

Annex **A**

LSAHP Sampling Design and Weights

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December 2019

This chapter should be cited as

Barrios, E. B. and M. P. N. Marquez (2019), 'Annex A: LSAHP Sampling Design and Weights', in G. T. Cruz, C. J. P. Cruz, and Y. Saito (eds.), *Ageing and Health in the Philippines*, Jakarta, Indonesia: Economic Research Institute for ASEAN and East Asia, pp. 227-234.

Annex A: LSAHP Sampling Design and Weights

Erniel B. Barrios and Maria Paz N. Marquez

The 2018 Longitudinal Study on Ageing and Health in the Philippines (LSAHP) is a survey with a nationally representative sample of 5,985 respondents aged 60 years and above (referred to as older persons or OPs) living in households. OPs living in institutions such as prisons, convents, seminaries, and the like were excluded from the study. The sample for the LSAHP is designed to produce results representative of the whole country, of urban and rural areas separately, and of the National Capital Region and each major island grouping – Balance Luzon, Visayas, and Mindanao.

The LSAHP is a longitudinal study of a cohort of OPs. The 2018 round provides information on the health status and well-being of older Filipinos. The survey instruments used in 2018 will be used in the follow-up survey in 2020 to facilitate the measurement of various indicators (and outcomes) pertaining to OPs and the corresponding changes over time.

Sample Design and Implementation

The 2018 LSAHP employed a multistage sampling design with provinces as the primary sampling units (PSUs), barangays (villages) as the secondary sampling units (SSUs), and OPs as the ultimate sampling units. The 2015 Census of Population served as the sampling frame for the selection of the PSUs and SSUs.

In the first stage, provinces were stratified into three strata (low, medium, and high proportion) based on the 2018 projected population 60 years and over. The population projection used the 2015 census data. An iterative algorithm was used to determine the stratum boundaries with the objective of minimising the pooled variance of the estimated total of indicators from the three strata.

The stratum with low proportion of OPs account for 55.21% of the provinces, the medium stratum accounts for 29.17% of the provinces, while the stratum with high proportion of OPs comprises 15.63% of the provinces.

Table A1. List of Sample Areas and their Corresponding Number of Sample Barangays and Sample Size

Area (Region and City/ Province)	No. of Barangays	No. of Older Person Respondents	
		Visited	Interviewed
NCR	17	647	586
Pasig	10	382	349
Muntinlupa	7	265	237
BALANCE LUZON	51	1,945	1,836
Bulacan	23	875	834
Rizal	17	653	607
Occidental Mindoro	5	190	179
Oriental Mindoro	6	227	216
VISAYAS	50	1,875	1,776
Eastern Samar	20	755	708
Samar (Western Samar)	30	1,120	1,068
MINDANAO	49	1,868	1,787
Davao Occidental	10	380	370
Dinagat Islands	7	265	261
Misamis Occidental	32	1,223	1,156
TOTAL	167	6,335	5,985

Source: Calculated by DRDF using original LSAHP data.

From each stratum, provinces (or city/municipality in the case of NCR¹) were selected using systematic sampling to induce implicit stratification amongst the major strata (NCR, Balance Luzon, Visayas, and Mindanao). The number of sample provinces/cities is proportional to the number of provinces/cities in the low, medium or high strata based on the density of OPs in NCR, Balance Luzon, Visayas and Mindanao, resulting in a self-weighting sample of provinces and cities.

¹ Metropolitan Manila, officially the National Capital Region, is composed of 16 cities and one municipality.

The selection of provinces (or cities in the case of NCR) resulted in a sample consisting of two cities in NCR and nine provinces distributed proportionally across Balance Luzon, Visayas, and Mindanao. Table A1 shows the list of these sample provinces/cities.

In the second stage, sample barangays were selected for each of the sample provinces/cities. The barangays were selected using probability proportional to size, with the proportion of OPs as the size measure. Barangays were further selected with induced implicit stratification for rural and urban areas.

In each sample barangay, a list of all OPs residing in the barangay was obtained from the barangay's Office for Senior Citizens Affairs. This list was validated with a relisting of all resident OPs in the barangay. This list which was sent to the central office for sampling served as the sampling frame from where the sample eligible respondents (ERs) for each barangay were drawn.

In the case of some very large sample barangays, we limited the listing to an enumeration area (EA). The EA should cover a minimum of 3 times the maximum sample size for the sample barangay. To facilitate data collection, only one EA was randomly selected per barangay. The EA was selected based on the location and density of OPs.

Sample Size

The initial target of the study was to cover 6,000 respondents from 167 barangays. The 167 barangays were proportionally distributed across 11 provinces/cities selected in the first stage (PSUs). However, to give allowance for possible attrition, nonresponse, and refusals based on the 2007 PSOA nonresponse rate, the survey targeted a sample of 6,335 OPs.

In drawing the sampling frame, we limited the OPs to one per household. In the case of more than one OP per household, we randomly selected one OP per household to be included in the sampling frame. We then organised the sampling frame by three age groups: 60–69, 70–79, and 80 and above. The sample was selected proportionally to the size of the age group based on the sampling frame for each barangay.

To ensure a sufficient number of respondents in the older age groups in the succeeding rounds of the survey, we oversampled the number of respondents in the age groups 70–79 and 80 and over by a factor of 2 and 3, respectively.

After determining the sample size per age group for each barangay, the ultimate sampling units (the units selected at the last stage in a multistage sample design) or the OP respondents were drawn using systematic random sampling from each of the three age groups based on the listing of OPs (sampling frame). The samples were centrally selected; this means that the list of OPs in the barangay was forwarded to the central office where the sample respondents were drawn. The list of selected sample respondents was then returned to the field. The sampling procedure does not allow for a replacement sample because the sample already considers the expected nonresponse per barangay.

Table A1 summarises the final distribution of the number of barangays and the number of respondents visited and interviewed for each sample area. In all, 6,335 OPs were visited; amongst them, 5,985 completed interviews for a completion rate of 94.5%.

Sampling Weights

To ensure that the results of the study will be representative at the national level and for urban–rural areas, sampling weights are required for analysis. As mentioned earlier, the samples were selected in three stages: (1) selection of provinces (PSUs), (2) selection of barangays (SSUs), and (3) selection of ERs or OPs (ultimate sampling units [USUs]). The selection of PSUs was done with stratification and proportional allocation; hence, the sample PSUs are self-weighting. The selection of USUs was done using systematic sampling, so ERs have equal weights within the sample barangay. The selection of barangays, however, was done with probability proportional to the estimated total number of OPs based on the 2015 census. Thus, the sampling weights will vary only across sample barangays. The basic weights are the inverse of inclusion probabilities of the sample barangays:

$$W_i = \frac{1}{\pi_i}$$

where $\pi_i = P[\textit{barangay } i \textit{ is included in the sample of 167 barangays}]$,
 $i = 1, 2, \dots, 167$.

Weights were then adjusted as a result of actual sample selection. Two sets of weights are provided in the data. The first set was adjusted to account for the differences between frame information and the actual characteristics of the sample barangays (W_i^1). The second set of weights (W_i^2) further accounts for differences between frame information and the actual characteristics of the sample barangays with disaggregation by implicit strata – that is, by the rural–urban classification of barangays and by the age group (60–69, 70–79, and 80 and over) of OPs. The first set of weights (Weight 1) is the adjusted design weights while the second set of weights (Weight 2) is the adjusted design weights with rural–urban breakdown (based on implicit stratification into rural–urban areas).

Weight 1

To compute for W_i^1 , the sample size was corrected first. The corrected sample size accounts for the oversampling of age groups 70–79 and 80 and above. Thus, the corrected sample size is computed as follows:

$$Adj\ n_i = n_{i1} + \frac{n_{i2}}{2} + \frac{n_{i3}}{3}$$

where n_{i1} is the actual sample size in barangay i amongst 60–69-year-old OPs,

n_{i2} is the actual sample size in barangay i amongst 70–79-year-old OPs, and

n_{i3} is the actual sample size in barangay i amongst 80-year-old and over OPs.

The original weights (W_i) were then adjusted as follows:

$$Adj\ W_i = W_i * \frac{OP_i}{FOP_i} * \frac{n_i}{Adj\ n_i}$$

where OP_i is the estimated total number of OPs in the barangay at the time of the survey,

FOP_i is the total number of OPs in the barangay based on the frame (2015 census),

n_i is the target sample size in barangay i , and

$Adj\ n_i$ is the corrected sample size (actual) after oversampling is considered.

Since the frame was based on the 2015 census, the weights were adjusted further to sum up to the projected OPs in 2018, as follows:

$$Adj W_i^{OP} = Adj W_i * \frac{Projected\ OP\ in\ 2018}{\sum_i Adj W_i}$$

The weights from $Adj W_i^{OP}$ are at the barangay level; hence, respondent-level weight was computed as follows:

$$W_i^1 = \frac{Adj W_i^{OP}}{Actual\ n_i}$$

where $Actual\ n_i$ is the actual number of sample OPs enumerated in barangay i .

W_i^1 can be used to estimate incidence amongst the OPs. The weights can also be standardised to sum up to the total sample size, which will facilitate the interpretation of descriptive statistics as well as modelling.

Weight 2

Another set of weights was computed to consider disaggregated estimates from implicit stratification in terms of rural–urban areas and by age group (60–69, 70–79, and 80 and over). W_{ij}^{2R} is defined as the weight amongst respondents of age group j (1 for 60–69, 2 for 70–79, 3 for 80 and over) in barangay i classified as R (Rural or Urban). In computing W_{ij}^{2R} , the original weight was distributed into the age groups based on the actual number of ERs in the age group as follows:

$$Adj W_{ij}^R = W_i * \frac{OP_{ij}^R}{OP_i^R}$$

where W_i is the original weight,

OP_{ij}^R is the actual number of OPs interviewed from age group j in barangay i classified as R , and

OP_i^R is the total number of OPs interviewed in barangay i classified as R .

We further adjusted the weights to conform to the projection of total OPs in each age group by rural–urban residence as follows:

$$AdjW_{ij}^{2R} = AdjW_{ij}^R * \frac{Projected\ OP\ in\ 2018_j^R}{\sum_i Adj\ W_{ij}}$$

$AdjW_{ij}^{2R}$ totals to projected rural–urban OPs by age group (60–69, 70–79, and 80 and over).

The weights from $AdjW_{ij}^{2R}$ are at the barangay level; hence, respondent-level weights were computed as follows:

$$W_{ij}^2 = \frac{AdjW_{ij}^{2R}}{Actual\ n_{ij}}$$

These weights can be standardised to sum up to the total sample size to facilitate the interpretation of descriptive statistics as well as modelling.

Annex **B**

Characteristics of Filipino Older Persons with Proxy Respondents

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December 2019

This chapter should be cited as

Cruz, C. J. P. and G. T. Cruz (2019), 'Annex B: Characteristics of Filipino Older Persons with Proxy Respondents', in G. T. Cruz, C. J. P. Cruz, and Y. Saito (eds.), *Ageing and Health in the Philippines*, Jakarta, Indonesia: Economic Research Institute for ASEAN and East Asia, pp. 235-241.

Annex B: Characteristics of Filipino Older Persons with Proxy Respondents

Christian Joy P. Cruz and Grace T. Cruz

In ageing research, the inclusion of proxy interviews is important in addressing the methodological challenges of acquiring a representative sample of the study population. Proxy interviews help reach institutionalised populations and individuals with physical and cognitive impairments, thus increasing the sample size and improving the representativeness of the study population (Weir et al., 2011). However, the inclusion of proxy respondents may create another challenge, as the lower accuracy of proxy responses can lead to biased estimates (Oksuzyan et al., 2019). Research findings tend to support the use of proxy ratings amongst older adults in many but not all areas when self-reports are not feasible (Nuemann et al., 2015).

The LSAHP employed two types of screening to determine if an OP could be interviewed or if he or she would require a proxy. For the first screening, the study required a proxy if the potential OP respondent was in any of the following situations: (i) the OP has been hospitalised, sick, or incapacitated; (ii) the OP has difficulty hearing; (iii) the OP has difficulty speaking; and (iv) the OP has poor cognitive or psychological condition (e.g. memory loss and confusion). All the OPs who passed the first screening were further subjected to a second-level screening: a cognitive assessment using the Short Portable Mental Status Questionnaire (SPMSQ) (Pfeiffer, 1975). The SPMSQ is a set of 10 questions that is commonly used for cognitive assessment, particularly for OPs. As mentioned in Chapter 2, the SPMSQ has not yet been validated in the Philippines. Thus, we employed the criteria proposed and used by Pfeiffer (1975) for determining who amongst our initial sample were not cognitively able to be interviewed for the study. According to Pfeiffer, those

who have 0–2 errors in the test are classified as having normal mental functioning, those with 3–4 errors have mild cognitive impairment, those with 5–7 errors have moderate cognitive impairment, and those with 8 or more errors have severe cognitive impairment. Pfeiffer factored in the respondent's educational attainment in determining his or her final cognitive level score. Specifically, those with lower educational attainment (grade school education or less) are allowed one more error, and those with at least a high school education are allowed one less error. When these scoring guidelines are applied to the LSAHP, an OP with an elementary education or less should have no more than five incorrect answers to be eligible for interview. An OP with a high school education should have no more than four incorrect answers, while an OP with a college education or higher should have no more than three incorrect answers to be eligible for interview.

In this section, we describe the characteristics of older Filipinos who required proxy respondents after the first and second screenings and compare them with the characteristics of their counterparts who did not need proxies. The reasons they were screened out during the first screening are also discussed. As presented in Chapter 2, the proxy interviews had a total of 776 respondents – 475 from the first screening and 301 from the second screening. Proxy interviews constitute 13% of the total unweighted sample. It should also be noted that the data collected from proxy interviews are not comparable with that of the regular interviews because the former skipped questions that are not factual. Examples of missed data for proxy interviews are mental health questions and attitudinal questions.

Results show that OPs who required a proxy during the survey are a select group with significantly different characteristics from those who did not need a proxy to answer the survey questions. Differences in the socio-demographic characteristics between these two groups are apparent, except in religion (Table B1). Those who are older, female, widowed, living in rural areas, less educated, and not working are more likely to need a proxy. Those with a proxy have a mean age of 81 compared to 72 for those who had no need for a proxy. In terms of marital status, a significantly higher proportion of OPs with a proxy are widowed (68% vs 48%).

Older Filipinos exhibit a relatively low educational profile, with elementary education as the modal educational attainment (Chapter 2). The OPs with a proxy have an even poorer educational profile, with nearly four in five (78%) having at most an elementary education compared to 65% of OPs with no proxy.

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

Characteristics of Older Persons	No. of Older Person Respondents						ALL
	Without Proxy	With Proxy	Sig	Type of Screen (With Proxy)		Sig	
				First Screen	Second Screen		
Age							
60-69	39.9	9.7		9.1	10.6		35.9
70-79	40.7	28.4	***	27.7	29.6	n.s.	39.1
80+	19.4	61.9		63.2	59.8		24.9
Mean age	71.88	80.72	***	81.04	80.19	n.s.	73.03
Sex							
Male	36.6	32.8	*	34.2	30.6	n.s.	36.1
Female	63.4	67.2		65.8	69.4		63.9
Marital status							
Single	3.5	3.2	***	3.0	3.7		3.2
Married	38.6	23.2		22.2	24.9		23.3
Living in Separated/Divorced/ Annulled	4.1	2.7		2.3	3.3	n.s.	2.7
Widowed	5.4	3.1		3.8	2.0		3.1
	48.5	67.7		68.7	66.1		67.7
Religion							
Roman Catholic	79.0	81.8		82.7	80.4	n.s.	79.4
Non-Roman Catholic	21.0	18.2	n.s.	17.3	19.6		20.6
Education							
No schooling	3.5	17.0		10.0	27.9		5.3
Elementary	61.7	61.4	***	65.8	54.5	***	61.6
High school	24.6	15.0		17.2	11.6		23.4
College+	10.2	6.6		7.0	6.0		9.7
Work Status							
Working	35.6	7.0	***	6.1	8.3	n.s.	31.9
Not working	64.4	93.0		93.9	91.7		68.1

Characteristics of Older Persons	No. of Older Person Respondents						ALL
	Without Proxy	With Proxy	Sig	Type of Screen (With Proxy)		Sig	
				First Screen	Second Screen		
Type of residence							
Urban	44.1	38.1	**	37.2	39.5	n.s.	43.3
Rural	55.9	61.9		62.8	60.5		56.7
Living arrangement							
Living alone	12.9	15.0		15.4	14.3		13.2
Living with spouse only	9.5	7.0		6.3	8.0		9.2
Living children	59.6	62.7	*	64.7	59.5	n.s.	60.0
Other types of living arrangement	17.9	15.4		13.5	18.3		17.6
<i>N</i>	5,209	776		475	301		5,985

* $p < .05$. ** $p < .01$. *** $p < .001$. n.s. = not significant.

Source: Calculated by DRDF using original LSAHP data.

Seventeen percent of those requiring a proxy had no formal schooling compared to 4% of those without a proxy. Given their education and age disparity, it is not surprising that those requiring a proxy are less likely to be working (7% vs 36%).

We also compared the two types of OPs who required a proxy – that is, those disqualified for interview in the first two screenings. Statistical tests show they are no different in terms of the socio-demographic variables including age, sex, marital status, religion, work status, and type of residence. An exception is education; those who did not pass the second screening, or the cognitive assessment are less educated compared to those who did not pass the first screening. About 28% of the former never attended formal school compared to 10% of the latter.

The reasons respondents were not interviewed during the first screening are presented in Table B2. Hearing difficulty (42%) and poor cognitive or psychological condition (32%) are the top reasons the OPs needed a proxy during the interview. Both reasons were more common amongst females and those in the oldest age group. Other reasons for requiring a proxy are hospitalisation, sickness, or incapacity (19%) and difficulty in speaking (8%). These two reasons were more commonly reported amongst the males and the younger cohort (60–69).

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

Characteristics of Older Persons	No. of Older Person Respondents						ALL
	With- out Proxy	With Proxy	Sig	Type of Screen (With Proxy)		Sig	
				First Screen	Second Screen		
Age							
60-69	39.9	9.7		9.1	10.6		35.9
70-79	40.7	28.4	***	27.7	29.6	n.s.	39.1
80+	19.4	61.9		63.2	59.8		24.9
Mean age	71.88	80.72	***	81.04	80.19	n.s.	73.03
Sex							
Male	36.6	32.8	*	34.2	30.6	n.s.	36.1
Female	63.4	67.2		65.8	69.4		63.9
Marital status							
Single	3.5	3.2		3.0	3.7		3.2
Married	38.6	23.2		22.2	24.9		23.3
Living in	4.1	2.7	***	2.3	3.3	n.s.	2.7
Separated/Divorced/ Annulled	5.4	3.1		3.8	2.0		3.1
Widowed	48.5	67.7		68.7	66.1		67.7
Religion							
Roman Catholic	79.0	81.8	n.s.	82.7	80.4	n.s.	79.4
Non-Roman Catholic	21.0	18.2		17.3	19.6		20.6
Education							
No schooling	3.5	17.0		10.0	27.9		5.3
Elementary	61.7	61.4	***	65.8	54.5	***	61.6
High school	24.6	15.0		17.2	11.6		23.4
College+	10.2	6.6		7.0	6.0		9.7
Work Status							
Working	35.6	7.0	***	6.1	8.3	n.s.	31.9
Not working	64.4	93.0		93.9	91.7		68.1

Characteristics of Older Persons	No. of Older Person Respondents						ALL
	With-out Proxy	With Proxy	Sig	Type of Screen (With Proxy)		Sig	
				First Screen	Second Screen		
Type of residence							
Urban	44.1	38.1	**	37.2	39.5	n.s.	43.3
Rural	55.9	61.9		62.8	60.5		56.7
Living arrangement							
Living alone	12.9	15.0		15.4	14.3		13.2
Living with spouse only	9.5	7.0		6.3	8.0		9.2
Living children	59.6	62.7	*	64.7	59.5	n.s.	60.0
Other types of living arrangement	17.9	15.4		13.5	18.3		17.6
N	5,209	776		475	301		5,985

*p < .05. **p < .01. ***p < .001. n.s = not significant.

Source: Calculated by DRDF using original LSAHP data.

Of note is the clear age gradient, with an increasing proportion needing a proxy with advancing age due to hearing impairment and poor cognitive or psychological condition.

In conclusion, we emphasise the significance of proxy interviews in improving the representativeness of the LSAHP study population. This is particularly relevant in the context of the OPs, our study population, who are expected to have poorer health and/or higher cognitive impairment. The good news is that proxy interviews constitute a small share of the total sample (13%). However, our analysis demonstrates that proxy interviews have a significantly different profile from the regular interviews. This should be borne in mind in the analysis and interpretation of findings. Analyses should also take note of the data deficiency of proxy interviews, specifically the exclusion of questions pertaining to beliefs and attitudes as well as those that measure self-assessment of the OP respondent to minimise bias. Further analysis should try to assess the validity of proxy responses and see which indicators may be subject to respondent biases (Nuemann et al., 2015).

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Annex C: Research Team and Field Personnel

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Lorelaine Gestopa
Ailele Inocian
King Joseph Dennise
Lomopog
Sol Lomopog
Estrella Panogalon
Kim Xavier Rodero
Marietta Simborio
Sean Michael Tesoro

Annex D: Advisory Committee

Asian Development Bank (ADB)

Coalition of Services for the Elderly (COSE)

Commission on Population and Development (POPCOM)

Department of Health – Philippines (DOH)

Department of Psychology, UP Diliman

Department of Social Welfare and Development (DSWD)

Institute on Aging – National Institutes of Health

National Economic and Development Authority (NEDA)

Philippine Health Insurance Corporation (PhilHealth)

Philippine Statistics Authority (PSA)

Social Security System (SSS)

United Nations Population Fund Philippines (UNFPA Philippines)

University of the Philippines Population Institute (UPPI)