Annex A

LSAHV Sampling Design and Weights

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Annex A: LSAHV Sampling Design and Weights

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The 2018 Longitudinal Study on Ageing and Health in Viet Nam (LSAHV) is a survey with a nationally representative sample of 6,050 respondents aged 60 years and above living in community dwellings. The sample for the LSAHV is designed to produce results representative of the whole country, of urban and rural areas separately, and of the economic regions.

Sampling Design

The 2018 LSAHV baseline data collection employed a multistage sampling design. Provinces are the primary sampling units, villages are the secondary sampling units, and older persons (OPs) are the ultimate sampling units. Based on the latest census of 2009, the provinces were stratified with respect to the estimated number of the population aged 60+ in 2018. In total, data collection was conducted in 654 villages from the 10 provinces of the 6 regions of Viet Nam.

Sample Estimation

The survey focused on three age groups: 60–69, 70–79, and 80+. Therefore, the sample was estimated to represent these three age groups and represent the six ecoregions of Viet Nam, Ha Noi, and Ho Chi Minh City.

The sample estimation for each ecoregion:

$$n = \frac{(z_{1-\alpha/2})^2 * P * (1-P) * deff}{d^2 * R}$$

Of which:
- n: Sample size, 60+
- zα/2: Z value of a certain confidence interval; 95%. Z0,025 = 1.96
- P: Estimate prevalence of disease
- deff: Designed effect to sample
- d: absolute precision required
- R: Response rate

If the confidence level is 95% and absolute precision 5%, 95% response rate, the prevalence of the 60+ population having any health condition is 0.711 (VWU, 2012) and deff of this design is 2.2112, then the average sample for each region is:

$$n = \frac{1.96^2 * 0.711 * (1-0.711) * 2.2112}{0.05^2 * 95\%} = 735 \text{ (60+)}$$

Total sample for six ecoregions, Ha Noi, and Ho Chi Minh City will be 735 x 8 = 5,880 (participants 60+)

Sampling Strategies

The LSAHV sampling strategies comprised six steps:

Step 1: Sample distribution by region. To oversample the population of the 70–79 and 80+ groups compared to the 60–69 population, the square root of the total population of 60+ was calculated. This calculation would increase the samples in the regions with smaller populations.

Step 2: Sample distribution by urban and rural. We used probability proportional to size to distribute samples for rural and urban settings.

Step 3: Distribution of samples by age group. We used the square root of the population of age groups 60–69, 70–79, and 80+ to identify the distribution index for each age group. This computation will help increase the number of participants in the smaller population.

Step 4: Province selection. We used the probability proportional to size method to select provinces by region.

Step 5: Village selection. From the list of selected provinces, we used the list of villages available from the most up-to-date 2018 database of the General Statistics Office to select the villages to survey. The village list was classified into the urban and the rural lists. The probability proportional to size method was used to select the total villages for each province.

Step 6: Participant selection. We had the list of 60+ population in selected villages from the General Office for Population Family Planning's most updated database in 2018. From this list, researchers from the Institute of Population, Health and Development divided the population into the 60–69, 70–79, and 80+ subgroups. We used a web-based random calculator programme (https://stattrek.com) to randomly select four from the 60–69 group, three from the 70–79, and two from the 80+ group in each commune. In Ha Noi and Ho Chi Minh City, the numbers were five from the 60–69 group, three from the 70–79 group, and two from the 80+ group in each commune. The sample totalled 6,050 participants (Table A1).

Table A1. Selected Provinces and Sample Distribution

No.	Province	Region	Sample	Village	Sample in Each Village	Sample for Each Age Group		
						60-69	70-79	80+
1	Lạng Son	Northern Midlands and Mountains	666	74	9	4	3	2
2	Quang Ninh	Red River Delta	891	99	9	4	3	2
3	Nghe An	North Central and Central Coast	684	76	9	4	3	2
4	Quang Ngai		306	34	9	4	3	2
5	Dak Lak	Central Highlands	414	46	9	4	3	2
6	Dong Nai	South East	540	60	9	4	3	2
7	Tra Vinh	Mekong River Delta	522	58	9	4	3	2
8	Hau Giang		387	43	9	4	3	2
9	Ha Noi	Red River Delta (Capital)	820	82	10	5	3	2
10	Ho Chi Minh City	South East (commercial centre)	820	82	10	5	3	2
	TOTAL (IN VIET NAM)		*6,050*	*654*				

Weighting Calculation

Weighting is used to adjust the results of a study to bring them more in line with what is known about a population.

Design Weight

The design weights are the inverse of the probability of inclusion to the sample. Therefore, the design weight is calculated as:

$$D\_Weight\_final = (W_1 * W_2 * W_3)$$

Of which: W_1: Design weight of selected province

$$W_1 = \frac{P_i}{n * Pt_i}$$

P_i: Population of region i (i=1;8)
Pt_i: Population of province t, region i.
n: Number of provinces of region i.

W_2: Design weight of selected village

$$W_2 = \frac{p_j}{(n_j * p_{dj})}$$

p_j: Population 60+ in province j, region i
p_{dj}: Population 60+ in village d, province j
n_j: Number of villages in province j, region i

W_3: Design weight of selected participant:

$$W_3 = \frac{p_{gd}}{N_{gd} * R_d}$$

P_{gd}: Population of age group g in village d
N_g: Number of selected participants in age group g, village d
R: Response rate in village d

Adjustment Weight

An adjustment weight to each survey respondent was also calculated. The main purpose of weighting adjustments is to reduce the bias in the survey estimates that non-response and non-coverage can cause.

$$C\_Weight\_final = D\_Weight\_final * \frac{Pc_{gi\ (TT/NT)}}{Pd_{gi\ (TT/NT)}}$$

$Pc_{gi\ (TT/NT)}$: Population from census results for age-group g of region i
$Pd_{gi\ (TT/NT)}$: Population from design weight of LSAHV for age-group g of region i

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Annex B

Characteristics of Vietnamese Older Persons with Proxy Respondents

Linh Thuy Dang, Nguyen Cong Vu, and Oanh Thi Le

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Annex B: Characteristics of Vietnamese Older Persons with Proxy Respondents

Linh Thuy Dang, Nguyen Cong Vu, and Oanh Thi Le

In the Longitudinal Study of Ageing and Health in Viet Nam (LSAHV), proxy respondents were included. Two steps of screening were applied to determine whether to interview an older person (OP) or require a proxy. In the first screening, the potential OP would be asked to introduce a proxy to be interviewed if he or she (i) has been hospitalised, sick, or incapacitated; (ii) has difficulty hearing; (iii) has difficulty speaking; and (iv) has experienced psychological disorder. If the OP passed the first screening, he or she undergoes the second screening on cognitive assessment, using the Short Portable Mental Status Questionnaire (SPMSQ). The SPMSQ, first proposed by Pfeiffer, is a brief cognitive screening instrument comprising 10 items to test orientation to time and place, memory, and current events (Pfeiffer, 1975). The SPMSQ scores are based on the number of incorrect answers. Those with zero to two errors have intact intellectual functioning; those with three to four errors have mild intellectual impairment; those with five to seven errors have moderate intellectual impairment; and those with eight to ten errors have severe intellectual impairment. However, the scores for intellectual level vary by education of respondents. One more error is allowed in the scoring if a respondent has a grade school education or less, and one less error is allowed if the respondent has education beyond high school. Therefore, to be eligible for interview, respondents with grade school education or less should not have more than six incorrect answers. Respondents with high school education should not have more than five incorrect answers to be eligible for interview whilst less than four incorrect answers are allowed for respondents with college education or more. Because this test has not yet been validated in Viet Nam, the standard cut-off scores recommended by Pfeiffer were adopted and only OPs with normal mental functioning were eligible for interview. OPs who failed in this assessment were required proxy respondents.

The total of 696 proxy respondents included 421 from the first screening and 275 from the second screening. Proxy interviews constituted 12% of the total unweighted sample. Use of proxies may relate to biases, affecting analysis and interpretation of findings (Weir et al., 2011; Nuemann et al., 2015). Therefore, questions about beliefs, attitudes, cognitive assessment, isolation, and self-assessment were skipped for proxy interviews to reduce bias.

Amongst 6,050 OP participants in the LSAHV, 696 required a proxy during the survey. OPs' sociodemographic characteristics by proxy status and screening type are presented in Table B1. Those who are older, female, not currently married, living in rural areas, and not working more likely needed a proxy. Those with a proxy have a mean age of 81 years compared to 72 years for those without a proxy. We also compared OPs who required a proxy in the first and second screenings. The mean age of OPs who needed a proxy in the first and second screenings are 82 and 79 years, respectively. There are significant differences in terms of age, religion, working status, and living arrangement but no difference in terms of sex, marital status, and type of residence.

Table B1. Profile of Respondents by Proxy Status and Screening Type (Unweighted Data)

Characteristics of Older Persons	Proxy Status						ALL
	Without Proxy	With Proxy	Sig	Type of Screen (With Proxy)		Sig	
				First Screen	Second Screen		
Age							
60-69	47.3	15.5		12.1	20.7		15.5
70-79	34.2	24.6	***	22.4	28.0	***	24.6
80+	18.5	59.9		65.6	51.3		59.9
Mean age	*71.55*	*80.89*	***	*82.14*	*78.97*	***	*72.62*
Sex							
Male	44.1	30.0	***	32.1	26.9	n.s.	30.0
Female	55.9	70.0		67.9	73.1		70.0

Characteristics of Older Persons	Proxy Status						ALL
	Without Proxy	With Proxy	Sig	Type of Screen (With Proxy)		Sig	
				First Screen	Second Screen		
Marital status							
Current married/Living together	60.0	32.0	***	30.9	33.8	n.s.	32.0
Other	40.0	68.0		69.1	66.2		68.0
Religion							
None	64.8	63.1	n.s.	67.0	57.1	*	63.1
Other	35.2	36.9		33.0	42.9		36.9
Work Status							
Working	29.6	7.6	***	4.8	12.0	***	7.6
Not working	70.5	92.4		95.3	88.0		92.4
Type of residence							
Urban	41.1	33.5	***	36.1	29.5	n.s.	33.5
Rural	58.9	66.5		63.9	70.6		66.5
Living arrangement							
Living alone	8.7	4.2	***	2.4	6.9	*	4.2
Living with spouse only	18.4	9.2		9.5	8.7		9.2
Living children	63.1	73.4		74.8	71.3		73.4
Other types of living arrangement	9.8	13.2		13.3	13.1		13.2
N	*5,354*	*696*		*421*	*275*		*696*

Statistical significance, *p < 0.05, ***p < 0.001, n.s. = not significant
Source: Calculated by PHAD using orginal LSAHV data.

Respondents were not interviewed during the first screening because of statistically significant differences amongst age groups (Table B2). Difficulty speaking (29%) and poor cognitive or psychological condition (25%) are more common amongst the youngest cohort (60–69 years). Difficulty hearing (42%) is the biggest problem amongst the oldest cohort (80+ years) whilst hospitalised, sick, or incapacitated (33%) is the popular reason for requiring a proxy amongst those aged 70–79. Age clearly affects the need of having a proxy.

Table B2. Reasons for Having a Proxy (First Screening) by Background Characteristics (Unweighted Data)

Characteristics of Older Persons	Reasons R Cannot Be Interviewed (First Screening)				Total	Sig	N
	R has been hospitalised, sick, or incapacitated	R has difficulty hearing	R has difficulty speaking	R has poor cognitive or psychological condition (memory loss, confusion, etc.)			
Age							
60-69	22.5	24.5	28.6	24.5	100.0		*49*
70-79	33.0	28.7	16.0	22.3	100.0	**	*94*
80+	27.5	42.0	10.1	20.3	100.0		*276*
Sex							
Male	33.3	40.0	10.4	16.3	100.0	n.s.	*135*
Female	25.7	35.6	15.1	23.6	100.0		*284*
Marital status							
Currently married/ Living together	34.9	32.6	16.3	16.3	100.0	n.s.	*129*
Other	25.2	39.0	12.4	23.5	100.0		*290*
Religion							
None	23.8	39.2	14.2	22.8	100.0	**	*281*
Others	37.0	32.6	12.3	18.1	100.0		*138*
Work Status							
Working	25.0	30.0	40.0	5.0	100.0	*	*20*
Not working	28.3	37.3	12.3	22.1	100.0		*399*
Type of residence							
Urban	35.8	31.1	10.6	22.5	100.0	*	*151*
Rural	23.9	40.3	15.3	20.5	100.0		*268*

Characteristics of Older Persons	Reasons R Cannot Be Interviewed (First Screening)				Total	Sig	N
	R has been hospitalised, sick, or incapacitated	R has difficulty hearing	R has difficulty speaking	R has poor cognitive or psychological condition (memory loss, confusion, etc.)			
Living arrangement							
Living alone	0.0	30.0	10.0	60.0	100.0		*10*
Living with spouse only	47.5	20.0	7.5	25.0	100.0		*40*
Living children	27.1	40.5	14.7	17.8	100.0	**	*314*
Other types of living arrangement	25.5	30.9	12.7	30.9	100.0		*55*
TOTAL	118	155	57	89			*419*

Sig = Statistical significance, * p <0 .05, ** p < 0.01, n.s. = not significant
Source: Calculated by PHAD using orginal LSAHV data.

Participation of proxies in providing information for OPs with cognitive impairment and other poor conditions improved the representativeness of the study population in the LSAHV. However, the proxies' responses led to lack of information regarding the attitudes, beliefs, cognitive assessment, isolation, and self-assessment of OPs. Furthermore, the proxies tended to answer 'don't know' to other questions related to OPs, which may be subject to respondent biases. These issues need to be addressed whilst data is being analysed and the findings are being interpreted.

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