)	44.21% (740)	41.44% (1,877)	
Retired	9.53% (466)	10.10% (169)	9.78% (434)	
Entrepreneur	17.55% (858)	18.40% (308)	16.56% (750)	
Service	4.48% (219)	4.42% (74)	4.15% (188)	
Farmer-Livestock	11.68% (571)	8.42% (141)	10.60% (480)	
Other	1.02% (50)	1.67% (28)	1.55% (70)	
Region				**0.231**
Urban	82.80% (4,048)	84.47% (1,414)	82.95% (3,757)	
Rural	17.20% (841)	15.53% (260)	17.05% (772)	
Number of household members				**0.000**
1-2 people	17.63% (862)	13.98% (234)	17.66% (800)	
3-5 people	64.94% (3,175)	68.70% (1,150)	63.26% (2,865)	
> 5 people	17.43% (852)	17.32% (290)	19.08% (864)	
Communicable Diseases Modules				
Dengue fever	0.35% (67)	0.22% (15)	0.11% (19)	
CBR	7.85	11.3	6.99	
CDR	0.008	0.010	0.010	

*C*hi-square test.*

4	**06-02-2024**	**Bukti manuskrip *accepted***

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6	**19-02-2024**	**Perbaikan manuskrip sebagai respon review 2**

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FIELD ACTION REPORT

Lessons Learned From Telephone-Based Data Collection for Health and Demographic Surveillance Systems During the COVID-19 Pandemic in Indonesia

Prima Dhewi Ratrikaningtyas,[a,b] Lutfan Lazuardi,[b,c] Agung Nugroho,[b,d] Amirah Ellyza Wahdi,[a,b] Rahsunji Intan Nurvitasari,[b] Luthfi Azizatunnisa,[b,e] Alfianto Hanafiah,[b] Septi Kurnia Lestari,[b] Ratri Kusuma Wardani,[b] Putri Tiara Rosha,[b] Aviria Ermamilia,[b,f] Fitrina Mahardani Kusumaningrum,[b,e] Vena Jaladara,[b,e] Yayuk Hartriyanti,[b,f] Fatwa Sari Tetra Dewi[b,e]

Key Findings

- During the pandemic, conducting telephone-based interviews allowed data to be collected for the routine longitudinal survey safely without direct respondent contact and without interruption.
- Establishing trust, encouraging social norms, describing the reciprocal benefits of survey participation, and leveraging social networks facilitated survey participation and data collection.
- Despite using strategies to encourage survey responses, the response rate for telephone-based data collection was lower than in-person data collection.

Key Implications

- Before conducting a telephone-based interview, researchers should conduct a feasibility study to explore the respondents' characteristics, including the cost impact on respondents, respondents' telephone ownership, and capabilities to interact by telephone (limited for the older age or respondents with disabilities), as well as connection strength and interview length.
- A longitudinal study in Indonesia should collect respondent contact numbers and update them frequently to ensure they are still active.

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ABSTRACT

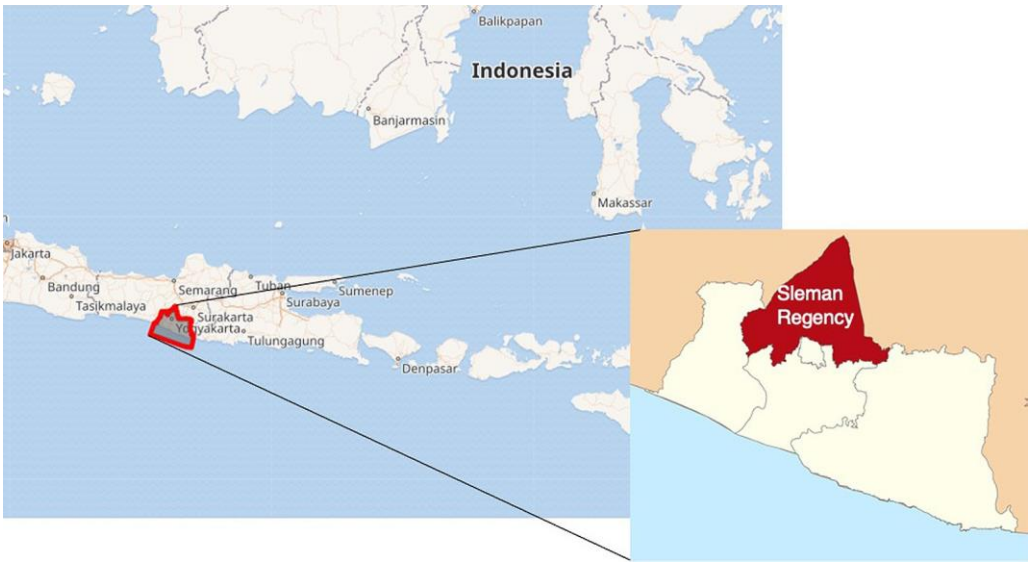
The Sleman Health and Demographic Surveillance System (HDSS) is a longitudinal survey held routinely since 2014 to collect demographic, social, and health changes in Sleman Regency, Special Region of Yogyakarta, Indonesia. During the COVID-19 pandemic in Indonesia, we needed to adjust our method of conducting data collection from in-person to telephone interviews. We describe the Sleman HDSS data collection strategy used and the opportunities it presented. First, the Sleman HDSS team completed a feasibility study and adjusted the standard operational procedures to conduct telephone interviews. Then, the Sleman HDSS team collected data via a telephone interview in September–October 2020. Ten interviewers were equipped with an e-HDSS data collection application installed on an Android-based tablet to collect data. The sample targeted was 5,064 households. The telephone-based data collection successfully interviewed 1,674 households (33% response rate) in 17 subdistricts. We changed the data collection strategy so that the Sleman HDSS could still be conducted and we could get the latest data from the population. Compared to in-person interviewing, data collection via telephone was sufficiently practical. The telephone interview was a safe and viable data collection method. To increase the response rate, telephone number activation could be checked, ways of building rapport could be improved, and engagement could be improved by using social capital.

BACKGROUND

As the demand for health care services rises, interest in longitudinal population studies is increasing. A longitudinal population study is valuable to identify trends in health services, factors related to health services, and their impact on improving physical and mental health.[1] Previous studies established the importance of population-based longitudinal studies to monitor the COVID-19 pandemic and its effects.[2]

The Sleman Health and Demographic Surveillance System (HDSS) is a longitudinal survey system that collects data on demographics and social and health status changes in Sleman Regency, Special Region of Yogyakarta, Indonesia. Sleman Regency (Figure) represents both urban and rural areas of Indonesia. The population of this regency has a relatively high life expectancy and a

FIGURE. Map of Sleman Regency, Special Region of Yogyakarta, Indonesia



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high prevalence of noncommunicable diseases and their risk factors. The Sleman HDSS aims to collect high-quality data as the basis for planning educational activities and policymaking to improve the population's health quality. The Sleman HDSS used a quantitative method that involved 5,147 households in 216 clusters (184 urban and 32 rural) in 80 selected villages in Sleman Regency. Details regarding the Sleman HDSS design are available elsewhere.[3]

In March 2020, the Director-General of the World Health Organization declared COVID-19 a global pandemic.[4] On March 2, 2020, the Indonesia government announced the first COVID-19 case, prompting the government to stop COVID-19 transmission by closing schools and offices, limiting religious activities, and restricting any activities in public spaces or facilities, including in-person data collection.[5]

Data collection during a pandemic is essential to monitor the impact of COVID-19 on the economic sector,[6,7] health care service access,[8,9] changes in health-related behaviors,[10] and mental health.[11–13] The Sleman HDSS team designed alternative strategies for collecting data during the pandemic. One of the proposed strategies was replacing in-person interviews with telephone interviews. Several large-scale household surveys have been conducted via telephone interviewing[14,15] because it enables high-frequency data collection in a shorter time and is more cost effective.[16,17] Based on a previous study that surveyed household information technology utilization patterns at Sleman Regency in 2019 (400 households), 92.75% owned cellular phones, 7.29% owned cable telephones, and 49.75% of respondents used the Internet to access social media applications, such as WhatsApp and Instagram.[18] Telephone-based data collection can collect valid and reliable data.[16,17,19] However, when designing telephone-based data collection, several factors need to be considered, including contact availability,[17,20] completion, response rate, demographic representative,[20] costs,[14] data consistency, and bias minimization.[17] We document the Sleman HDSS team's experience in conducting the wave 6 survey during the pandemic using telephone-based data collection in 2020 and share lessons learned. We describe the processes and activities that were adjusted during the pandemic, including preparation, data collection process, and data management.

Telephone interviewing enables high-frequency data collection in a shorter time and is more cost effective.

PREPARATION

We conducted a feasibility study to explore HDSS respondents' perceptions of data collection via telephone using a qualitative method with a rapid assessment procedure. Twenty-four respondents were interviewed in depth via telephone, including households, heads of the village, and researchers with experience in conducting telephone interviews.

Results revealed that respondents preferred in-person interviews over telephone interviews. However, the pandemic conditions did not give us much choice in data collection methods. A telephone interview could be implemented by considering several factors, including connection strength, interview time and duration, cost impact to respondents, respondents' telephone ownership, and the ability to communicate by telephone. Results showed that the respondents expected interviews to be conducted in their free time and last about 20 to 30 minutes.

Initial contact with respondents was a crucial part of engaging with them. The feasibility study results suggested sending a short message that included standardized study information and asking for the respondent's willingness to participate in this study. During the initial contact with respondents, the interviewer's credentials were proved by displaying the Sleman HDSS attributes in the interviewer's contact profile and showing a letter of assignment. Several respondents' contact numbers in the Sleman HDSS database were invalid or inactive. As a result, the feasibility study results recommended checking the respondents' numbers with community stakeholders.

Then, we developed a standard operating procedure (SOP) to collect data via telephone. In the adjusted SOP, the initial contact had to ensure that the telephone number called was active and was indeed the number of the Sleman HDSS respondent's household members. In addition, the Sleman HDSS team adjusted the SOP for distributing an interview incentive (telephone or Internet credits/e-money) and changed the informed consent to verbal informed consent. Before starting the interview, we explained the purpose and methods of our research to all the participants. We also asked them if they were willing to have their voices recorded during the interview. Only those who gave their consent were recorded, and we repeated the consent questions at the beginning of the recording as a confirmation.

We prepared the questionnaire and data collection application using the hybrid e-HDSS, an electronic-based questionnaire using a mobile device.[3] This application has several features, including the ability to record voice, automatically show questions that meet the predetermined rule (e.g., respondent characteristics and question skipping pattern), automatically generate identity numbers, and recall basic demographic data from the Sleman HDSS database.

Ethical Approval

The verbally informed consent procedure for the Sleman HDSS was approved by the Medical and Health Research Ethics Commission, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada (approval number KE/FK/0586/EC/2020.)

DATA COLLECTION PROCESS

We collected data in September–October 2020. Usually, the Sleman HDSS team would request permission for data collection by visiting the local leaders (the subdistrict head office, head of the village, and head of the subvillage). However, due to the COVID-19 restrictions, data collection permission was requested by mail and by contacting the local leaders via telephone or WhatsApp. We divided the interview process into several stages: initial contact, interview consent request, household module interview, and individual module interview.

Initial contact aimed to confirm that the telephone number was active and owned by the Sleman HDSS respondent. The interviewer contacted the respondents in the interview list through text messages or WhatsApp messages to explain the aim of the interview. Afterward, the interviewer confirmed the potential respondents' identities by requesting the respondents' full names and addresses. If both name and address data matched, the interviewer explained the survey procedure and confirmed the respondents' willingness to participate. If the name and address did not match, the interviewer would check with the database and report it as the wrong number.

Research information and requests for interview consent were delivered verbally or through text/chat by the interviewer. Confirmation of respondents' identity, verbal informed consent, and respondents' statement of consent were recorded as proof of respondents' participation in this study. Subsequently, the interviewer would send text reminders concerning the data collection time and confirm the preferred communication mode. After we confirmed the respondent's identity and received consent, we proceeded to the interview stage.

For the household question module, 1,674 households were successfully interviewed, and for the individual question module, 1,525 respondents were successfully interviewed. The main reasons for the initial failed contact were an inactive number (66%), participants who did not respond (26%), and misdialed numbers (5%). The strategy used to minimize interview failures involved contacting the respondent at least 3 times at different times, contacting other family members, and asking for help from community leaders (e.g., head of

The response rates for household and individual question modules were 33%.

the subvillage) or the health cadre to inform the respondent concerned.

There are 1,665 rows in the original data recapitulation for wave 6, but in the audio file processing, only 1,644 rows are involved. This is due to 19 recordings excluding interview time and 2 recordings containing unanswered calls. Table 1 shows the information and duration of interviewed data collection by telephone. The mean duration of the interview was 31.73 minutes (standard deviation: 43.13 minutes). Most respondents were successfully interviewed only once (90.39%), and the most frequently chosen time for the interview was afternoon (43.67%).

Table 2 compares the Sleman HDSS respondents' characteristics in the fifthwave in 2019 (in-person interview), sixth wave in 2020 (telephone interview), and seventh wave in 2021 (in-person interview). The proportion of household wealth status, level of education, current employment, number of household members, and head of household's age were significantly different between waves.

TABLE 1. Summary of Telephone Interview Results

Variables	Total Respondents, No. (%) (n51,644)
Interview frequency per respondent	
Once	1,486 (90.39)
More than once	158 (9.61)
Time of interview	
Morning	342 (20.80)
Noon	718 (43.67)
Afternoon	584 (35.52)
Duration of interview	
Less than 20 minutes	348 (21.17)
20–30 minutes	518 (31.51)
More than 30 minutes	778 (47.32)

DATA MANAGEMENT

We ensured that the quality of data collected met the standard by using the e-HDSS and conducting spot-checking, cross-checking, and data cleaning. The spot-checking process ensured the data collection process followed the SOP. Before the pandemic, supervisors conducted spot-checking by observing interviewers during in-person interviews in respondents' houses and then recording their observations on the form provided. During the COVID-19 pandemic, supervisors conducted spot-checking by listening to interview recordings. They performed spot checks at the beginning of the data collection process (first week of September) and in the middle of data collection (first week of October). To check for any misses, matching was conducted to see the compatibility between the respondent's answers and the data entered by the interviewers into the questionnaire.

The cross-checking procedure involved listening to the interview recording and matching the recording with the data uploaded to the Sleman HDSS server. Around 5% of household interview recordings were randomly selected for cross-checking.

There was no difference in data-cleaning methods before and after the pandemic. The Sleman HDSS data manager handled data cleaning from initial contact reports and daily interview reports and cleaned the interview data, including checking data completion and validation rules, double-checking data with previous wave data, and tabulating data.

The cleaning process aimed to find any errors in the questionnaire filling process. Based on the cleaning process result, the interviewers were asked to confirm any errors, using the interview recordings and field notes for correction. After the data were cleaned and met the established standard, the data manager would release the dataset for the data analysis process. The Sleman HDSS sixth wave data were released on July 17, 2021.

BENEFITS OF TELEPHONE INTERVIEWS

No Direct Contact With Respondents

Data collection using the telephone could be done without making physical contact with respondents, so it was very appropriate to use during the pandemic.[21] In response to future pandemic events, data collection by telephone can be used and can complement in-person interview data collection.[22]

No Disruption of Routine Survey

The COVID-19 pandemic affected the lives of many people in low- and middle-income countries, including Indonesia. During the pandemic, many activities were hindered, including activities that involved community participation. Despite these challenges, we were still able to conduct the Sleman HDSS during the pandemic. To understand the impact of the pandemic on the population, the survey collected data from households and individuals. For individuals, we focused on collecting information on

TABLE 2. Comparison of the Sleman HDSS Respondents' Characteristics Between In-Person Interviews (Fifth and Seventh Waves) and Phone-Based Interviews (Sixth Wave)

Characteristics	Wave 5 (In-Person), No. (%) (n54,889)	Wave 6 (Phone-Based), No. (%) (n51,674)	Wave 7(In-Person), No. (%) (n54,529)	*P* Value[a]
Household wealth index				.000
Low	1,945 (40.53)	497 (30.72)	1,733 (40.72)	
Medium	1,999 (41.65)	711 (43.94)	1,820 (42.76)	
High	855 (17.82)	410 (25.34)	703 (16.52)	
Homeownership status				.244
Private property	3,418 (72.52)	1,120 (70.48)	3,085 (72.50)	
Rent/other	1,295 (27.48)	469 (29.52)	1,295 (27.50)	
Head of household age				.000
Less than 20 years	2 (0.04)	0 (0.00)	1 (0.02)	
Early adulthood (20–40 years)	619 (12.66)	221 (13.20)	470 (10.38)	
Middle adulthood (41–60 years)	2,596 (53.10)	978 (58.42)	2,376 (52.47)	
Late adulthood (>60 years)	1,672 (34.20)	475 (28.38)	1,681 (37.12)	
Head of household educational level				.000
Low (no education and elementary school)	1,570 (32.20)	363 (21.72)	1,408 (31.09)	
Middle (junior and senior high school)	2,594 (53.20)	969 (57.99)	2,488 (54.93)	
High (diploma and higher education)	712 (14.60)	339 (20.29)	633 (13.98)	
Head of household employment				.001
Stay-at-home parent and student	176 (3.60)	60 (3.58)	210 (4.64)	
Unemployed	499 (10.21)	154 (9.20)	511 (11.28)	
Employees and workers	2,050 (41.93)	740 (44.21)	1,877 (41.44)	
Retired	466 (9.53)	169 (10.10)	434 (9.78)	
Entrepreneur	858 (17.55)	308 (18.40)	750 (16.56)	
Service	219 (4.48)	74 (4.42)	188 (4.15)	
Farmer-livestock	571 (11.68)	141 (8.42)	480 (10.60)	
Other	50 (1.02)	28 (1.67)	70 (1.55)	
Region				.231
Urban	4,048 (82.80)	1,414 (84.47)	3,757 (82.95)	
Rural	841 (17.20)	260 (15.53)	772 (17.05)	
Number of household members				.000
1–2 people	862 (17.63)	234 (13.98)	800 (17.66)	

Continued

TABLE 2. Continued

Characteristics	Wave 5 (In-Person), No. (%) (n54,889)	Wave 6 (Phone-Based), No. (%) (n51,674)	Wave 7(In-Person), No. (%) (n54,529)	*P* Value[a]
3–5 people	3,175 (64.94)	1,150 (68.70)	2,865 (63.26)	
>5 people	852 (17.43)	290 (17.32)	864 (19.08)	
Communicable diseases modules				
Dengue fever	67 (0.35)	15 (0.22)	19 (0.11)	
Crude birth rate[b]	7.85	11.3	6.99	
Crude death rate[b]	0.008	0.010	0.010	

Abbreviations: HDSS, Health and Demographic Surveillance System.
[a] Chi-square test.
[b] Per 1,000 persons in a population.

respondents' socioeconomic status, health access, mental well-being, physical activity, and smoking behavior. We recognized that household-level data may not have been representative of the whole population, so we also analyzed the individual-level data to capture the variations among different individuals.

LESSONS LEARNED

Social Capital Facilitated Survey Implementation

Social capital is defined as trust, norms, reciprocity, and networks between individuals.[23] Taking advantage of existing social capital facilitated the implementation of the survey.

Respondents' willingness to participate was influences by trust in the survey team, social norms, and reciprocity between the survey team and respondents.

Respondents' participation was indirectly influenced by trust in Universitas Gadjah Mada (UGM), the oldest state university in Indonesia. When the respondent knew that the survey was conducted by UGM, the respondent responded well. UGM's credibility made respondents believe that this survey could be trusted and was useful for the community. Because the Sleman HDSS is longitudinal, it requires long-term collaboration with the community. Thus, HDSS routinely held activities, such as community service activities with HDSS researchers and UGM lecturers, to familiarize and strengthen bonds with respondents.

Social norms were evident when respondents were reluctant to refuse the interview for fear of being considered disrespectful after getting permission from the hamlet or local officials. In addition, interviewers were asked to maintain politeness, speak at a calm tempo, and add sufficient "small talk" to maintain rapport, even when there was no in-person interaction.

During the informed consent process, the Sleman HDSS team explained that the survey would contribute to the health sector, especially in the Sleman area, so respondents felt that there would be reciprocity for their participation and were then willing to participate in the survey.

Telephone data collection used social networks owned by the Sleman HDSS team that started by contacting or communicating to the subdistrict, village, or hamlet head to ask for the respondent's phone number.

Lack of Availability of Respondents' Contact Number Hindered Data Collection

One of the significant challenges in conducting telephone interviews was the lack of availability of respondents' contact numbers. Of 5,604 households, only 3,676 (72.59%) had their contact numbers stored in the HDSS database. The Sleman HDSS team also requested aid from local community figures to provide an additional 436 household contact numbers. Based on the Regulation of Communication and Informatics Minister of Indonesia, No. 14 of the Year 2017 on Telecommunication Service Customer Regulation, each customer can only register a maximum of 3 different numbers for every Citizenship Identity Number.[24] However, many customers own over 3 different numbers and frequently change numbers, resulting in difficulty for Sleman HDSS to track which number is currently active.[25]

Alternative Strategies Should Be Pursued to Improve Response Rate

Data collection via telephone was viable for the Sleman HDSS respondents despite the challenges and lower response rate. The response rate was

influenced by respondents being contactable via telephone and the respondent's willingness to participate.[14] The Sleman HDSS team designed various strategies to increase the response rate, such as adjusting the call time according to the respondent's profession, calling back up to 5 times, and sending reminder messages through WhatsApp. Subsequent studies are needed to investigate different methods to improve response rates from respondents with active numbers but who did not respond.

Subsequent studies are needed to investigate different methods to improve response rates from respondents with active numbers but who did not respond (the nonresponse rate was about 15%). Despite a low response rate, telephone-based data collection generally shows little bias from nonresponse on lifestyle, health, and demographic questions.[26] A detailed analysis of the relationship between nonresponse rates and nonresponse bias from 30 published studies found that the response rate alone was not a very good indicator of the magnitude of nonresponse bias.[27,28]

Respondents' Telephone Literacy Limited Participation

The percentage of the population using cellular phones continued to increase until 2019, reaching 63.53%.[29] Social media dominates the purpose of Internet use (87.20%).[29] Using cell phones to take online surveys is not yet common in Indonesian society. Furthermore, because respondents were not met in person for the survey, it was easier for them to refuse/ignore telephone messages to participate. Data collection via telephone requires adequate technical skills and preparation in using the telephone for both the researcher and the respondent.[30]

CONCLUSIONS AND RECOMMENDATIONS

COVID-19 prompted a shift in data collection methods for population surveys from in-person interviews to telephone-based interviews, creating many opportunities that can be learned from conducting surveys elsewhere. This method was sufficiently safe to be conducted during the pandemic. We gained much information about the limitations of telephone surveys and how to overcome them, which could also help improve our research strategies in the post-pandemic era. Social capital and improvement in telephone literacy could help increase the response rate for data collection by telephone.

Acknowledgments: The researchers would like to express gratitude to all enumerators and field supervisors who worked hard to collect data during the pandemic while facing various challenges. We also express our gratitude to Dr. Ifta Choiriyyah, MSPH, PhD, chairman of the Health and Demographic Surveillance System, who provided input on this article.

Funding: The Sleman Health and Demographic Surveillance System data collection was primarily funded by the Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia.

Author contributions: PDR: conceptualization, methodology, writing–original draft, writing–review and editing: LA: conceptualization, writing–review and editing; AEW, AN, YH, VJ, and AE: writing–review and editing; LL: conceptualization, writing–review and editing; FMK: conceptualization, writing–original draft; SKL: conceptualization, writing–original draft, writing–review and editing; RKW: conceptualization, resources, visualization, writing–original draft; RIN and AH: writing–original draft, resources; PTR: resources, visualization, writing–original draft; FSTD: conceptualization, methodology, writing–review and editing.

Competing interests: None declared.

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Peer Reviewed

Received: January 12, 2023; Accepted: February 6, 2024; First published online: March 4, 2024.

Cite this article as: Ratrikaningtyas PD, Lazuardi L, Nugroho A, et al. Lessons learned from telephone-based data collection for health and demographic surveillance systems during the COVID-19 pandemic in Indonesia. *Glob Health Sci Pract*. 2024;12(2):e2200446. https://doi.org/10.9745/GHSP-D-22-00446