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Brazilian Longitudinal Study of Aging (ELSI-Brazil)

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Overview

Brazil, the world's fifth most populous nation, with more than 200 million inhabitants, is experiencing one the fastest demographic aging worldwide, a trend that will accelerate during the twenty-first century (Lima-Costa et al. 2018). ELSI-Brazil is a nationally representative study of 9412 individuals aged 50 years and older, residing in 70 municipalities across the 5 Brazilian macro regions. ELSI allows to investigate the aging process, its health, psychosocial and economic determinants, and societal consequences. The goal of ELSI is not only to build an understanding of aging in a large, Western, middle-income country in a rapid demographic transition, but also to provide scientific data to support and study policy changes that may affect older adults. Recent economic crises and proposed reforms in social security may have unknown implications for the welfare of older Brazilians. ELSI represents a unique opportunity to investigate the impact of such reforms. The study is being conducted by the Oswaldo Cruz Foundation (in Portuguese, Fundação Oswaldo Cruz), Minas Gerais, Brazil. The study is funded by the Brazilian Ministry of Health (1st and 2nd waves) and has the support of researchers from several Brazilian and foreign academic institutions, as well as from policymakers from the Ministry of Health.

Study Design

The sample was designed to be representative of the noninstitutionalized population within the eligible age range. Brazil's national household surveys use the Brazilian Institute of Geography and Statistics (in Portuguese, Instituto Brasileiro de Geografia e Estatística) geographic operational base for stratification and selection of areas. We used an inverse sampling design to avoid an increase in the sample size to compensate for nonresponses. The inverse sampling design enables to define how many units need to be observed in order to obtain a prespecified number of interviews to be performed. Application of this method in ELSI consisted of sequentially visiting the previously selected households until reaching the planned number of interviews. The planned number of interviews was 10,000 (9412 participated).

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Sample weights were derived to account for differential probability of selection and differential nonresponse. Correct use of weights is essential to population inference because the sample is not self-weighting by design. All residents in the selected households aged 50 years or older were eligible for interview and other procedures, and a subsample was selected for blood collection. Baseline examination was conducted in 2015–2016. The second wave is planned for 2018–2019. Subsequent waves are planned for every 3 years. The study adopts a conceptual framework of the Health and Retirement family of studies, allowing cross-national comparisons. Further details on the ELSI's design can be seen in a previous publication (Lima-Costa et al. 2018) and on the research homepage (elsi.cpqrr.fiocruz.br).

Content

The baseline examination included detailed household and individual interview, physical measurements, and performance. Blood tests and sample storage were performed in a subsample of about 2500 participants. The household interview included measures of house characteristics and accessibility, as well as detailed information on housing assets, consumption, and income (Table 1). Individual interviews included a broad range of topics related to an individual's demographic characteristics and background, neighborhood and discrimination, life history, work and retirement, family transfers, health behaviors, women's health, general health and diseases, oral health, functioning, cognition, depressive symptoms, psychosocial characteristics, use of medication, and use of health services (Table 1). Physical measures and performance included blood pressure, anthropometry, grip strength, gait speed, and balance tests (Table 1). The questionnaires and the operational manual are available on the research homepage. Blood tests comprised total cholesterol, high-density lipoprotein (HDL) cholesterol, low-density lipoprotein (LDL) cholesterol, urea, creatinine, ferritin, thyroid-stimulating hormone (TSH), glycated hemoglobin, vitamin D, and hemogram. Serum and plasma aliquots are stored at the Oswaldo Cruz Foundation, Minas Gerais, Brazil.

Ethical Issues

ELSI-Brazil was approved by the ethics board of FIOCRUZ, Minas Gerais (Certificado de Apresentação para Apreciação Ética: 34649814.3.0000.5091). Genotyping of the cohort population was approved by Brazil's national research ethics committee (Certificado de Apresentação para Apreciação Ética: 63725117.9.0000.5091). Participants signed separate informed consent forms for the interviews, physical measurements, and the laboratory assays, authorized sample storages, and access to administrative records.

Key Findings

Sixteen papers with baseline results of ELSI were recently published in a special issue of the *Revista Brasileira de Saúde Pública* (in English, *Brazilian Journal of Public Health*) (Lima-Costa 2018). The results showed high levels of social inequality in the majority of topics investigated, with the poorest or those with lower educational level affected most. Inequalities were observed in physical activity (Peixoto et al. 2018), oral health status (Andrade et al. 2018a), limitations to perform basic activities of daily living (Andrade et al. 2018b), frailty (Andrade et al. 2018c), adequate control of hypertension (Firmo et al. 2018), underutilization of medications due to financial reasons (Loyola Filho et al. 2018), source of health care (Macinko et al. 2018), and capacity to work (Castro et al. 2018). Social participation (Ferreira et al. 2018) and the fear of falling (Pimentel et al. 2018) were associated with the urban environment. Perceived quality of life was associated with sociability and emotional and instrumental support (Neri et al. 2018). Performance in cognitive function tests was shown to be worse in the Northeast region (Castro-Costa et al. 2018). Back pain and hypertension were found to play a prominent role in the configuration of multimorbidity (Nunes et al.

Brazilian Longitudinal Study of Aging (ELSI-Brazil), Table 1 Summary of data collection in household and individual questionnaires and physical measurements for Brazilian Longitudinal Study of Aging (ELSI-Brazil)

Enrolment section	
Location; number of people in the household, their names, data of birth, sex, and relationship with the head of family	
Household questionnaire	
House characteristics and accessibility; housing assets; consumption; appliances and vehicles, income; Family Health Program affiliation	
Individual questionnaire	
Demographics and background	Citizenship; immigration; marital status; ethno-racial background; education; number of descendants and mother's education and background
Neighborhood and discrimination	Perception of neighborhood, crime, violence, and discrimination
Mini childhood life history	Early family structure and economic conditions of family and health conditions
Work and retirement	Current job status; work history; retirement; pension
Family transfers	Transfers of money to and from descendants
Health behaviors	Physical activity; food consumption; alcohol consumption and smoking
Women's health	Menarche and menopause; reproductive history; Pap smear and mammogram
General health and diseases	General health, vision and hearing; falls, joint surgery and bypass surgery/stent/angioplasty, self-reported chronic diseases and treatment for selected conditions; family's history of cardiovascular diseases and diabetes; flu shot; frailty; sleep
Oral health	Self-reported clinical measures; self-rated oral health, use of dental services, and impact of oral health on quality of life
Physical functioning	Mobility; instrumental activities of daily living; basic activities of daily living; advanced activities of daily living; helpers
Cognitive function	Memory and executive function; proxy rating of memory
Depressive symptoms	The eight-item Center for Epidemiologic Studies Depression scale (CES-D8)
Psychosocial	Social relationships; social support; wellbeing; critical events; religiosity; CASP-19
Medication	Number of medications of regular use; expenditure; barriers to get medications
Use of health services	Private health plans; doctor visits; regular source of care (perception of quality and barriers); hospitalizations; emergency care; health expenses
Physical measurements and performance	
Anthropometry	Weight, height, and measurement of waist and hip circumference: 2 measures each (Scale: Seca 813, Germany; Stadiometer: Nutri Vita, Brazil)
Blood pressure (systolic and diastolic)	5 min rest, 3 measures (Oscilometric sphygmomanometer: Omron HEM 7200, Japan)
Grip strength	Stronger arm with elbow about 90%, 3 measures (Dynamometer: Saehan Sh5002, Belgium)
Balance test	Feet side by side, one foot ahead of the other, and one foot behind the other (Stopwatch: Vollo 1809, Brazil)
Walking speed	3 m distance, 2 measures (Stopwatch: Vollo 1809, Brazil)

2018). Women are the main source of care for those with functional limitations, and among those who worked, a third stopped working to be caregivers (Giacomin et al. 2018). Incapacity to work (Castro et al. 2018), as well as the receipt of pensions (Andrade et al. 2018d), was associated with worse health conditions. However, people who receive pensions were more autonomous and had more financial security (Andrade et al. 2018d).

Furthermore, because ELSI is funded by the Ministry of Health, there is a great interest in information that can be useful for health planning and evaluation. Brazil is the only country with more than 100 million inhabitants that has universal and free coverage of health care. Three quarters of the population has the public system (in Portuguese, named as Sistema Único de Saúde – SUS) as their only source of health care. In

addition, about 25% have access to private health plans. As part of the SUS, Brazil has rolled out the Family Health Program (FHP), a comprehensive model of community-based primary health care that reaches over 100 million people. Findings from ELSI's baseline, also published in the above-mentioned special issue, showed that some indicators of utilization and quality of health services are better among those who have access to private health plans, who in turn have much better socioeconomic conditions (Macinko et al. 2018). Access to primary care is high by international standards, but many hospitalizations could be prevented by more effective actions at this level of care (Melo-Silva et al. 2018). Finally, differences in the performance of primary care among users of the public system were found, with a better performance of the FHP compared to other basic units (Macinko et al. 2018). The above-mentioned papers (English version) can be accessed through the link http://www.rsp.fsp.usp.br/search/?lang=en or on the research homepage.

Future Plans

DNA extraction and genome assays on those aliquots are planned. If authorized by Brazilian authorities, mortality and administrative linkages will be performed. ELSI is also planning to be part of an ongoing international research collaboration to measure and understand dementia risk within ongoing longitudinal studies of aging around the world using a Harmonized Cognitive Assessment Protocol Healthy Cognitive Aging Project (HCAP).

Data Access

ELSI's steering committee (and scientific team) encourages the public use of the research data. Registration to access the data is important since it will be used as an indicator of interest from both Brazilian and international researchers. The dataset corresponding to the baseline interviews and physical measurements are available on the research homepage. The dataset is available in two formats: Stata (version 13) and text files with values separated by commas (extension ".cvs"). Results of blood tests are available under request.

Cross-References

- Brazilian Longitudinal Study of Aging
- China Health and Retirement Longitudinal Study
- Costa Rican Longevity and Healthy Aging Study
- English Longitudinal Study of Ageing
- Health and Aging in Africa: a Longitudinal Study of an INDEPTH Community in South Africa
- Health and Retirement Study
- Healthy Ageing in Scotland
- Indonesia Family Life Survey
- Introduction to the Health and Retirement Studies Series
- Japanese Study of Aging and Retirement
- Korean Longitudinal Study of Ageing
- Longitudinal Aging Study in India
- Malaysia Ageing and Retirement Survey
- Mexican Health and Aging Study
- Northern Ireland Cohort for the Longitudinal Study of Ageing
- Study on Global Ageing and Adult Health
- Survey of Health, Ageing and Retirement in Europe
- The Irish Longitudinal Study on Ageing

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