UNIVERSITAS GADJAH MADA
FAKULTAS KEDOKTERAN,
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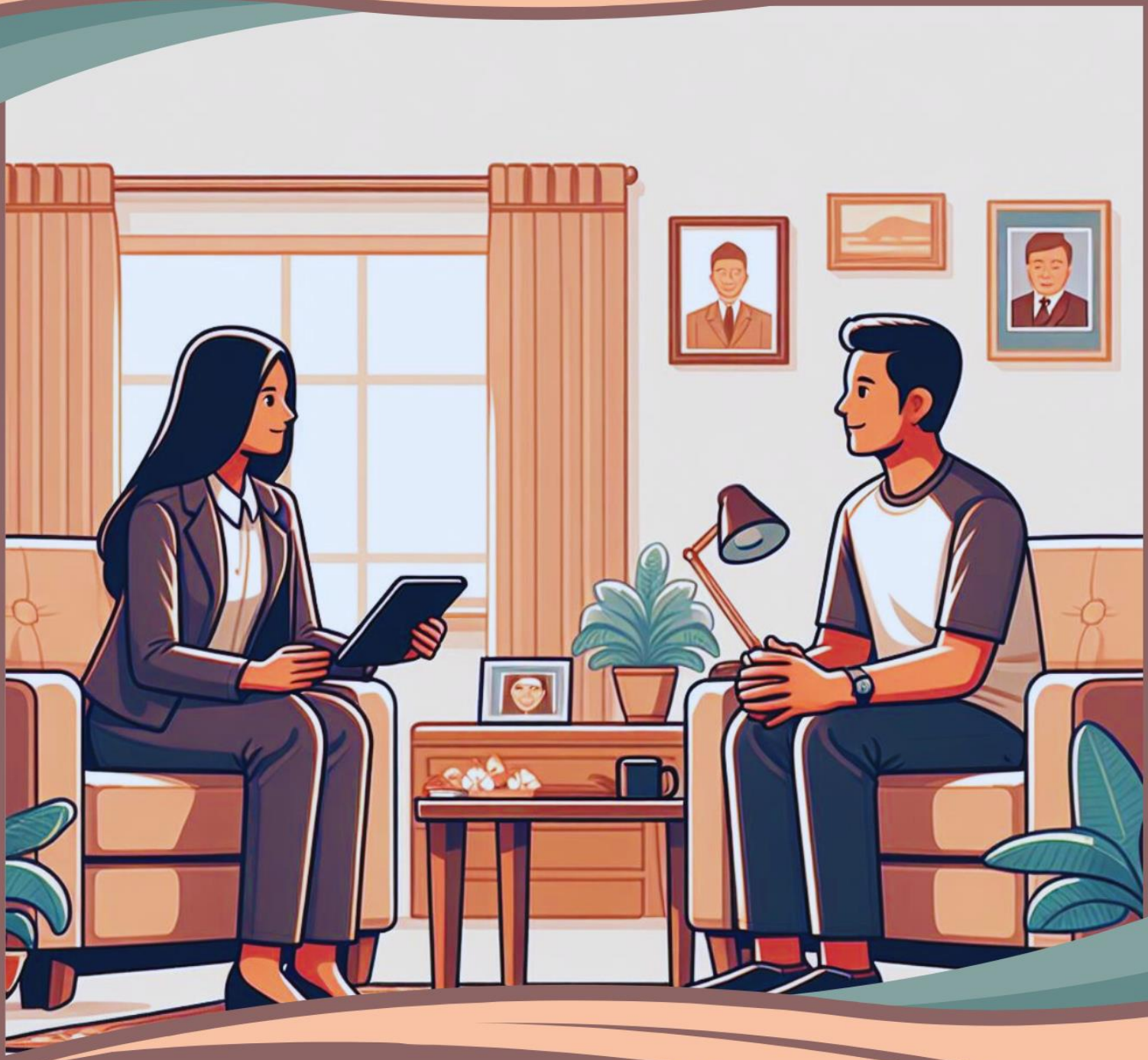
SLEMAN HDSS GUIDEBOOK

Volume 3: Wave 7 (2021) & Wave 8 (2022)



Sleman HDSS Guidebook

Volume 3: Wave 7 (2021) & Wave 8 (2022)

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Preface

The Sleman *Health and Demographic Surveillance System* (HDSS) is a longitudinal study designed to monitor the changing demographic, social, and health conditions of the Sleman Regency, Special Region of Yogyakarta, Indonesia. The HDSS was initiated by and is financially supported by the Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada (UGM), Indonesia, in collaboration with the Sleman Regency government.

During the years 2021 and 2022, data collection was carried out utilizing the original Sleman HDSS design, which entailed conducting interviews face-to-face. However, the modifications made to data collection procedures in 2020 significantly influenced the types and designs of survey modules employed in subsequent waves.

This manual aims to inform users of Sleman HDSS dataset about the changes implemented in the research methodologies and instruments employed during waves 7 (2021) and 8 (2022) of the study. Readers may consult the Sleman HDSS Guidebook Volume 1: Waves 1-5 (2015-2019) for a comprehensive and detailed description of the research methodologies, data collection processes, modules, questionnaires, data management, and data weighting employed in the Sleman HDSS study.

It is our sincere hope that this manual will facilitate more effective exploration of the Sleman HDSS data, thereby empowering a greater number of stakeholders to realize the potential benefits thereof.

We express our deepest gratitude to all parties who have contributed to the preparation of this book.

Sleman, June 2024

Acting director of Sleman HDSS

dr. Fatwa Sari Tetra Dewi, MPH, Ph.D.

Table of Contents

Sleman HDSS

The Health and Demographic Surveillance System (HDSS) is a surveillance system that collects data on demographic dynamics, health status, and social transition periodically at regular intervals (Dewi *et al.*, 2018). In the year 2014, the Faculty of Medicine, Public Health, and Nursing at Universitas Gadjah Mada (UGM), in collaboration with the Sleman Regency government, initiated the implementation of HDSS in Sleman Regency. The vision of Sleman HDSS is to "Support scientific development in the health sector through innovative, excellent, and high-quality, world-class research based on population data".

The Sleman HDSS conducts annual data collection, starting with its initial wave in 2015. In 2022, the eighth wave of data collection took place. The Faculty of Medicine, Public Health, and Nursing of Universitas Gadjah Mada fully funded the data collection for Waves 7 and 8 of the Sleman HDSS.

Ethical Consideration

Ethical Clearance (EC)

The Sleman HDSS data collection activities were carried out only after obtaining approval from the Ethical Committee for Medical Research and Health of the Faculty of Medicine, Public Health, and Nursing, UGM. Subsequently, the ethics review was conducted annually. All ethical clearance received by Sleman HDSS are listed in Table 1.

Table 1. Record of Ethical approval for HDSS Sleman 2021-2022

Date of issuance	Type	Document Number
11 June 2021	***Ethical clearance***	**KE/FK/0640/EC/2021**
09 July 2021	*Amendment*	KE/FK/0640/EC 11 June 2021
13 June 2022	***Ethical clearance***	**KE/FK/0741/EC/2022**
26 August 2022	*Amendment*	KE/FK/0741/EC 13 June 2022
05 October 2022	*Amendment*	KE/FK/0741/EC 13 June 2022

Informed Consent

Before data collection began (including interviews and physical measurements), individuals participating in the Sleman HDSS received a comprehensive explanation of the study's aims,

data collection procedures, data security measures, and the potential benefits and risks of participation. This ensured informed consent and transparency throughout the research process. Participants who agreed to participate provided informed consent by signing or thumbprinting the consent form, indicating their understanding and agreement.

Participants who consented to participate in Sleman HDSS data collection:

1. Understood that there is minimal risk associated with their participation and responses.
2. Acknowledged that their information will be kept confidential, and personally identifiable details will not be disclosed.
3. Understood that their data will be used exclusively for research purposes and not for commercial gain.
4. Granted permission for researchers to use their data for research purposes, with approval from the Ethics Committee of the Faculty of Medicine, Public Health, and Nursing, UGM.
5. Agreed to follow research procedures.
6. Decided whether their interviews could be recorded.

Confidentiality of Privacy

The Sleman HDSS is committed to maintaining the anonymity of study participants and the confidentiality of their data. Data disseminated by the Sleman HDSS consists of processed or aggregated datasets that do not contain any personally identifiable information about respondents.

Sleman HDSS Research Methods

The Sleman Health and Demographic Surveillance System (Sleman HDSS) is a longitudinal prospective study involving a household panel representing the population of Sleman Regency. Demographic and health data are collected from the household panel in each wave. However, the number of the Sleman HDSS household members is dynamic, as some family members may move out or pass away. Additionally, family members who are born or people who move into the Sleman HDSS household are also considered respondents of the Sleman HDSS. The criteria for Sleman HDSS respondents are residents who have been or will be domiciled in Sleman Regency for six consecutive months. The Sleman HDSS requires a minimum sample size to provide valid representation of the demographic and health conditions in Sleman Regency, calculated using the same formula as in the previous wave (see Sleman HDSS Guidebook Volume 1: Wave 1-5, (Lestari, Huda*, et al.*, 2023)).

During the 2021 and 2022 data collection phases, face-to-face interviews were conducted in accordance with the initial design of the Sleman HDSS, with strict adherence to health protocols to ensure the safety of participants and researchers.

Data collection for the Sleman HDSS was carried out using tablet PCs equipped with a data collection application known as e-HDSS. Enumerators entered data into e-HDSS during interviews and then uploaded the collected data to the Sleman HDSS data server. The data manager subsequently downloaded the data for processing. The seventh wave of data collection used the same e-HDSS application as the sixth wave. For the eighth wave, a tailored version of the e-HDSS application, e-HDSS Anak, was developed specifically for toddler respondents. This application includes all modules relevant to child respondents, such as birth anthropometry, vaccinations, breastfeeding and complementary feeding, nutritional intake, and anthropometry.

Households participating since Wave 1 are considered Panel 1. Household samples recruited in subsequent waves are considered Panel 2 (recruited in Wave 4), Panel 3 (Wave 6), Panel 4 (Wave 7), and Panel 5 (Wave 8). These new household samples, or refreshment samples, were recruited to maintain the Sleman HDSS sample size close to the required minimum. In Waves 4 and 8, potential refreshment samples were identified by finding Sleman HDSS households that had been marked as "non-interview" in the previous wave. Sleman HDSS enumerators revisited these households and invited them to participate in the current wave. If a household declined to participate, the enumerator selected a replacement refreshment sample. The first potential replacement was the house closest to the front door of the household that had declined. If that household also declined, subsequent replacements were selected in a clockwise pattern from the front door of the original non-participating household. However, in Wave 7, the refreshment sample selection process was carried out for every household that refused during that wave.

Types of Sleman HDSS Respondents

Research Subjects

The research subjects in the Sleman HDSS study comprised households whose members had resided in Sleman Regency, Special Region of Yogyakarta, for at least six consecutive months. The household and the individual were the units of analysis in the study. A total of 5,064 households, spread across 216 clusters (184 urban and 32 rural) in Sleman Regency, participated in the Sleman HDSS study. Respondents interviewed in Waves 7 and 8 were

categorized into three types: the main respondent, the individual panel respondent, and the primary caregiver.

Main Respondent

The main respondent is an individual from the household who is 18 years or older and the most knowledgeable about the household's circumstances. Usually, the main respondent is the head of the household or their partner. The main respondent is responsible for answering the household-level module questions.

Individual Panel Respondent

The individual panel respondent is a household member from each household who was selected using the Kish Grid Sampling method to randomly select household members aged 25 years or older (World Health Organization, 2020a).

Since 2018, the e-HDSS application has included a module for selecting respondents based on the Kish Grid Sampling method. In Wave 7, the individual panel respondents from existing households were those who had already participated in earlier waves. The individual panel respondents from new households were automatically chosen within the e-HDSS application (see the e-HDSS manual for more information (Lestari *et al.*, 2021))

Primary Caregiver

The primary caregiver is the person most knowledgeable about the daily conditions of the infant/toddler/child whose information is collected by the Sleman HDSS. Primary caregiver respondents are usually the child respondent's mother, father, grandfather, or grandmother.

Number of Sleman HDSS Respondents

Table 2 presents information on the number of households of Sleman HDSS respondents in Waves 1–8. Respondents were categorized into several panels. Panel 1 was the sample of Sleman HDSS households that began participating in Wave 1 (2015). Panel 2 and subsequent panels were part of the refreshment sample in Wave 4 (Panel 2), Wave 6 (Panel 3), Wave 7 (Panel 4), and Wave 8 (Panel 5).

The minimum number of samples needed in Sleman HDSS was 4,890 (Lestari, Huda*, et al.*, 2023). In Wave 1, 5,147 households participated in Sleman HDSS. These respondents

constituted the in-scope population in Wave 2. In Sleman HDSS Wave 2 and thereafter, the in-scope population was defined as Sleman HDSS households that met the following criteria:

- Participated (interviewed) in the previous wave, or
- Could not be interviewed in the previous wave because they could not be found or refused to be interviewed.
- Could not be interviewed in Wave 6 because there were no telephone number data, did not pick up the phone, or the telephone number recorded was wrong or inactive.

Non-interviews are classified as dropouts when the reason was refusal to participate, or the address cannot be located. Additionally, single-person household dropouts can occur when the individual in the household either cannot communicate or has passed away (Table 3 and Table 4). The Sleman HDSS households that drop out during a wave become part of the out-of-scope population for the next wave.

The number of Sleman HDSS households can change due to household dynamics, such as household splitting or merging. Split households occur if one or more household members declare that they have been living separately from the registered household and have formed a new household located in the same cluster as the previous household or still within the Sleman HDSS' working area. Alternatively, if two different households share a house but have separate kitchens, it is also considered a split household (Lestari, Huda*, et al.*, 2023).

In contrast, merged households occur if, in a certain wave, two or more Sleman HDSS households declare themselves as one household, even though they were recorded as separate households in the previous wave. Split households increase the number of households registered as Sleman HDSS samples, while household merging events decrease the number. The number of original or initial households, split households, merged households, and recorded households in the database is presented in Table 2. The number of households interviewed in a wave is equal to the number of original households minus the number of merged households plus the number of split households.

Response rate refers to the proportion of original households that participated from the total in-scope population for that wave. In Wave 7, a response rate of 85.3% was achieved. This figure increased to 91.0% in Wave 8.

The retention rate for a wave is the percentage of initial households that are still participating in data collection in that wave. The formula used to calculate the retention rate is:

$$Wave\ 2, 3, \&\ 4\ Retention\ rate = \frac{Number\ of\ Panel\ 1\ original\ households\ interviewed}{Total\ number\ of\ original\ households\ Panel\ 1\ (Wave\ 1)}$$

$$Wave\ 5\ and\ 6\ Retention\ rate\ \frac{Number\ of\ Panel\ 1\ +Panel\ 2\ original\ households\ interviewed}{Total\ number\ of\ original\ households\ Panel\ 1\ (Wave\ 1)\ +Panel\ 2\ (Wave\ 4)}$$

$$Wave\ Retention\ rate\ 7 = \frac{\frac{Number\ of\ Panel\ 1\ +Panel\ 2\ +Panel\ 3\ original\ households\ interviewed}{Total\ number\ of\ original\ households}}{Panel\ 1\ (Wave\ 1)\ +Panel\ 2\ (Wave\ 4)+Panel\ 3\ (Wave\ 6)}$$

$$Wave\ Retention\ rate\ 8 = \frac{\frac{Number\ of\ Panel\ 1\ +Panel\ 2\ +Panel\ 3\ +Panel\ 4\ original\ households\ interviewed}{Total\ number\ of\ original\ households}}{Panel\ 1\ (Wave\ 1)\ +Panel\ 2\ (Wave\ 4)+Panel\ 3\ (Wave\ 6)+Panel\ 4\ (Wave\ 7)}$$

The calculation of the wave retention rate does not include the wave's new panel, which consists of the group of respondents who began participating in that wave. For example, Panel 2 began participating in Wave 4 and was not included in the calculation of the Wave 4 retention rate. The retention rate of Wave 7 indicates that 81.6% of households that started participating in Wave 1 (Panel 1), Wave 4 (Panel 2), and Wave 6 (Panel 3), were still participating in Wave 7. The retention rate increased slightly to 84.6% in Wave 8. Table 2 also presents dropout data. The dropout rate of Sleman HDSS respondents is the percentage of households classified as dropouts from the total in-scope population. The Wave 7 dropout rate was the highest compared to previous waves, at 3.9%. This figure decreased slightly to 2.6% in Wave 8.

Table 2. The number of Sleman HDSS respondents from 2015 to 2022

Wave Year	Panel	In scope popu-lation	Number of households interviewed				Respo nse rate (%)	Retent ion rate (%)	Drop out	Drop out rate (%)
			Origin al	Split	Merged	Record ed				
1 2015	1		5147			5147				
	Total		***5147***			***5147***				
2 2016	1	5147	4999	0	3	4996	97.1	97.1	103	2.0
	Total	***5147***	***4999***	***0***	***3***	***4996***	***97.1***		***103***	***2.0***
3 2017	1	5041	4758	3	6	4755	94.4	92.4	137	2.7
	Total	***5041***	***4758***	***3***	***6***	***4755***	***94.4***		***137***	***2.7***
4	1	4901	4618	84	1	4701	94.2	89.7	160	3.3
2018	2	393	264			264	67.2			
	Total	***5294***	***4882***	***84***	***1***	***4965***	***92.2***		***160***	***3.3***
5	1	4835	4557	90	2	4645	94.3	88.7	115	2.4
2019	2	264	245	0	1	244	92.8		10	3.8
	Total	***5099***	***4802***	***90***	***3***	***4889***	***94.2***		***125***	***2.5***
6	1	4811	1550	18	0	1568	32.2		54	1.1
2020	2	253	86	0	0	86	34.0	30.2	1	0.4
	3	11	11			11	100.0			

Wave Year	Panel	In scope popu-lation	Number of households interviewed				Response rate (%)	Retention rate (%)	Drop out	Drop out rate (%)
			Original	Split	Merged	Recorded				
	Total	***5075***	***1647***	***18***	***0***	***1665***	***32.5***		***55***	***1.1***
7	1	4779	4191	62	7	4246	87.7		189	4.0
2021	2	254	222	0	0	222	87.4	81.6	14	5.5
	3	11	11	0	0	11	100.0		0	0.0
	4	203	50			50	24.6			
	Total	***5247***	***4474***	***62***	***7***	***4529***	***85.3***		***203***	***3.9***
8	1	4649	4350	117	4	4463	93.6		123	2.6
2022	2	236	223	0	0	223	94.5		6	2.5
	3	11	11	0	0	11	100.0	84.6	0	0.0
	4	50	45	0	1	44	90.0		1	2.0
	5	391	228			228	58.3			
	Total	***5337***	***4857***	***117***	***5***	***4969***	***91.0***		***130***	***2.6***

Table 3. Reasons for non-interview of Sleman HDSS respondents for Wave 2 - Wave 5

Wave	2	3	4		5	
Panel	1	1	1	2	1	2
Dropout						
refused to participate	26	49	82		45	3
*passed away**	14	15	8		10	
moved out of study area	60	55	62		47	3
address not found		5	2		6	4
*unable to communicate due to health problems**	3	13	6		7	
Total	**103**	**137**	**160**		**115**	**10**
Non-*Dropout*						
cannot be met	45	146	134		170	11
phone number unavailable						
wrong phone number						
inactive phone number						
no response						
refused to participate this wave						
Total	**45**	**146**	**134**		**170**	**11**

**single-person household*

Table 4. Reasons for non-interview of Sleman HDSS respondents Wave 6 - Wave 8

Wave	6			7				8				
Panel	1	2	3	1	2	3	4	1	2	3	4	5
Dropout												
refused to participate	48			33	4			41	1			
*passed away**				35				24	1			
moved out of study area	6	1		72	9			37	4			
address not found				22				9				
*unable to communicate due to health problems**				27	1			12			1	
Total	54	1		189	14			123	6		1	
Non-*Dropout*												
cannot be met				333	9			138	6		3	
phone number unavailable	955	42										
wrong phone number	108	6										
inactive phone number	1545	80										
no response	603	40										
refused to participate this wave				70	5			35	5		1	
Total	3211	168		403	14			173	11		4	

**single-person household*

Sleman HDSS' Data Collection

Data collection for Sleman HDSS Wave 7 and 8 began with collecting data on households panel and adult individuals panel (Wave 7), followed by toddlers panel (Wave 8) (see Table 5 and Table 6). Verbal autopsy data collection was conducted after the completion of household panel data collection (Table 7). In 2020, the household panel data collection was postponed to September, and verbal autopsy data collection was cancelled (see Table 5 and Table 6). This caused a shift in the timetable of data collection for Wave 7 and onwards. The verbal autopsy data collection for Wave 7 was conducted in 2022, as was Wave 8 in 2023. Data collection for adult individual panels started simultaneously with household panels (Table 5). In Wave 8, data collection for toddlers was carried out by a dedicated field team from September 21, 2022, to January 31, 2023.

Table 5. Sleman HDSS' households panel (core module) data collection periods between 2015-2022

Wave	Start date	End date
1	15 January 2015	28 April 2015
2	1 February 2016	17 June 2016
3	13 March 2017	22 May 2017
4	26 February 2018	16 May 2018
5	4 March 2019	29 May 2019
6	2 September 2020	31 October 2020
7	24 September 2021	31 January 2022
8	14 September 2022	31 December 2022

Table 6. Sleman HDSS adult individual panels data collection periods between 2015-2022

Wave	Start date	End date
1	-	-
2	-	-
3	13 March 2017	22 May 2017
4	26 February 2018	16 May 2018
5	4 March 2019	29 May 2019
6	2 September 2020	31 October 2020
7	24 September 2021	31 January 2022
8	-	-

Table 7. Sleman HDSS verbal autopsy data collection periods between 2015-2022

Wave	Start date	End date
1	27 July 2015	5 August 2015
2	08 October 2016	29 October 2016
3	18 October 2017	4 December 2017

Wave	Start date	End date
4	25 October 2018	16 December 2018
5	24 October 2019	18 November 2019
6	-	-
7	1 February 2022	15 March 2022
8	14 February 2023	30 March 2023

Sleman HDSS Questionnaire Module

The questionnaire module used by Sleman HDSS in each wave was developed according to the plan agreed upon in a workshop involving an advisory board of experts at Sleman HDSS. The list of questionnaire modules that have been used in Sleman HDSS Waves I–VIII can be found in Table 8.

Table 8. Sleman HDSS Wave 1 questionnaire module

Modul	HDSS 1 2015	HDSS 2 2016	HDSS 3 2017	HDSS 4 2018	HDSS 5 2019	HDSS 6 2020	HDSS 7 2021	HDSS 8 2022
Households panel								
Birth Events	■	■	■	■	■	■	■	■
Death Events	■	■	■	■	■	■	■	■
Migration Events (In and Out)	■	■	■	■	■	■	■	■
Registration of Demographic Data (New Respondents)	■	■	■	■	■	■	■	■
Demographic Data Update		■	■	■	■	■	■	■
Infant and Child Health		■		■	■	■	■	■
Child Dietary Intake and Nutritional Status Assessment							■	■
Childbearing History (Parity)		■		■	■	■	■	■
Contraceptive Use		■			■			
Household Food and Beverage Consumption	■							
Household Expenditure	■							
Household Asset Ownership	■			■				■

Modul	HDSS 1 2015	HDSS 2 2016	HDSS 3 2017	HDSS 4 2018	HDSS 5 2019	HDSS 6 2020	HDSS 7 2021	HDSS 8 2022
Housing Facilities and Characteristics	■			■				■
Atopic Dermatitis						■		
Hirschsprung's Disease					■			
Mosquito Repellent Use		■						
Knowledge about HIV		■						
Consumption of Risky Foods		■						
Infectious Diseases		■	■	■	■	■	■	
Non-Communicable Diseases		■						■
Injuries		■	■		■		■	
Disabilities		■						
Mental Health of Household Members					■			
Access and Utilization of Healthcare Services		■	■		■	■	■	
COVID-19 Vaccination History of Household Members							■	
Family Consumption Access							■	
Adult individuals panel								
Non-Communicable/Chronic Diseases			■			■		
Risk Factors for NCDs								
Fruit and Vegetable Consumption				■				
Physical Activity Level				■		■		
Smoking History			■	■		■		
Blood Pressure				■				
Waist and Hip Circumference				■				
Mental Health (SRQ20)					■	■	■	
Quality of Life			■					
History of COVID-19							■	
COVID-19 Vaccination Status							■	

Modul	HDSS 1 2015	HDSS 2 2016	HDSS 3 2017	HDSS 4 2018	HDSS 5 2019	HDSS 6 2020	HDSS 7 2021	HDSS 8 2022
Health Literacy								
Socioeconomic Impact of COVID-19								

All questionnaires used by the Sleman HDSS are available for download from the Sleman HDSS website (https://hdss.fk.ugm.ac.id/kuesioner-hdss-sleman/). The Sleman HDSS also provides a data codebook. This document contains a list of variables associated with the questions in the Sleman HDSS questionnaire module and the derived variables in the Sleman HDSS dataset. For further details, please refer to the following link (https://hdss.fk.ugm.ac.id/codebook-data-hdss-sleman/).

Changes to the Interview Module used in Waves 7 and 8

Most questionnaires used in Waves 7 and 8 were identical to those used in the previous wave, with some changes to wording and the addition of new modules.

Household member module (Kode: ART)

Data collection in Waves 7 and 8 used the standardized household member module, with some additions and adjustments. Starting in Wave 7, the module on pregnancy outcomes was expanded to record up to four pregnancy outcomes that occurred after the previous wave visit. Additionally, each pregnancy outcome could include birth information (birth weight and length) for up to three children. In Wave 8, information on birth certificate ownership was collected from all Sleman HDSS respondents.

Infant and Child Health Module (Codes: KAI, KIM, ASM, FFQ)

The Infant and Child Health Module (KAI) collects data on birth weight, height, head circumference, and gestational age at birth for household members aged 0-59 months. Similar to Wave 6, the KAI module in Wave 7 was only used for new household members aged 0-59 months. In Wave 8, however, this module was administered to all toddlers in Sleman HDSS households who had not previously received it.

In Wave 8, the Immunization Status Module (KIM) was administered in its entirety. In contrast, Wave 7 only included questions about the completeness of immunizations received and adverse events following immunization. The assessments in Wave 8 were expanded to

include historical data on weight measurements, administration of vitamin A capsules to toddlers, and breastfeeding and complementary feeding practices for children aged 0–23 months.

The nutritional status and dietary intake of toddlers were also assessed in Wave 8. This was conducted in collaboration with a nested research project in Sleman HDSS entitled "Validation and Reliability of the Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ) against 24-Hour Recalls (24-HR) in Assessing Macronutrient Intake in Toddlers in Sleman Regency," led by Yayuk Hartriyanti, S.KM, M.Kes. Dietary intake was assessed using the Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ) and compared to 24-hour recalls (24-HR). Nutritional status was determined based on toddler weight and height (Module Code: KAI).

Infectious Diseases Module (Code: PM)

The purpose of this module is to collect data about infectious diseases among household members, obtained from main respondents. In Wave 7, questions were added concerning three previously unaddressed diseases: typhoid fever, diarrhea, and hepatitis.

Non-Communicable Diseases Module (Code: PTM)

In Wave 7, only questions regarding injuries were used. In Wave 8, information on cancer diagnoses was collected. The questions pertaining to cancer were adapted from those used in Wave 2. Specifically, the Wave 8 questions inquired about cancer diagnoses occurring within the preceding three years. Furthermore, the cancer type options provided in the Wave 8 questions were more detailed than those in the Wave 2 version (Table 9).

Table 9. Differences in Sleman HDSS cancer type options between Wave 2 and Wave 8's questionnaire

Cancer type options in Wave 2' questionnaire	Cancer type options in Wave 8' questionnaire
1. Cervical cancer	1. Cervical cancer
2. Breast cancer	2. Breast cancer
3. Prostate cancer	3. Prostate cancer
4. Colorectal cancer	
5. Lung and bronchus cancer	
6. Nasopharyngeal cancer	6. Nasopharyngeal cancer
7. Lymphoma	
8. Leukemia	8. Leukemia
	9. Lung cancer

Cancer type options in Wave 2' questionnaire	Cancer type options in Wave 8' questionnaire
	10. Liver cancer
	11. Colon cancer
	12. Rectum/anus cancer
	13. Non-Hodgkin lymphoma
	14. Ovarian cancer
	15. Uterine cancer
	16. Bladder cancer
	17. Brain and central nervous system cancer
	18. Thyroid cancer
95. Other cancers	95. Other cancers
98. Do not know the type of cancer	98. Do not know the type of cancer

Access and Utilization of Healthcare Services Module (Code: AKS)

In Wave 6, the healthcare services access and utilization module were reintroduced and continued in Wave 7. This module aimed to collect data regarding healthcare facility utilization during the COVID-19 pandemic. Unlike the AKS module used in Waves 2, 3, and 5, the Wave 6 and 7 AKS module targeted one respondent, typically the primary respondent. In Wave 7, questions were added regarding delayed or inaccessible healthcare services within the past year due to the COVID-19 outbreak.

Individual Panel Mental Health Module (Code: SRQ)

In Wave 7, the SRQ20 questionnaire was again used to collect information about the respondents' mental health status. However, Wave 7 also introduced questions about counselling/therapy/treatment history within the last month.

COVID-19 Vaccination Module (Code: VAC)

In Wave 7, two distinct COVID-19 vaccination modules were used: one for the household panel and one for the individual panel. The household panel module only sought information about the vaccination status of each household member. Conversely, the individual panel module gathered information about COVID-19 history, vaccination status, willingness to receive the COVID-19 vaccine, reasons for refusing the COVID-19 vaccine, and reasons for not considering the COVID-19 vaccine necessary.

Health Literacy Module (Code: HL)

The health literacy module used in Wave 7 was measured using the Indonesian version of the Health Literacy Study Short Form (HLS-EU-16Q) (Rachmani *et al.*, 2019) questionnaire, which was provided by the Asian Health Literacy Association (AHLA). This module was primarily intended for the individual panel.

Family Food Consumption Access Module (Code: AKK)

The AKK module was adapted from the Household Food Insecurity Access Scale (HFIAS) questionnaire to assess family food security (Coates *et al.*, 2007). This module was used in Wave 7 and was administered to the primary respondent.

Generated Variable

In addition to the "original variables" (variables that correspond with the questionnaire), the Sleman HDSS dataset also includes derived variables (generated variables). The derived variables are the result of processing multiple original variables according to existing standards. The derived variables in the Sleman HDSS dataset for Wave 7 and Wave 8, and their explanations, are as follows:

Mental Health

Variable names in the dataset: ***gv_mental,*** **gv*_depresi,*** **gv*_cemas,*** **gv*_somatik,*** **gv*_kognitif,*** **gv*_energi***
Data source: Wave 7

The individual mental health module utilized the Self Reporting Questionnaire (SRQ 20) developed by the World Health Organization (WHO) (Beusenberg & Orley, 1994). It consists of 20 questions addressed to selected respondents. The aim is to assess the respondent's mental health problems during the past month. This instrument validity in Indonesian settings has been tested and it has been used in The Basic Health Research (RISKESDAS) Indonesia. A study in Indonesia reported that with a cut-off point of 5/6, the SRQ had a positive predictive value of 60% and a negative predictive value of 92% (National Institute of Health Research and Development-Ministry of Health Indonesia, 2018). If a subject answers "Yes" to six or more questions out of the 20, they are considered to have emotional distress or a mental disorder that may lead to mental health problems (Ganihartono, 1996). The generated variable representing mental health status is "gv_mental."

In addition to the total score, subscale scores can be calculated for specific symptoms: Symptoms of depression (variable name: **gv_depresi**), Indicated by answering "Yes" to all of the following questions:

1. srq06: Does your hands shaking?
2. srq09: Do you feel unhappy?
3. srq10: Do you cry more than usual?
4. srq14: Are you unable to play a useful part in life?
5. srq15: Has you lost interest in things?
6. srq16: Do you feel that she/he is a worthless person?
7. srq17: Do you has the thought of ending his/her life been on you mind?

Symptoms of anxiety (variable name: **gv_cemas**), indicated by answering "Yes" to all of the following questions:

1. srq03: Do you sleep badly?
2. srq04: Are you easily frightened?
3. srq05: Do you feel nervous, tense, or worried?

Somatic symptoms (variable name: **gv_somatik**), indicated by answering "Yes" to all of the following questions:

1. srq01: Do you often have headaches?
2. srq02: Are your appetite poor?
3. srq07: Are your digestion poor?
4. srq019: Do you have uncomfortable feelings in his/her stomach?

Cognitive symptoms (variable name: **gv_kognitif**), indicated by answering "Yes" to all of the following questions:

1. srq08: Do you have trouble thinking clearly?
2. srq12: Do you find it difficult to make decisions?
3. srq13: Are you daily work suffering?

Symptoms of decreased energy (variable name: **gv_energi**), indicated by answering "Yes" to all of the following questions:

1. srq08: Do you have trouble thinking clearly?
2. srq11: Do you find it difficult to enjoy your daily activities?
3. srq12: Do you find it difficult to make decisions?
4. srq13: Are you daily work suffering?
5. srq18: Do you feel tired all the time?
6. srq20: Are you easily tired?

Socio Economic Status (SES)

Variable names in the dataset: **gv_ses**
Data source: Wave 8

The socioeconomic status (SES) of households in the Sleman HDSS was determined as a wealth index. It was calculated using Principal Component Analysis (PCA) based on several variables, including asset ownership and house characteristics (Vyas & Kumaranayake, 2006).

This method results in the classification of households into five SES quintiles: low, low-middle, middle, upper-middle, and high. The variables used to create the SES variable are listed below:

1. kr04: The main type of the house's wall
2. kr06: The main type of the house's roof
3. kr03: The main type of the house's floor
4. kr08: Main source of lighting
5. Kr01: Ownership status of the house
6. hrt05: Does the household own paddy field?
7. hrt09: Does the household own a garden/dry land?
8. hrt13: Does the household own a yard?
9. hrt01a: Ownership of household goods: TV
10. hrt01b: Ownership of household goods: Cable TV (paid TV subscription)
11. hrt01c: Ownership of household goods: Refrigerator
12. hrt01d: Ownership of household goods: Air conditioning unit
13. hrt01e: Ownership of household goods: Washing machine
14. hrt01f: Ownership of household goods: Mobile phone
15. hrt01g: Ownership of household goods: Water heater
16. hrt01h: Ownership of household goods: Laptop/netbook/tablet
17. hrt01i: Ownership of household goods: PC computer
18. hrt01j: Ownership of household goods: Bicycle
19. hrt01k: Ownership of household goods: Motorcycle
20. hrt01l: Ownership of household goods: Car
21. hrt01m: Ownership of household goods: Truck
22. hrt01n: Ownership of household goods: Bus
23. hrt01o: Ownership of household goods: Gas cylinder of 12 kg or more

For further information about the data analysis process for SES in Wave 8, please refer to the "Computing Wealth Index as a Measure of Household Socio-Economic Status using Principal Component Analysis (PCA)" book (Lestari, Pratama*, et al.*, 2023).

Cause of Death

Variable names in the dataset: ***gv_cod***
Data source: Wave 7 and 8

In Waves 7 and 8, mortality data were collected using the same questionnaire as in previous years, with additional questions about COVID-19 for respondents who had died from March 1, 2020, onward. The COVID-19 questionnaire was adapted from the World Health Organization (WHO) Verbal Autopsy Questionnaire (Byass et al., 2019; Nichols et al., 2018; World Health Organization, 2016).

The software used to process data and analyze the cause of death classification (Verbal Autopsy/VA) in waves 7 and 8 were STATA, InterVA, and COVID-19 Rapid Mortality Surveillance (CRMS) InterVA software. Here's a brief explanation of each software package (Byass, 2020; World Health Organization, 2020b, 2023):

- STATA: Used for data cleaning and variable format conversion according to InterVA guidelines.
- InterVA: Used for data analysis and mortality cause classification based on ICD-10 categories.
- InterVA CRMS: Used to assess the probability of COVID-19 or non-COVID-19 mortality among respondents.

The following steps were taken to prepare the verbal autopsy data for analysis using InterVA:

1. Cleaned interview data: Ensured the interview data was thoroughly cleaned and free of inconsistencies or errors.
2. Data generation: Generated VA data for InterVA software based on the indicators specified in the InterVA usage guide.
3. Data export: Exported the generated data in .csv file format for analysis.

Once the data was prepared according to InterVA software indicators, analysis was carried out using InterVA software, involving the following steps:

- **Prevalence input:** Entered the prevalence rates for malaria and HIV based on the conditions within the sample environment. Sleman HDSS set the prevalence of both malaria and HIV as "Low."
- **Data import:** Imported the prepared .csv data file for analysis.
- **Output file specification:** Specified the filename for the analysis output and initiated the analysis process.
- **Analysis results:** InterVA analysis generated probable causes of death and other factors, including malaria prevalence (malprev), HIV prevalence (hivprev), pregnancy status-related cause (pregstat), likelihood of pregnancy status (preglik), primary cause of death (cause1), likelihood of primary cause (lik1), secondary cause of death (cause2), likelihood of secondary cause (lik2), tertiary cause of death (cause3), likelihood of tertiary cause (lik3), indeterminate likelihood (indet), most likely circumstantial category (comcat), and likelihood of circumstantial category (comnum).
- **ICD-10 Classification:** Classified the results into ICD-10 codes based on the primary cause of death (cause1) identified through analysis.
- **Data integration:** Imported and stored the InterVA analysis results into STATA software.
- **Data merging:** Merged the InterVA analysis results with the VA interview data (questionnaire data) to create a comprehensive dataset.

To analyze the data related to COVID-19, the following steps were performed using the CRMS InterVA software for each respondent:

1. Entering the respondent's identification
2. Entering the respondent's age (in years)
3. Inputting responses according to the 10 questionnaire responses, as follows:
   a. During 2 weeks before death, did [NAME] live in an area with distancing or stay-at-home in force?
   b. During 2 weeks before death, did [NAME] have an injury or accident that led to death?
   c. During 2 weeks before death, was [NAME] tested for COVID-19 by a health professional, with a positive result?
   d. During 2 weeks before death, did [NAME] have a high fever for at least 3 days?
   e. During 2 weeks before death, did [NAME] have extreme fatigue?
   f. During 2 weeks before death, did [NAME] have a cough?
   g. During 2 weeks before death, did [NAME] report lost or reduced sense of smell or taste?
   h. During 2 weeks before death, did [NAME] have difficulty breathing?

i. During 2 weeks before death, did [NAME] live with/visit/care for someone with these symptoms or a positive COVID test?
j. During 2 weeks before death, did [NAME] travel to an area where COVID-19 was present?

4. The analysis generates two output probabilities: the percentage of respondents who died from COVID-19 (%covid) and the percentage who died from non-COVID-19 causes (%non-covid).
5. Steps 1 to 4 are repeated for each respondent in the dataset.
6. All analysis results are then merged with the Sleman HDSS Wave 7 and 8 release datasets.

Sleman HDSS Data Release

Every year, Sleman HDSS releases a dataset compiling data from the first wave to the latest wave. Each dataset is assigned a release number to indicate its version. As the data undergoes continuous cleaning and synchronization between waves, data users are advised to always use the latest version and include the corresponding release number in their publications.

The Sleman HDSS dataset release number (Table 10) consists of three digits, each with a specific meaning:

1. First digit: Indicates a significant change in the dataset, such as the addition of the latest data or data corrections that result in a change in the sample size.
2. Second digit: Indicates a data change that does not affect the sample size.
3. Third digit: Indicates a minor change, such as adding a new variable.

Table 10. Sleman HDSS dataset versions and release dates

Version number	Release date
1-0-0	24-Nov-17
2-0-0	29-Dec-17
3-0-0	02-Jul-18
3-1-0	11-Feb-19
5-0-0	13-Jun-17
5-1-0	15-May-17
6-0-0	19-Dec-17
7-0-0	12-Dec-18

Version number	Release date
8-0-0	26-Feb-19
9-0-0	30-Dec-20
9-1-0	02-Jan-20
9-1-1	09-Mar-20
10-0-0	10-Dec-20
10-1-0	22-Apr-21
10-1-1	07-Jul-21
11-0-0	28-Mar-22
11-1-0	31-May-22
11-1-1	28-Nov-22
12-0-0	28-Mar-23

Further Readings

Further information on the research methods, data collection process, modules, questionnaires, data management, data weighting, and instruments used in the Sleman HDSS data collection can be found in the following articles and books:

1. Dewi, F. S. T., Choiriyyah, I., Indriyani, C., Wahab, A., Lazuardi, L., Nugroho, A., Susetyowati, S., Harisaputra, R. K., Santi, R., Lestari, S. K., NG, N., Hakimi, M., Josef, H. K., & Utarini, A. (2018). *Designing and collecting data for a longitudinal study: the Sleman Health and Demographic Surveillance System (HDSS)*. Scandinavian Journal of Public Health, 46(7), 704-710. https://doi.org/10.1177/1403494817717557.

2. Lestari, S. K., Huda, T. A., Wardani, R. K., Pratama, K. G., Rosha, P. T., Maulana, F. R., Putri, R. K. S. C., & Hikmah, N. F. N. (2023). *Sleman HDSS Guidebook Volume 1: Wave 1-5 (2015-2019)*. Fakultas Kedokteran, Kesehatan Masyarakat, dan Keperawatan UGM.

3. Lestari, S. K., Pratama, K. G., & Wardani, R. K. (2023). *Sleman HDSS Manual Series: Computing Wealth Index as a Measure of Household Socio-Economic Status using Principal Component Analysis (PCA)*. Faculty of Medicine, Public Health, and Nursing (FK-KMK) UGM. https://doi.org/10.5281/zenodo.10792248

4. Lestari, S. K., Wardani, R. K., Pratama, K. G., & Putri, R. K. S. C. (2024). *Sleman HDSS Guidebook Volume 2: Wave 6 (2020)*. Faculty of Medicine, Public Health, and Nursing (FK-KMK) UGM.

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Lestari, S. K., Wardani, R. K., Maulana, F. R., Aryani, S. F., & Yuwana, J. R. (2021). *Manual e-HDSS* Fakultas Kedokteran, Kesehatan Masyarakat, dan Keperawatan UGM.

Lestari, S. K., Huda, T. A., Wardani, R. K., Pratama, K. G., Rosha, P. T., Maulana, F. R., Putri, R. K. S. C., & Hikmah, N. F. N. (2023). *Sleman HDSS Guidebook Volume 1: Wave 1-5 (2015-2019)*. Fakultas Kedokteran, Kesehatan Masyarakat, dan Keperawatan UGM.

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