



Association Between History of Abuse and Falling in Older Adults

Carlos A. Reyes-Ortiz, MD, PhD,*¹ Jose Mauricio Ocampo-Chaparro, MD, MSc,[†]
Adalberto Campo-Arias, MD, MSc,[‡] Holly Holmes, MD, MSc,* and John Halphen, MD*

OBJECTIVES: To explore the association between history of several types of abuse and falling.

DESIGN: Cross-sectional population-based study.

SETTING: Data from the Salud, Bienestar y Envejecimiento (Health, Well-being, and Aging) Bogotá Study.

PARTICIPANTS: Community-dwelling adults aged 60 and older living in Bogotá, Colombia (n=2,000).

MEASUREMENTS: Falling was defined as the number of times a person had fallen during the previous 12 months. History of abuse was assessed according to self-report. Logistic regression analyses were used to assess the association between elder abuse and falling, adjusting for potential confounders.

RESULTS: Multivariate data analyses showed significant higher odds of any falls (≥ 1 vs 0) for past emotional (odds ratio (OR)=1.53, 95% confidence interval (CI)=1.23–1.90), physical (OR=1.98, 95% CI=1.57–2.51), or sexual (OR=3.08, 95% CI=1.78–5.32) abuse. Similarly, the odds of recurrent falls (≥ 2 vs 0–1) were significantly higher with each type of abuse. In addition, the odds of any falls and recurrent falls were significant higher in participants with polyvictimization (≥ 2 types of abuse) than in those with no history of abuse or 1 type of abuse.

CONCLUSION: History of abuse (emotional, physical, or sexual) was strongly associated with falling in older adults living in Bogota. Further research is needed to confirm these findings and further delineate the independent effects of elder abuse on fall risk. *J Am Geriatr Soc* 2018.

Key words: falls; history of abuse; older adults; Bogota; population-based study

Approximately one-third of people aged 65 and older who live in the community and half of those aged 80 and older fall each year.^{1,2} Consequences of falling include developing fear of falling, emergency department visits, death, hospital admissions, functional decline, and discharge to a nursing home.^{1,2}

There is usually a combination of intrinsic (e.g., gait impairment) and extrinsic (e.g., environmental hazards) risk factors for falling in older adults,³ including functional impairment, cognitive impairment, depression, walking and balance impairment, extremity weakness, vision impairment, psychotropic medications, and medical conditions, such as diabetes, urinary incontinence, and stroke.^{2–4} Elder abuse is a factor that may be associated with falls.^{5,6}

Elder abuse is common and has grave consequences. The National Elder Mistreatment Study showed that 1 in 10 participants had at least 1 category of abuse in the past year, with 5.1% reporting neglect, 4.6% emotional abuse, 1.6% physical abuse, 0.6% sexual abuse, and 5.2% current financial exploitation.⁷ Elder abuse victimization has psychological and physical consequences by increasing mortality, emergency department use, hospitalization, and nursing home placement.^{8,9}

The Salud, Bienestar y Envejecimiento (SABE; Health, Well-being and Aging) Bogotá Study presents an opportunity to evaluate the association between abuse and falling in a large Hispanic population.^{9,10} There are few studies on abuse of elderly Hispanic adults. Hispanic elder abuse in the community accounted for 36.8% of confirmed cases reported to Adult Protective Services in Texas from 1991 to 1995.¹¹ Approximately 40% of Hispanic elderly adults residing in low-income communities had experienced some form of elder abuse and or neglect within the previous year. Of these, 24.7% reported psychological abuse, 10.7% physical abuse, 9% sexual abuse, 16.7% financial

From the *Division of Geriatric and Palliative Medicine, Department of Internal Medicine, University of Texas Health Science Center at Houston, Houston, Texas; [†]Departamento Medicina Familiar, Universidad del Valle, Cali, Colombia; and the [‡]Programa de Medicina, Facultad de Ciencias de la Salud, Universidad del Magdalena, Santa Marta, Colombia.

Address correspondence to Carlos A. Reyes-Ortiz, MD, PhD, University of Texas McGovern Medical School at Houston, Department of Internal Medicine, Division of Geriatric and Palliative Medicine; 6431 Fannin St, MSB 5.111, Houston, TX 77030. E-mail: carlos.a.reyesortiz@uth.tmc.edu

DOI: 10.1111/jgs.15432

exploitation, and 11.7% caregiver neglect.¹² Abuse of elderly Hispanic adults has been evaluated but not the association between abuse and falling.

Limited data have linked suspicious accidental falls to physical abuse,^{5,6} but studies have linked other forms of abuse to falling in older adults in any population. The reason other types of abuse are linked to falling could be the relationship of abuse with posttraumatic stress disorder, depression or caregiver stress.¹³ The objective of this study was to explore the association between a history of various types of abuse and falling in older adults in Bogotá, Colombia.

METHODS

The SABE Bogotá Study is a cross-sectional survey that was conducted in Bogota, Colombia, in 2012. It was designed using a probabilistic sampling scheme by random selection of clusters (sets of 10 houses). Initially selected individuals were invited in person to participate and were visited 1 to 2 times at their homes. Of 2,442 persons contacted, 81.9% agreed to participate, for a total of 2,000 participants who were interviewed and assessed in their homes. Based on population projections, this population was statistically representative of 779,534 persons aged 60 and older living in Bogotá in 2012. Teams composed of a supervisor, 3 or 4 surveyors, and 1 expert in anthropometric measurements were created. A team of experts composed of the principal investigator or a co-investigator, a professional trained in conducting field interviews, a statistician, and the field coordinator trained each team. The surveys were administered orally in Spanish.^{9,10}

The Pan American Health Organization designed the SABE survey for 7 Latin American cities.¹⁴ The instrument was modified and adapted to Colombia's context, and a section on violent experiences was added. All survey respondents signed informed consent to participate in the study, which the ethics committee of the Pontificia Universidad Javeriana, Bogota, approved.

The outcome variable for this study was falling, which was assessed by asking participant: "Have you fallen in the last 12 months?" A positive response was followed by "How many times have you fallen?" According to number of falls, falling was categorized in 2 ways; any falling was defined as 1 or more versus 0 falls, and recurrent falling was defined as 2 or more versus 0 or 1 falls.

The main independent variable was history of abuse, assessed according to the question: "Have you ever been a victim of emotional (e.g., offensive expressions or insults), physical (lesions/physical aggression such as blows, slaps, kicks), or sexual abuse?" The questions were asked of the older person in a separate room if he or she lived with someone. This approach has been used and found valid in other studies examining history of abuse.¹⁵

Sociodemographic variables included age, sex, years of education (0–4 vs ≥ 5), and socioeconomic status (SES). In Colombia, SES is categorized into 6 levels from the lowest to the highest social class, depending on income level and house characteristics, following the methodology reported by the Departamento Administrativo Nacional de Estadística.¹⁰ We dichotomized SES by merging the 2 lowest levels and comparing them with the 4 highest levels.

Other variables were poor vision, depressive symptoms, cognitive function, psychotropic medications, functional status, comorbidity, and walking speed. Poor vision was defined as a report or regular or poor (vs good, very good, excellent) near (e.g., read or see images in a newspaper) or distance (e.g., recognize someone across the street) vision with or without correction. Depressive symptoms were measured using the Geriatric Depression Scale (GDS; range 0–15; depression defined as ≥ 6).¹⁶ This scale has been shown to have high reliability, with an internal consistency in older Colombians ($\alpha=0.78$),¹⁷ as well in this study ($\alpha=0.84$). Cognitive function was assessed using the abbreviated version of the Mini-Mental State Examination validated in the initial SABE studies.¹⁸ Scores on the abbreviated version range from 0 to 19, with higher scores indicating better cognitive function. A score less than 13 indicates cognitive impairment. The study interviewers checked all medications that each elder participant was taking at home. Psychotropic medications were defined as benzodiazepines, opioids, sleep medications (prescribed or over the counter, e.g., diphenhydramine, chlorpheniramine), antidepressants, and antipsychotics. Functional status was evaluated using the Lawton scale for instrumental activities of daily living (IADLs),¹⁹ which assesses 8 activities (using the telephone, taking medications, managing finances, preparing meals, shopping, housekeeping, doing laundry, using transportation). Scores range from 0 to 8, with higher scores signifying better functional status. Low IADLs was defined as a Lawton score less than 4. Comorbidity included history of 7 medical conditions: hypertension, diabetes mellitus, coronary heart disease, arthritis, stroke, chronic pulmonary obstructive disease, and cancer. Respondents were asked: "Has a doctor or a nurse told you that you have...?" for each of the conditions. High comorbidity was defined as having a history of 3 or more of these conditions. Walking speed was measured in meters per second, and slow walking speed was defined as being below the 25th percentile (<0.48 m/s).

A descriptive analysis was performed by estimating percentages for nominal variables and means \pm standard deviations for continuous variables. Bivariate analyses of falling with history of abuse and risk factors reported in the literature for falling or abuse available in the database where done and odds ratios (ORs) with 95% confidence intervals (CIs) were reported. To construct multivariate logistic regression models, potential confounding factors in the association between falling and history of abuse were identified to make multivariate logistic regression models were used to select in significant variables into each model and estimate the odds of any falls (≥ 1 vs 0) or recurrent falls (≥ 2 vs 0–1). Models were checked using the Hosmer-Lemeshow procedure and showed good fit of the data (all $p > 0.20$).²⁰ The association between falling and number of abuse types (≥ 2 considered polyvictimization) was also estimated. Statistical significance was set at $p < .05$. SAS version 9.4 (SAS Institute, Inc., Cary, NC) was used for analysis.

RESULTS

Of the 2,000 study participants, 62.4% were female, 28.4% ($n=569$) had fallen once, and 12.7% ($n=254$) had fallen 2 times or more during the previous year; 26.9%

Table 1. Descriptive Statistics and Bivariate Associations with Falling: Bogotá Salud, Bienestar y Envejecimiento Study

Characteristic	All, N = 2,000	Odds Ratio (95% Confidence Interval) P-Value	
		≥1 (n = 569) vs 0 Falls, n = 1,431	≥2 (n = 254) vs 0-1 Falls, n = 1,746
Age, mean ± standard deviation	71.2 ± 8.0	1.02 (1.01–1.03) <.001	1.03 (1.01–1.04) .002
Female, n (%)	1,249 (62.4)	1.29 (1.05–1.58) .01	1.36 (1.02–1.80) .03
Education 0–4 years, n (%)	887 (44.3)	1.38 (1.14–1.68) .001	1.55 (1.19–2.02) .001
Low socioeconomic status, n (%)	1,038 (51.9)	1.23 (1.01–1.49) .04	1.29 (0.99–1.69) .06
Depression (Geriatric Depression Scale score ≥6), n (%)	514 (25.7)	1.48 (1.20–1.84) <.001	1.78 (1.35–2.35) <.001
≥3 comorbidities, n (%)	323 (16.1)	1.51 (1.18–1.95) .001	1.74 (1.27–2.40) .001
Lawton instrumental activity of daily living score <4, n (%)	150 (7.5)	1.60 (1.13–2.26) .007	1.73 (1.13–2.66) .01
Poor vision, n (%)	1,042 (52.1)	1.26 (1.04–1.53) .02	1.49 (1.14–1.95) .004
Psychotropics, n (%)	164 (8.2)	2.11 (1.52–2.92) <.001	2.74 (1.88–3.99) <.001
Low cognition (abbreviated Mini-Mental State Examination score <13), n (%)	286 (14.3)	1.45 (1.12–1.89) .005	1.30 (0.92–1.85) .14
Walking speed <0.48 m/s, n (%)	780 (39.0)	1.27 (1.04–1.54) .02	1.18 (0.90–1.55) .22
Emotional abuse, n (%)	539 (26.9)	1.52 (1.23–1.88) <.001	1.52 (1.15–2.01) .003
Physical abuse, n (%)	388 (19.4)	1.98 (1.57–2.50) <.001	2.19 (1.64–2.94) <.001
Sexual abuse, n (%)	56 (2.8)	3.24 (1.90–5.54) <.001	2.37 (1.27–4.40) .006
Any type of abuse, n (%)	676 (33.8)	1.68 (1.38–2.06) <.001	1.65 (1.26–2.16) <.001
≥2 types of abuse, n (%)	274 (13.7)	2.10 (1.62–2.73) <.001	2.53 (1.84–3.47) <.001

had a history of emotional abuse, 19.4% physical abuse, 2.8% sexual abuse, 33.8% any type of abuse, and 13.7% polyvictimization (≥2 types of abuse). Regarding the

number of abuse types, 20.1% (n=402) had 1 type, 12.0% (n=241) had 2 types, and 1.7% (n=33) had 3 types of abuse.

Table 2. Multivariate Logistic Regression Models: Association Between Falling and History of Abuse: Bogotá Salud, Bienestar y Envejecimiento Study (N = 2,000)

Characteristic	Odds Ratio (95% Confidence Interval)			
	Model 1	Model 2	Model 3	Model 4
Any falls: ≥1 vs 0				
Age	1.02 (1.01–1.03)	1.02 (1.01–1.03)	1.02 (1.01–1.03)	1.02 (1.01–1.04)
Female	1.25 (1.01–1.53)			1.26 (1.02–1.55)
Psychotropics	1.94 (1.39–2.70)	1.91 (1.37–2.66)	1.88 (1.35–2.62)	1.96 (1.41–2.73)
Depression (GDS score ≥6)			1.27 (1.02–1.59)	
≥3 comorbidities	1.31 (1.02–1.70)	1.32 (1.02–1.71)	1.33 (1.02–1.72)	
Emotional abuse	1.53 (1.23–1.90)			
Physical abuse		1.98 (1.57–2.51)		
Sexual abuse			3.08 (1.78–5.32)	
Any type of abuse				1.72 (1.40–2.11)
Recurrent falls: ≥2 vs 0-1				
Age	1.02 (1.01–1.04)	1.02 (1.01–1.04)	1.02 (1.00–1.04)	1.02 (1.01–1.04)
Psychotropics	2.36 (1.61–2.48)	2.31 (1.57–3.41)	2.35 (1.60–3.45)	2.34 (1.59–3.44)
Depression (GDS score ≥6)	1.46 (1.09–1.96)	1.40 (1.04–1.87)	1.50 (1.12–2.00)	1.43 (1.07–1.91)
≥3 comorbidities	1.42 (1.02–1.98)	1.41 (1.01–1.96)	1.45 (1.05–2.02)	1.40 (1.01–1.94)
Emotional abuse	1.43 (1.07–1.91)			
Physical abuse		2.05 (1.51–2.77)		
Sexual abuse			2.11 (1.12–3.99)	
Any type of abuse				1.54 (1.17–2.04)

Odds ratios adjusted for all other variables in the model.

For any falling: Model 1 adjusted for age, sex, psychotropics, high comorbidity, emotional abuse. Model 2 adjusted for age, psychotropics, high comorbidity, physical abuse. Model 3 adjusted for age, psychotropics, depression, high comorbidity, sexual abuse. Model 4 adjusted for age, sex, psychotropics, any type of abuse.

For recurrent falling: Model 1 adjusted for age, psychotropics, depression, high comorbidity, emotional abuse. Model 2 adjusted for age, psychotropics, depression, high comorbidity, physical abuse. Model 3 adjusted for age, psychotropics, depression, high comorbidity, sexual abuse. Model 4 adjusted for age, psychotropics, depression, high comorbidity, any type of abuse.

GDS = Geriatric Depression Scale.

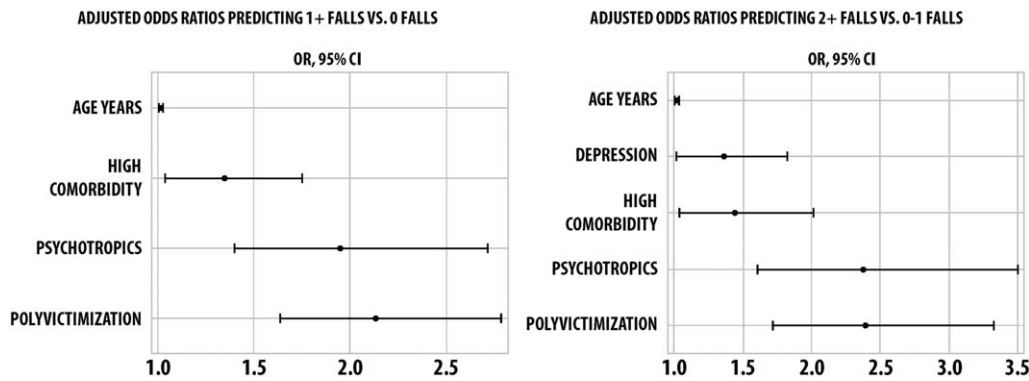


Figure 1. Multivariate logistic regression models examining the relationship between polyvictimization and falls: predictors for (A) any falls, (B) recurrent falls). Each odds ratio (OR) is adjusted for all the other variables in the models from (A) and (B) (e.g., age, high comorbidity). CI= confidence interval.

In bivariate analyses, age, female sex, low education, poor vision, high comorbidity, depression, functional limitations (IADLs), slow walking speed, psychotropic medications, and cognitive impairment were significantly associated with falling (≥ 1 falls, ≥ 2 falls, or both, Table 1).

Multivariate logistic regression analyses related to the association between falling and history of abuse are in Table 2. Only variables found significant were included, with each OR adjusted for all the other variables in the model. Older adults reporting past emotional (OR=1.53, 95% CI=1.23–1.90, $p<.001$), physical (OR=1.98, 95% CI=1.57–2.51, $p<.001$), sexual (OR=3.08, 95% CI=1.78–5.32, $p<.001$), or any (OR=1.72, 95% CI=1.40–2.11, $p<.001$) abuse had higher odds of any falls. Similarly, older adults reporting past emotional (OR 1.43, 95% CI=1.07–1.91, $p=.01$), physical (OR=2.05, 95% CI=1.51–2.77, $p<.001$), sexual (OR=2.11, 95% CI=1.12–3.99, $p=.02$), or any (OR=1.54, 95% CI=1.17–2.04, $p=.002$) abuse had higher odds of recurrent falls.

The unadjusted percentage of study participants falling increased from 24.8% for participants having no abuse to 30.9% with 1 type, 41.1% with 2 types, and 54.6% with 3 types of abuse (Mantel-Haenszel test, chi-square=38.62, $p<.001$). In multivariate models (only variables found significant included), participants with polyvictimization (≥ 2 types of abuse) had higher odds of any falls than those with no history of abuse or 1 type of abuse (OR=2.13, 95% CI=1.64–2.78, $p<.001$). Participants with polyvictimization had higher odds of recurrent falls than those with no history of abuse or 1 type of abuse (OR=2.39, 95% CI=1.72–3.33, $p<.001$) (Figure 1).

DISCUSSION

History of abuse was associated with higher odds of any falls and recurrent falls. Participants with polyvictimization had higher odds of any falls and recurrent falls. These are unique findings; to our knowledge, no prior studies have reported an association between history of emotional or sexual abuse and falls. There are only a few reports on physical abuse potentially related to falling but none on other types of abuse.^{5,21}

A potential explanation for why a history of abuse may be related to falling is that any type of abuse has

been associated with psychological consequences such as symptoms of depression, anxiety, and posttraumatic stress disorder.^{9,13} Past abuse as stressful traumatic events may also have long-term physical health consequences by increasing the allostatic load and neurohormonal dysregulation. These consequences include chronic musculoskeletal pain and cardiovascular disease.^{22,23} It is also possible that abuse is related to other fall risk factors, including unsafe environment, poor nutrition, inadequate physical and emotional support, and poor medical care, which could indirectly be related to falling.⁷ Further research is needed to disentangle these relationships to more clearly identify the independent effects of elder abuse on fall risk.

Although accidents often cause injury in older adults, not all injuries are the result of accidents.⁵ Falls can be related to assaults and violent attacks.²¹ Some people experiencing physical elder abuse may initially be reported in the hospital emergency department to have had an “accidental” fall despite suspicious characteristics such as bruises on the breast, internal injuries, and upper extremity dislocations,^{5,6} but there are limited data supporting these statements. Barriers to data availability include lack of screening for and underreporting of elder abuse. The literature has not previously reported a link between falling and history of other types of abuse.

Our study has important public health implications. For instance, elder abuse needs to be systematically screened for and addressed in the healthcare system. A history of elder abuse should be considered as an additional important factor in the etiology of falls. Falling is a common geriatric syndrome that requires a multidimensional approach and management.

Our study has some limitations. First, the cross-sectional nature of the study did not allow us to determine causality. It is likely that a history of abuse leads to falling, but it is also possible that falling, more likely in a frail older adult, may lead to abuse. Second, this sample is representative only of adults aged 60 and older living in the capital city of Colombia. Third, we do not know when the abuse occurred relative to the fall. Fourth, recall may cause bias. Individuals who have depression may be less likely to recall past traumatic events; it is also possible that people who have been abused are more likely to report events such as falls. Fifth, participants with low

cognition, usually excluded or represented by a proxy, may not recall the events well. These limitations may affect the interpretation or applicability of our results. Nevertheless, this study also has strengths, being the first epidemiological study on the association between different types of abuse (physical, emotional, sexual) and falling. History of abuse has not been included in the list set of risk factors for falling worldwide.¹⁻⁴

History of abuse (emotional, physical, sexual) was strongly associated with falls in elderly adults in Bogota, Colombia. Further research is needed to explain the association between and sequence of events and why people with a history of elder abuse are more likely to fall.

ACKNOWLEDGMENTS

Financial Disclosure: The SABE Bogota study was supported by a grant from the Administrative Department of Science, Technology and Innovation, Colciencias in Colombia, Code 120354531692. Dr. Reyes Ortiz has been supported as a U.S. Fulbright Scholar 2017–2018 (PS00251235).

Conflict of Interest: The authors declared no conflicts of interest with respect to the authorship or publication of this article.

Author Contributions: Study concept and design: Reyes-Ortiz, Ocampo-Chaparro, Holmes. Acquisition of data: Reyes-Ortiz. Data analysis: Reyes-Ortiz. Interpretation of results, substantive edits, and manuscript preparation: all authors.

Sponsor Role: None.

REFERENCES

- Lusardi MM, Fritz S, Middleton A et al. Determining risk of falls in community dwelling older adults: A systematic review and meta-analysis using posttest probability. *J Geriatr Phys Ther* 2017;40:1–36.
- Soriano TA, DeCherrie LV, Thomas DC. Falls in the community-dwelling older adult: A review for primary-care providers. *Clin Interv Aging* 2007;2:545–553.
- Panel on Prevention of Falls in Older Persons, American Geriatrics Society and British Geriatrics Society. Summary of the updated American Geriatrics Society/British Geriatrics Society clinical practice guideline for prevention of falls in older persons. *J Am Geriatr Soc* 2011;59:148–157.
- Sousa LM, Marques-Vieira CM, Caldevilla MN et al. Risk for falls among community-dwelling older people: Systematic literature review. *Rev Gacha Enferm* 2017;37:e55030.
- Ziminski CE, Phillips LR, Woods DL. Raising the index of suspicion for elder abuse: Cognitive impairment, falls, and injury patterns in the emergency department. *Geriatr Nurs* 2012;33:105–112.
- Ziminski CE, Wigglesworth A, Austin R et al. Injury patterns and causal mechanisms of bruising in physical elder abuse. *J Forensic Nurs* 2013;9:84–91.
- Acierno R, Hernandez MA, Amstadter AB et al. Prevalence and correlates of emotional, physical, sexual, and financial abuse and potential neglect in the United States: The National Elder Mistreatment Study. *Am J Public Health* 2010;100:292–297.
- Podnieks E, Thomas C. The consequences of elder abuse. In Dong X, ed. *Elder Abuse: Research, Practice and Policy*. Cham, Switzerland: Springer International Company AG.; 2017:109–123.
- Flores RJ, Campo-Arias A, Stimpson JP et al. The association between past sexual abuse and depression in older adults from Colombia. *J Geriatr Psych Neurol* 2018;31:13–18.
- Cano-Gutiérrez C, Reyes-Ortiz C, Borda, MG et al. Self-reported vaccination in the elderly: SABE Bogotá Study, Colombia. *Colomb Med* 2016;47:25–30.
- Otiniano ME, Herrera CR. Abuse of Hispanic elders. *Tex Med* 1999;95:68–71.
- DeLiema M, Gassoumis ZD, Homeier DC et al. Determining prevalence and correlates of elder abuse using promoters: Low-income immigrant Latinos report high rates of abuse and neglect. *J Am Geriatr Soc* 2012;60:1333–1339.
- Kamiya Y, Timonen V, Kenny RA. The impact of childhood sexual abuse on the mental and physical health, and healthcare utilization of older adults. *Int Psychogeriatr* 2016;28:415–422.
- Reyes-Ortiz CA, Al Snih S, Markides KS. Falls among elderly persons in Latin America and the Caribbean and among elderly Mexican-Americans. *Pan Am J Public Health* 2005;17:362–369.
- Williams JH, Davis M, Acierno R. Global prevalence of elder abuse in the community. In Dong X, ed. *Elder Abuse: Research, Practice and Policy*. Cham, Switzerland: Springer International Company AG.; 2017:45–65.
- Yesavage JA, Brink TL, Rose TL et al. Development and validation of a geriatric depression screening scale: A preliminary report. *J Psychiatr Res* 1982;17:37–49.
- Gómez-Angulo C, Campo-Arias A. Escala de Yesavage para depresión geriátrica (GDS-15 y GDS-5): Estudio de la consistencia interna y estructura factorial. *Univ Psychol* 2011;10:735–743. Available at <http://www.redalyc.org/pdf/647/64722377008.pdf> Accessed October 12, 2017.
- Icaza MG, Albala C. Mini-Mental State Examination (MMSE) del Estudio de la Demencia en Chile: Análisis Estadístico. Serie Investigaciones en Salud Pública. Washington, DC: OPS; 1999. Available at: <http://www.paho.org/spanish/hdp/hdr/serie07composite.pdf> Accessed October 16, 2017.
- Lawton MP, Brody EM. Assessment of older people: Self-maintaining and instrumental activities of daily living. *Gerontologist* 1969;9:179–186.
- Hosmer DW, Lemeshow S. *Applied Logistic Regression*, 2nd Ed. New York: John Wiley & Sons Inc.; 2000.
- Rosen T, Bloemen EM, LoFaso VM et al. Emergency department presentations for injuries in older adults independently known to be victims of elder abuse. *J Emerg Med* 2016;50:518–526.
- McFarlane AC. The long-term costs of traumatic stress: intertwined physical and psychological consequences. *World Psychiatry* 2010;9:3–10.
- D'Andrea W, Sharma R, Zelechowski AD et al. Physical health problems after single trauma exposure: When stress takes root in the body. *J Am Psychiatr Nurses Assoc* 2011;17:378–392.