

Review

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Review

Life Course Exposures Related to Geriatric Syndromes: A Comprehensive Review

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Abstract

During the last decades, there has been a growing interest in and knowledge of the relationship between adverse childhood experiences (ACEs) or stressful life events and health issues in younger and adult populations. However, less is known in older populations. This comprehensive review aimed to summarize studies on the relationship between life course exposures and geriatric syndromes. We searched PubMed for articles published between 2015 and 2026 using specific keywords. We included 84 studies. There is substantial variability in the exposure measures used (e.g., for ACEs, from 1 question to more than 30) and in the outcomes (e.g., different diagnostic criteria for dementia or frailty). Our synthesis showed that ACEs, stressful events and other adversity measures are usually associated with greater probabilities for the occurrence of geriatric syndromes such as dementia, frailty, depression, falls, low muscle strength, multimorbidity, and functional decline. There are also some reports for mediators that may partially explain those associations.

Keywords: geriatric syndromes; older adults; adverse childhood experiences; abuse; maltreatment; discrimination; stressful events; life course

1. Introduction

Geriatric syndromes are a group of diverse health conditions commonly observed in older adults, less frequent in younger adults, and not classified as specific diseases [1,2]. Geriatric syndromes in older people are also considered common, multifactorial health conditions resulting from accumulated impairments across the life course in multiple systems [3,4]. Bernard Isaacs (cited by Morley) [5] was the first to mention the major geriatric syndromes, or 'Giants of Geriatrics', as instability (replaced later as falls), immobility (later equivalent to functional dependence), incontinence (urinary or fecal), and intellectual impairment (named later as cognitive impairment, including dementia and delirium) [1–4]. Then, geriatricians and researchers included other geriatric syndromes such as frailty, sarcopenia, dizziness, syncope, functional decline, low strength, pressure ulcers, depression, polypharmacy, and multimorbidity [6–9].

Our central hypothesis for this comprehensive review is that multilevel life-course exposures (e.g., at the individual, family, and various environmental levels) during prenatal, childhood, youth, or early adulthood, as well as during late adulthood or old age, may determine the long-term development of geriatric syndromes in older adults. Our hypothesis is based, in part, on combining the life course approach and the social-ecological model, both of which are very useful in public health [10]. These exposures include traumatic or stressful life events, adverse childhood experiences (ACEs, e.g., abuse, household dysfunction), deprivation (e.g., parental neglect), or adversity in social determinants of health (e.g., poverty, poor health status, hunger) [11,12]. Many studies have focused on youth or adulthood [13–15], but fewer have examined the consequences of lifetime exposures for middle-aged or older people [16,17]. Potential risk exposures include traumatic events (e.g., early parental death), chronic stress (e.g., domestic violence), neighborhood environment (e.g., unsafe),

socioeconomic adversity, isolation, bullying, and discrimination [11–17]. This comprehensive review aimed to summarize studies on the relationship between life course exposures and geriatric syndromes.

2. Materials and Methods

We performed the search in PubMed/Medline and limited it to papers reporting in English. Since the scope of our review was to report contemporary trends, we searched between January 2015 and January 2026. The principal words we searched are as follows: “(Geriatric Syndrome) OR (Cognitive decline) OR (Cognitive impairment) OR (Dementia) OR (Frailty) OR (Falls) OR (Sarcopenia) OR (Muscle strength) OR (Functional decline) OR (Functional limitations) OR (Delirium) OR (Depression) OR (Multimorbidity)” AND “(Adverse Childhood Experiences) OR (Childhood Adversity) OR (Early Adversity) OR (Early Life Stress) OR (Violence) OR (Stressful Events) OR (Maltreatment) OR (Abuse) OR (Discrimination) OR (Traumatic Events) OR (Neighborhood Deprivation) “.

Inclusion criteria were 1) studies that included original research and 2) articles reporting at least one outcome of interest (a geriatric syndrome) with specific exposures related to ACEs, stressful or traumatic life events, adversity, abuse, deprivation, discrimination, or similar during the life span (the whole period or parts from prenatal to old age). We also searched systematic reviews and the reference lists of the initially included studies, and manually reviewed them to identify other potentially relevant publications. We excluded non-original studies, abstract-only publications, duplicates, articles including adults but not older adults, and articles in languages other than English. We also excluded studies that only assessed adverse events in adulthood or health outcomes in children.

3. Results

We included 84 studies, summarized in 8 tables. Each table includes columns with 1-first author last name with year of publication and country; 2- study design and population; 3-exposures; 4-geriatric syndromes or other outcomes; 5- main outcome’s findings; and 6- additional comments.

3.1. Dementia or Cognitive Impairment

Twenty-one studies on dementia or cognitive impairment published from 2018 to 2025 are in Table 1 [18–38]. Early life stress was associated with increased risk for dementia and poorer global cognition [18,21]. Early parental (mother or father or both) deaths were associated with increased odds for dementia [19] and lower cognitive function [22,25]. Poor childhood health was associated with lower cognitive function [22]. Childhood maltreatment was associated with dementia [24]. Documented abuse and neglect were associated with cognitive impairment [34]. A greater number of ACEs was associated with worse cognition [25,26,33], increased risk for dementia [20,27,32,38], and subjective cognitive decline [29]. Psychosocial stressors (e.g., financial strain, neighborhood disadvantage, poor socioeconomic status [SES]) were associated with dementia and cognitive impairment [35–37]. Women with lifetime post-traumatic stress disorder (PTSD) and re-experiencing symptoms for PTSD had higher odds for low global cognition; however, men had lower odds for low global cognition [23]. Life course exposure to traumatic events was associated with cognitive decline [28,31] and increased risk for dementia [30].

Table 1. Studies related to Dementia or Cognitive Impairment .

Authors	Design, population	Exposures	Geriatric Syndrome s or other Outcomes	Main outcome’s findings	Additional comments
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Donley, 2018, Finland	Longitudinal cohort, 2,682 men aged ≥ 42 ; KIHHD	Childhood stress (interviews 1984 & 1989) included living in custody or an orphanage, experience of crisis in childhood, having problems with teachers and emigrating because of war	Incident cases of dementia, including AD, were obtained through 2014 via national health register linkages	Childhood stress was associated with increased risk of dementia (HR=1.93 95% CI 1.14–3.25).
Condesala, 2020, Spain	Case-control study 65, 997 participants aged ≥ 50 ; SHARE	Parental death (mother or father or both) at the age of ≤ 16 years (childhood & adolescence)	Diagnosis of dementia by a doctor	Early parental death associated with increased odds of dementia (OR=1.50 95% CI 1.31-1.72).
Tani, 2020, Japan	Longitudinal (3-yr follow-up), 17,412 participants aged ≥ 65 ; JAGES	ACEs 7 questions, before the age of 18 (parental loss or parental divorce), family psychopathology (parental mental illness or family violence), and abuse and neglect (physical abuse, psychological neglect, or psychological abuse).	Dementia was defined as level II or higher on the dementia scale (it corresponds to a 16-point rating on the Mini-Mental State Examination)	Participants who experienced ≥ 3 ACEs (vs. 0) had a greater risk of developing dementia (HR= 1.78 95% CI 1.15-2.75; $p=.009$)
Grainger, 2020, Australia	Cohort study, 484 older adults (mean age 83.4 SD=4.3); Sydney MAS	Early-life stress (ELS), using the short form of the Childhood Trauma Questionnaire, including 28 items and assesses 5 traumatic experiences: physical abuse, physical neglect, sexual abuse, emotional abuse, emotional neglect.	Global cognitive function measured by 10 neuropsychological tests with domains: attention/processing speed, memory, language, visuospatial reasoning, and executive functioning. (standardized z-scores)	Global cognition was poorer in those who had experienced physical neglect (mean - .48 SD=1.04) relative to those who had not (mean - .14 SD=1.08; $p<.05$).
Yang, 2020, China	Longitudinal, 16,258 participants aged ≥ 45 ; CHARLS	Early-life conditions (ELCs): early parental death, childhood SES, food deprivation, and childhood health	Cognitive function was assessed using episodic memory (immediate & delayed recall) & mental intactness (serial subtractions, date, day of week, redraw a picture)	Early maternal death was associated with lower cognitive function among middle- and old-aged Chinese adults (β range between - 0.44 & -0.35, $p<0.05$). Less healthy participants during

				childhood had lower cognitive performance than those who had enjoyed good health (β range between -0.36 and -0.14, $p < 0.05$).
Nilawee Longitudinal (14 years), 1,700 participants aged ≥ 65 , PTSD ESPRIT study cohort	Lifetime and current post-traumatic stress disorder (PTSD) diagnoses were assessed using the Watson's PTSD Inventory	Cognitive tests assessed global cognition, visual memory, verbal fluency, psychomotor speed and executive function. Incident dementia (Dx DSM-IV criteria)	Men with lifetime PTSD or without re-experiencing symptoms had lower odds for low global cognition (OR=0.61 95% CI 0.42-0.88; and OR=0.57 95% CI 0.38-0.84, respectively). Women with re-experiencing symptoms had higher odds for low global cognition (OR=1.46 95% CI 1.03-2.09)	Women without re-experiencing symptoms had lower risk for dementia (HR=0.49 95% CI 0.29-0.80)
Macpherson, 2021, UK	Retrospective cohort study (CM) included physical abuse, physical neglect, emotional abuse, emotional neglect, and sexual abuse	Childhood maltreatment diagnosis – AD-8: The Washington University Dementia Screening Test	Incident dementia	CM was associated with dementia (HR = 1.32, 95% CI 1.02–1.71)
Gold, 2021, USA	Cohort study (KHANDL E) participants aged ≥ 65 ; Domestic violence; family member substance abuse or serious illness, parent loss of a job; parent was at jail, death of mother or father.	ACEs (score 0-9) before age 16: parents divorced; parents remarried.	Spanish and English Neuropsychological Assessment Scales (SENAS) including Verbal episodic memory, semantic memory and executive function	ACEs associated with worse cognition: parent remarried ($\beta = -0.11$ 95% CI -0.20 to -0.03); death of mother ($\beta = -0.18$ 95% CI -0.30 to -0.07); and death of a father ($\beta = -0.11$ 95% CI -0.20 to -0.01)
Lin, 2022, China	Prospective cohort, 6,466 participants mean age 57.2 (SD=8.3); CHARLS	ACEs 10 types, 5 threat-related adversities (i.e., physical abuse, household substance abuse, domestic violence, unsafe neighborhood, bullying) and 5 deprivation-	Episodic memory (immediate & delayed recall (score 0-10). Executive function (orientation, calculation & visuospatial ability	Participants with ≥ 2 childhood deprivations had faster cognitive decline in all cognitive tests ($\beta = -0.035$ [95% CI -0.050 to -0.019])

		related adversities (i.e., emotional neglect, household mental illness or someone incarcerated, parental divorce or death)	(score 0-11). Global cognition (total score 0-21)	SD/y for global cognition; $\beta=-0.047$ [95% CI -0.068 to -0.025] SD/y for episodic memory; $\beta=-0.019$ [95% CI -0.034 to -0.004] SD/y for executive function)
Nilawee Longitudinal Cohort, 2022, France	25-item questionnaire to assess ACEs, using a modified version of the Childhood Trauma Questionnaire	participants aged ≥ 65 , ESPRIT study cohort	Cognitive tests assessed global cognition, visual memory, verbal fluency, psychomotor speed (PS) and executive function. Incident dementia (Dx DSM-IV criteria)	At baseline, women having ≥ 5 ACEs (vs. 0-2) had poor psychomotor speed (OR= 1.52 95% CI 1.07-2.17). Also, participants with 3-4 ACEs (vs. 0-2) had worse verbal fluency (OR= 1.34 95% CI 1.00-1.78). Early abuse/maltreatment & poverty/financial difficulties were associated with worse PS.
Stebbins Longitudinal Cohort, 2022, USA	Life course (ever have or been) traumatic events (TEs), e.g., child ever died? ever been in a major fire, flood, earthquake, or other natural disaster? ever have a life-threatening illness or accident? Before age 18: did your parents drink or use drugs? ever physically abused by parents?	participants aged ≥ 65 ; HRS	Telephone Interview for Cognitive Status (HRS-TICS)	≥ 1 TEs over the life course was associated with accelerated cognitive decline ($\beta=-0.05$ 95% CI: -0.07 , -0.02) HRS-TICS units/year; 1 vs. 0 events) compared to experiencing no events.
Voyer, 2023, USA	Eleven questions for ACEs were converted to a summed ACEs score. As binary variable was used ≥ 2 ACEs vs. 0-1.	2020 BRFSS	Subjective cognitive decline (SCD): had confusion or memory loss more often or is getting worse in the past 12 months	Having ≥ 2 ACEs (vs. 0-1) increased the odds of SCD (OR= 1.69 95% CI 1.36-2.10).
Nilawee Longitudinal Cohort, 2023, Australia	Ten adverse life events related to interpersonal relationships (e.g. death of a spouse), finances (e.g. major money problems) and external problems)	participants aged ≥ 70 ; ASPREE &	Cognitive tests assessed global cognition, episodic memory, delayed recall, executive function, and psychomotor speed.	Experiencing death of a spouse/partner (HR=1.72 95% CI 1.17-2.52) and major financial problems (HR=1.53 95% CI 1.05-2.23) were associated with incident dementia. Women with some events (e.g. close family or friends lost their job/retired)

	ALSOP studies	factors (e.g. major accident or disaster).	Incident cognitive decline: those whose cognitive score dropped by >1.5 SD. Diagnosis of dementia - DSM-IV criteria.	associated with increased risk of dementia. Experiencing financial problems was associated with increased risk cognitive decline in men (HR=1.43 95% CI 1.10-1.86).	had low risk of dementia (HR=0.62 95% CI 0.40-0.95).
Zuelsdo rff, 2024, USA	Longitudinal cohort, 13,952 participants aged ≥ 55 ; old HRS	Childhood traumatic events (CT): 4 items about childhood (e.g., were you ever physically abused by parents?). 7 events at any age (e.g., Were you the victim of a serious physical attack or assault in your life?) and, if yes, the year that occurred. CT index (0-11).	27-item adapted Telephone Interview on Cognitive Status (TICS)	In White participants only (n=11,607), greater childhood trauma exposure predicted worse baseline cognition (global cognition, immediate recall & delay recall) but slower change over time (global cognition & immediate recall).	
Hu, 2024, UK	Longitudinal cohort, mean age 55.9 (7.7) at baseline; UK Biobank (n=150,152)	Childhood adversity (CA) (abuse or neglect; childhood trauma screen, 0-5)	Dementia (ICD-10 diagnosis)	Individuals with any CA had a greater risk for dementia (OR=1.30, 95% CI 1.13-1.50) compared with those who did not experience CA	Depression, smoking, low grip strength & biomarkers were mediators.
Wang, 2025, China	Longitudinal, 6,178 participant s aged ≥ 60 ; CHARLS	13 childhood adversities (before age 17), e.g., parental death, anxiety, depression, mental illness, disability, drug abuse, alcohol abuse, or involvement in criminal activities; a bedridden parent, lack of affection, neglect, physical abuse, domestic violence	Cognitive function evaluation comprises of an episodic memory test (immediate & delayed recall) and an attention test (total score 0-25)	Multiple childhood adversities were associated with lower cognitive function ($\beta = -0.36$, 95% CI [-0.58, -0.14]). Participants having rapid cognitive decline with moderate physical-mental deterioration, experiencing 2 childhood adversities predicted lower cognitive function ($\beta = -0.88$, 95% CI [-1.62, -0.14]).	

Assuras, 2025, USA	Prospective cohort, n=908 (matched control group, n=667); New York	Documented physical, sexual abuse or neglect; 5 interviews from mean age 29.2 to 59.4	Comprehensive neuropsychological assessment battery (12 tests). Cognitive impairment with no dementia (CIND) or dementia	Maltreated individuals in both age groups were at increased risk for CIND [older (> age 59, OR=2.08 95% CI 1.52–2.86) and younger (< age 59, OR=1.63 95% CI 1.11–2.40)], compared to controls	Any maltreatment was associated with amnestic or non-amnestic CIND
Choi, 2025, USA	Cohort of 8,678 dementia-free participants aged ≥ 60 and <90 at baseline with data on APOE genotype; HRS	Retrospective early life conditions (deficits in financial, social, and human capital, as well as poor childhood health)	Dementia incidence (Langa–Weir Classification of Cognitive Function)	Low social capital (cause-specific HR=1.24 95% CI 1.06–1.45), low human capital (HR=1.46, 95% CI 1.29–1.66), and any health conditions (HR=1.12 95% CI 1.01–1.25) were also associated with greater risk of dementia.	
Li, 2025, UK	Cohort of 10,893 participants aged ≥ 50 at baseline; ELSA	Psychosocial stressors (financial strain, caregiving, disability & limiting long-term illness)	Cognitive function: an overall global cognition score and domains scores (memory, executive function & orientation)	Multiple stressors were associated with steeper declines in global cognition (B= -0.34, 95% CI [-0.45, -0.23], $p < .001$), memory (B= -0.12, 95% CI [-0.16, -0.07], $p < .001$), and executive function (B= -0.20, 95% CI [-0.29, -0.11], $p < .001$).	
Lian, 2025, Puerto Rico	Longitudinal cohort of 3,713 participants aged ≥ 60 ; PREHCO	Childhood adversity, 13 items (e.g., household SES, indicators of health status during early childhood and adolescence, neighborhood characteristics)	Mini-mental Cabán (MMC) (score 0-20) for global cognition. Cognitive impairment was defined as MMC scores 1.5 SD or more below the expected score at baseline	At baseline, parental illiteracy ($\beta = -0.35$, $p < .001$), neighborhood disadvantage ($\beta = -0.27$, $p < .001$), economic hardship ($\beta = -0.10$, $p = .003$) and childhood illness ($\beta = -0.21$, $p < .001$) were associated with MMC scores. Neighborhood disadvantage was	Depression and self-rated health were mediators

			associated with incident cognitive impairment (OR=1.19 95% CI 1.06-1.34, p= .003).	
Liu, 2025, USA	Longitudinal cohort of 51,327 participants aged ≥50; events HRS	Dementia was evaluated using the modified Telephone Interview for Cognitive Status (TICS-m)	ACEs were associated with increased risk of dementia (HR= 1.08 95% CI 1.02-1.16)	The association of ACEs and dementia was fully mediated by early-life stage cognitive reserve enhancing factor and partially mediated by adulthood enhancing factor

Only significant ($p < .05$) multivariate results are reported in the table. OR=odds ratios; HR=hazard ratios; RRR=relative risk ratio; B= unstandardized beta estimated; CI=confidence intervals; SD= standard deviation; ACEs=Adverse Childhood Experiences; AD=Alzheimer's Disease. KIH= Kuopio Ischemic Heart Disease Risk Factor; SHARE= Survey of Health, Ageing, and Retirement in Europe; JAGES= Japan Gerontological Evaluation Study; Sydney MAS= Sydney Memory and Ageing Study; CHARLS= China Health and Retirement Longitudinal Study; ESPRIT= "Enquete de Sante' Psychologique- Risques, Incidence et Traitement". KHANDLE=Kaiser Healthy Aging and Diverse Life Experiences; ASPREE= ASPIrin in Reducing Events in the Elderly study; ALSOP= ASPREE Longitudinal Study of Older Persons sub-study; HRS= US Health and Retirement Study; BRFSS=Behavioral Risk Factor Surveillance System; ELSA= English Longitudinal Study of Ageing; PREHCO= Puerto Rican Elder: Health Conditions.

3.2. Frailty

Fifteen studies on frailty published from 2018 to 2025 are in Table 2 [39–53]. In two Finnish studies, exposure to early-life stress, represented by wartime parental separation, was associated with increased frailty (measured by Fried's criteria phenotype) among older men in a case-control study [39] and among women from midlife into old age in a longitudinal study [46]. Exposure to childhood starvation, food deprivation, or hunger [42,43,48] was associated with frailty (measured by the Frailty Index or the FRAIL Scale) among Chinese older adults. Lifetime exposure (fetal or school-age) to famine was associated with frailty (Frailty index) in Chinese older adults [53]. Childhood adversity (abuse or neglect) was associated with frailty (Frailty Index) among adults aged 40-69 in the United Kingdom, and unhealthy lifestyle was a mediator [52]. Life course physical abuse (childhood) and psychological violence (by their intimate partner) were associated with frailty in older adults in a multinational study [40]. Lifetime neighborhood social deprivation was associated with frailty (Frailty index) in older adults residing in Scotland, United Kingdom [44]. By contrast, better childhood neighborhood quality and better childhood health status were associated with a lower risk of frailty in older age [42]. In three longitudinal studies, ACEs were associated with frailty (Frailty Index) among middle-aged and older adults [49–51]. In a Canadian cross-sectional study, ACEs were associated with frailty (Frailty Index) among older adults [47]. In a European longitudinal study, ACEs and adverse childhood health experiences were associated with frailty (Fried's phenotype)

among middle-aged and older adults [41]. In a Chinese longitudinal study, ACEs were associated with greater frailty [45]. In comparison, better self-rated childhood health and health care were associated with less frailty among middle-aged and older adults [45].

Table 2. Studies related to Frailty.

Authors	Design, population	Exposures	Geriatric Syndrome s or other Outcomes	Main outcome's findings	Additional comments
Haapanen, 2018; Finland	Cases (n=117); separated age 72.8 SD=2.6)- controls (n=855 non-separated 70.5 SD=2.5); HBCS	Early life stress (Wartime parental separation- World War II)	Frailty at a mean age of 71 years (Fried's criteria: weight loss, low p. activity, exhaustion, weakness and slowness between 2011 and 2013)	Compared to the non-separated men who had been separated had an increased frailty (RRR= 5.18 95% CI 1.16- 23.17 p=0.031).	No associations were observed among women
dos Santos Gomes, 2018, Albania, Brazil, Canada, Colombia	Cross-sectional participant s aged 65-74; IMIAS	Physical abuse during the first 15 years of life. Adulthood domestic physical and psychological violence by family and intimate partners was assessed by the Hurt, Insult, Threaten and Scream (HITS) scale.	Frailty (Fried's phenotype)	Childhood physical abuse (OR=1.68; 95% CI 1.01-2.78) and psychological violence by their intimate partner (OR= 2.07 95% CI 1.37-3.12) were associated with frailty.	
Van Der Linden, 2020; Switzerland and	Longitudinal cohort 23,358 participant s aged ≥50; SHARE	ACEs score 0-7: e.g., child in foster care, parental (death, mental illness, or drinking abuse), period of hunger, and property taken away (≥1 vs. 0). Adverse childhood health experiences (ACHE) e.g., serious health conditions, long hospitalization, (≥1 vs. 0)	Frailty (Fried's phenotype): weakness, shrinking, exhaustion, slowness, or low activity.	Participants having at least one ACE (OR=1.30 95% CI 1.14–1.48 p< .001) or one ACHE (OR=1.40 95% CI 1.24–1.57 p< .001) had increased odds for frailty.	
Li, 2020; China	Longitudinal cohort 6,806 participant s aged ≥60; CHARLS	Early life risk factors (childhood or adolescence): starvation, domestic violence, neighborhood quality [0 (lowest) to 4 (highest)], childhood health status (e.g. healthier vs. same as others)	Frailty: slowness, weakness, exhaustion, inactivity and weight loss (robust, pre-frail, frail)	Better childhood neighborhood quality (e.g., 4 vs. 0, OR= 0.28 95% CI 0.15-0.52) and better childhood health status (OR=0.74 95% CI 0.57-0.96) had lower risk of being frail. Childhood severe starvation	

				was associated with higher risk of prefrailty (OR=1.30 95% CI 1.04-1.62)
Ye, 2021; China	Longitudinal cohort 11,615 individuals aged ≥ 45 ; CHARLS	Childhood food deprivation (CFD): not enough food to eat before age 12, or born & affected areas and in famine periods in China.	FRAIL scale as a sum of fatigue, resistance, ambulation, illness, and loss of weight (robust, pre-frail, frail)	CFD was associated with frailty at old age (OR=1.30 95% CI 1.26–1.36). Those with extreme CFD (vs. mild CFD) had increased risks of frailty (OR=1.34 95% CI 1.26–1.43).
Baranyi, 2022, UK	Longitudinal cohort, 363 participants, mean age 69.3 (SD=0.74); LBC1936	Neighborhood social deprivation (NSD): population density, overcrowding, infant mortality, household renting; male unemployment, overcrowding, car ownership, and social class. During childhood, young adulthood, late adulthood	Frailty Index (FI) 30 deficits covering physical, psychological, and cognitive systems	Among males, greater accumulated NSD was associated with higher FI at baseline (B= 0.017, 95% CI 0.005, 0.029). Among females, in late adulthood, higher NSD was associated with widening frailty trajectories (B= 0.005, 95% CI 0.0004, 0.009).
Yan, 2022, China	Longitudinal cohort 10,963 participants aged ≥ 45 ; CHARLS	ACEs (before age 17) with 17 indicators criteria; including abuse and neglect, death, illness/disability, living environment outside the home -score 0 to 1, with greater values indicating severe ACEs), childhood SES, and childhood health and health care	Frailty Index (32 deficits in six domains were chosen to construct FI, score 0 to 1)	ACEs, childhood SES, and indicators of childhood health and health care were associated with baseline & change rate of FI. ACEs (B= 0.018 [SE=0.004], $p < 0.001$), self-rated childhood SES ($-0.001 [0.000]$, $p < 0.01$), and objective health & health care ($-0.002 [0.001]$, $p < 0.05$) were significantly associated with the slope (latent growth curve, FI trajectory).
Haapanen, 2022, Finland	Longitudinal cohort 2,000 participants aged 57-84 years (3	Early life stress (Wartime parental separation- World War II)	Frailty Index (FI) assessed at a mean age of 57 years (Fried's criteria).	Women separated from their parents during War had steeper increase in FI levels percentage point differences of No associations were observed among men

		waves over 17 years); HBCS		change per year from midlife to old age (B=0.211 95% CI 0.009, 0.414; p=0.041)
Mian, 2022, Canada	Cross-sectional, 23,354 people aged 45–85 years; CLSA	ACEs (8-item) (3 abuse types; neglect; parental divorce, mental illness or death; intimate partner violence)	Frailty Index (76-item FI) (based on Rockwood & Mitnitski)	ACEs was associated with FI (≥ 3 ACEs vs. 0, B=0.04 [95% CI 0.037, 0.044])
Gao, 2022, China	Cross-sectional, 7,342 participant s aged ≥ 65 ; CLHLS	Childhood hunger (CH) “Did you often go to bed hungry as a child?” “yes” or “no.”	Frailty Index (FI) using 44 health deficits, including daily life events, chronic illness, and psychological functioning	Childhood hunger was associated with frailty among participants 65–79 years (OR=1.21 95% CI 1.03–1.43), CH at aged ≥ 80 years had lower odds of frailty (OR=0.80 95% CI 0.65–0.98).
Wang, 2022, China	Longitudinal, 11,568 participant s aged ≥ 45 ; CHARLS	ACEs covering childhood intrafamilial aggression, family dynamics, SE deprivation, loss or threat of loss within the family, and neighborhood quality (score 0-18)	Frailty Index (FI) using 41 measures. Robust, prefrail, and frail, with its trajectories classified as stable at robust and prefrail and rapidly rising to frail.	An increased number of ACEs was associated with a frail status (OR=1.20 95% CI 1.16-1.23) and being in the rapidly rising trajectory (OR=1.19 95% CI 1.16-1.23).
Dimitria dis, 2023, Netherlands	Baseline (n=2,176) aged 58-89, longitudinal 17-yr follow-up (n=1,427); LASA	ACEs: War experiences, a parent death, excessive alcohol use of a relative, sexual abuse, severe problems at home, parents’ poverty, physical illness of respondent	LASA-FI (score 0.0 to 0.7; Frailty is defined as an FI ≥ 0.25)	ACE and frailty were associated at baseline (OR=1.88 95% CI 1.46–2.42; p<.001) and at follow-up (HR=1.28 95% CI 1.01–1.64; p=0.044)
Wang, 2023, China	Longitudinal 43,928 participant s from Europe (aged ≥ 50) and China (aged ≥ 45); SHARE and CHARLS	ACEs covering childhood intrafamilial aggression, family dynamics, SE deprivation, loss or threat of loss within the family, and neighborhood quality (score 0-18)	Frailty Index (FI) using 35 attributes (score 0 to 1). Robust (FI ≤ 0.10), prefrail (FI > 0.10 & < 0.25), and frail (FI ≥ 0.25). Trajectories: stable at robust and prefrail, rapidly increasing to frail.	ACEs >3 (vs. ≤ 1) was associated with a frail status for men (OR=1.69 95% CI 1.36-2.09) and women (OR=2.38 95% CI 1.93-2.94). ACEs >3 (vs. ≤ 1) was associated with FI trajectory of rapidly rising to frail for men (OR=1.70 95% CI 1.24-2.34) and women (OR=2.12 95% CI 1.70-2.63).

Yang, 2024, UK	Cross-sectional, 152,914 adults aged 40–69; from the UK Biobank	Childhood adversity 5-item: physical neglect, emotional neglect, sexual abuse, physical abuse, and emotional abuse	Frailty index (FI) using 49 items covering sensory, cranial, mental well-being, infirmity, cardiometabolic, musculoskeletal, immunological, cancer, pain, and gastrointestinal. A frailty score (0 to 1)	Childhood adversity was associated with frailty (OR=1.38 95% CI 1.36-1.40; p<.001)	Unhealthy lifestyle score (0–5; based on BMI, smoking, alcohol, activity, and diet) was a mediator
Xian, 2025, China	Cross-sectional (2017–2018), 4,473 participant s with mean age 60.0 ± 5.4; CHARLS	Famine fetal exposed (1959–1962), preschool exposed (1954–1957), and school-aged (1950–1953), compared to the non-exposed group (1964–1967).	Frailty index (FI) based on 32 items for disability, comorbidity, physical functioning, cognitive impairment, and depressive symptoms. Robustness (FI ≤0.10), prefrailty (FI >0.10 & <0.25), and frailty (FI ≥0.25)	There was a significant increase in the probability of frailty compared to the non-exposed group in fetal school-age (OR=2.84 95% CI 1.73-4.65) and exposed groups. (OR=2.81 95% CI 1.73-4.57)	

Only significant ($p < .05$) multivariate results are reported in the table. OR=odds ratios; RRR=relative risk ratio; B= unstandardized beta estimated; SE= standard error; CI=confidence intervals; SD= standard deviation; BMI=body mass index; ACEs=Adverse Childhood Experiences. HBCS=Helsinki Birth Cohort Study; IMIAS= International Mobility in Aging Study; SHARE= Survey of Health, Ageing, and Retirement in Europe; CHARLS= China Health and Retirement Longitudinal Study; LBC1936=Lothian Birth Cohort 1936; CLSA=Canadian Longitudinal Study on Aging; CLHLS =Chinese Longitudinal Healthy Longevity Survey; LASA= Longitudinal Aging Study Amsterdam.

3.3. Depression

Fourteen studies on depression published from 2015 to 2026 are in Table 3 [54–67]. In two studies, childhood forced sexual intercourse [54] or ever being a victim of sexual abuse (along with being displaced by violence) [56] were associated with later life depression. In two studies, having poor or moderate perceived social support [55] and poor childhood friendship experiences [66] were associated with high depressive symptoms among older adults. In one study, childhood traumatic events and their severe impact on the current lives of Chinese older adults were associated with depressive symptoms score, and resilience mediated that relationship [60]. In older adults from England [57] Japan [58], China [59,61,63,65,67], the United States [62], and Korea [64], a higher number of ACEs was associated with depressive symptoms. In one English longitudinal study, greater ACEs exposure was associated with depressive symptoms and CRP (inflammation marker) levels was a mediator [57]. In a Chinese longitudinal study, in addition to ACEs, adverse adult experiences (AAEs) like prolonged bed rest or lifetime discrimination were associated with depressive symptoms [63]. In some studies, other mediators between ACEs and depression were adult SES [58], arthritis [61,63], digestive or respiratory diseases [61], sleep duration [59,65], and other chronic diseases [65].

Table 3. Studies related to Depression.

Authors	Design, population	Exposures	Geriatric Syndrome s or other Outcomes	Main outcome's findings	Additional comments
Ege, 2015, USA	Cross-sectional, 8,051 participant s aged ≥ 60 ; 2010 BRFSS data	ACEs: parents being physically abusive to each other, being physically harmed by a parent, being sworn at by the parent, being touched sexually by an adult, being forced to sexually touch an adult, and being forced into a sexual encounter	Depressive symptoms 8-item the Patient Health Questionnaire (PHQ). Depression a score of ≥ 10 .	A single occurrence of being forced sexual intercourse was associated with late-life depression (OR=2.92 95% CI 1.06-8.02). Repeated physical abuse and repeated forced sexual intercourse were also associated with depression (OR=2.94 95% CI 1.68-5.13; OR=3.66 95% CI 1.01-13.2, respectively).	
Cheong, 2017; Ireland	Cross-sectional, 2047 participant s aged 50–69; Livinghealth 9–11 h Clinic Mitchelstown (Ireland) 2010–2011 cohort	ACEs (0-10), three domains: abuse, neglect, household dysfunction. Perceived social support (Oslo Social Support Scale), scores 3-8 (poor, 9-11 (moderate) and 12-14 (strong)	CES-D scale (0-60) ≥ 16 was defined as having depressive symptoms	Among individuals reporting poor perceived social support (PSS), having any ACE (vs 0) was associated with depressive symptoms (OR=2.85 95% CI 1.64- 4.95). Among those reporting moderate PSS, the odds were OR=2.21 95% CI 1.52-3.22	
Flores, 2018, USA	Cross-sectional, 2,000 participant s aged ≥ 60 ; SABE Bogota	History of sexual abuse (ever being a victim)	Using the GDS (score 0-15), depression was defined as score ≥ 6	Higher odds of depression for past sexual abuse (OR=3.91 95% CI 2.13-7.16)	Being displaced by violence was also associated with depression
Iob, 2020; England	Longitudinal, 4,382 participant s aged ≥ 50 ; ELSA	ACEs before age 16, with 4 dimensions: threat (e.g., abuse), household dysfunction (e.g., parent mental illness or substance abuse), low parental bonding (maternal and paternal), and loss experiences (e.g., parent death, or foster care).	Depressive symptoms were assessed using the 8-item Centre for Epidemiological Studies Depression scale (CESD-8) (score 0-8)	Greater ACEs cumulative exposure was associated with higher depressive symptoms at baseline ($\beta=0.149$ 95% CI 0.115–0.183) and with their increase over time	Higher baseline CRP levels mediated ACEs cumulative exposure on the baseline value and change in depressive symptoms.

				($\beta=0.355$ 95% CI 0.184–0.526).	
Yazawa, 2022; Japan	Cohort, 7,271 participant s aged ≥ 65 ; JAGES	ACEs, having ≥ 2 experiences: parental loss, parental divorce, parental mental illness, domestic violence, physical abuse, psychological neglect or abuse, & economic disadvantage	Depressive symptoms were assessed using the GDS-15. Score 0-15; or ≥ 5 mild-to-severe depressive symptoms	ACEs was associated with greater depressive symptoms after adjusting for low adult SES (B= 0.41 95% CI 0.25–0.57).	Adult SES was a mediator
Guo, 2023; China	Cross- sectional, 11,452 participant s aged ≥ 45 , CHARLS	ACEs 12 items that occurred before the age of 17 years (score 0-12)	Depressive symptoms were measured by the CESD-10 (Epidemiologic Studies Depression Scale) (score 0-30). Cut-off point of 10 for clinically significant levels	Having ≥ 4 ACEs (vs. 0) was associated with depressive symptoms OR=3.38 95% CI 2.92–3.90)	Short sleep duration was a mediator
Li, 2023; China	Cross- sectional, 1,091 participant s aged ≥ 60 , in Jinan, China.	Childhood traumatic events as the number of traumatic events (0-15) before age 18. Their impact on their lives (0=not at all to 4=very hard; total score 0-60 points for childhood trauma severity [CTS]).	Depressive symptoms were assessed using the GDS-15 (Score 0-15)	Childhood traumatic events ($\beta=0.131$ (SE=0.041) 95% CI= 0.048-0.209, p=0.003), childhood trauma severity ($\beta=0.109$ (SE=0.033) 95% CI= 0.043-0.171, p=0.002).	Resilience mediated the relationship between CTS and depressive symptoms
Dai, 2024; China	Longitudinal; 6,921 participant s aged ≥ 45 ; CHARLS	ACEs (10- item) (e.g., physical abuse) and 5 deprivations (e.g., emotional neglect).	5 threats Depressive symptoms (CES-D- 10 scale) trajectory	Compared to individuals without ACEs, those with ≥ 4 ACEs had a significantly higher odds of following the continuing-high trajectory (OR=20.22 95% CI 12.11–33.74), rather than the continuing-low trajectory	Mediators were arthritis, digestive, and respiratory diseases
Babatunde, 2024; USA	Cross- sectional, 60,122 participant s aged ≥ 60 ; 2020 BRFSS	ACE score (0, 1, 2-3, & ≥ 4) included exposure to eight types of ACEs before age 18	Self-reported history of depression (health professional diagnosis)	Experiencing ≥ 4 ACEs (vs. 0) had higher odds for depression among Whites (OR=3.83 95% CI 3.07-4.79), Blacks (OR=3.39 95% CI 1.71-6.71), and Hispanics (OR=12.61 95% CI 4.75-33.43).	

Jiang, 2025; China	Longitudinal, 3,941 participants aged ≥ 45 ; CHARLS	ACEs 10 items before the age of 18 (e.g., parental divorce, childhood hunger). Five items for Adverse Adult Experiences (AAEs) (e.g., death of a child, lifetime discrimination)	Depressive symptoms (DS) were assessed using the 10-item Center for Epidemiologic Studies Depression Scale (CES-D 10) (score 0-30). A cutoff score >10 indicated probable depression	Six ACEs were associated with DS [e.g., childhood hunger (OR=1.23 95% CI 1.03–1.47), dangerous growth environments (OR=1.34 95% CI 1.09–1.65)] & 2 AAEs like prolonged bed rest (OR=1.39 95% CI 1.08–1.79), & lifetime discrimination (OR=1.37 95% CI 1.12–1.66)	Arthritis or rheumatism was a partial mediator
Rhee, 2025; USA	Cross-sectional, 315 Americans residing in affordable senior housing.	ACEs 10 items before the age of 18, such as Korean maltreatment (e.g., neglect, physical, verbal, or sexual abuse) and household dysfunction (e.g., parental separation/incarceration, substance use, or mental health issues).	Depressive symptoms (DS) using the Patient Health Questionnaire-9 (PHQ-9)	ACEs were associated with DS in multivariate analysis (B=0.84 SE=0.18, $p<.001$); adding potential protective factors (B=0.68 SE=0.17, $p<.001$) and interactions (B=0.46 SE=0.19, $p<.05$)	
Li, 2025; China	Cross-sectional, 6,585 participants aged ≥ 60 ; CHARLS	ACEs (range 0–12): 7 conventional (physical abuse, emotional neglect, household substance abuse, mental illness, domestic violence, incarcerated household member, parental separation/divorce); 2 expanded (unsafe neighborhood, bullying); and 3 novel indicators (parental death, sibling death, parental disability)	Depression via the CES-D-10 (cutoff ≥ 12).	ACEs was associated to depression (OR=1.17 95% CI 1.11–1.24).	Mediators were sleep duration and chronic diseases
Dai, 2025; China	Longitudinal, 6,395 participants aged ≥ 60 ; CHARLS	Poor childhood friendship experiences (CFE) (self-report)	Depressive symptoms (CES-D-10 scale, score 0-30); ≥ 10 significant depressive symptoms	Individuals with poor CFE had a greater risk for depressive symptoms (OR=1.64, 95% CI 1.22–2.21) compared with those with better CFE	

Chen, 2026; China	Longitudinal ACEs score 0-10; (e.g., al, 3,734 participant relationships, emotional s aged ≥45; abuse, domestic CHARLS violence, household substance abuse or incarceration, parental mental illness, family discord, neglect, family member death, family burden, and adverse outside-family environment.	Depressive symptoms (DS)- Center for Epidemiologic Studies Depression Scale (CES-D 10) score 0-30, ≥10 significant depressive symptomatology	Having ≥4 ACEs was associated with DS trajectories, stable increasing vs. low-stable type (OR=2.43 95% CI 1.78-3.32, p<.001). For each one-point increase in ACE scores, there is an increase of 0.501 (95% CI 0.430-0.570, <.001) CES-D score.
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Only significant ($p<.05$) multivariate results are reported in the table. OR=odds ratios; HR=hazard ratios; B= unstandardized beta estimated; β = standardized beta estimated; CI=confidence intervals; BMI=body mass index; ACEs=Adverse Childhood Experiences. CES-D-10= Center for Epidemiologic Studies Depression Scale. GDS= Geriatric Depression Scale. BRFSS=Behavioral Risk Factor Surveillance System; SABE= Health, Well-being, and Aging; ELSA=English Longitudinal Study of Ageing; CHARLS= China Health and Retirement Longitudinal Study; JAGES= Japan Gerontological Evaluation Study.

3.4. Falls

Seven studies on falls from 2018 to 2025 are in Table 4 [68–74]. Older adults with several abuse types (ever being abused: emotional, physical, sexual) and polyvictimization had increased odds for recurrent falling [68,69]. Older adults with lifetime discrimination (ever had, during childhood or recently [within the last 5 years]) [70] or ageism (perceived age discrimination) [71] had increased odds for recurrent falling. Middle-aged and older adults exposed to a greater number of ACEs had higher odds of falling [72–74]. The most common mediator was depression [69,71–74].

Table 4. Studies related to Falls.

Authors	Design, population	Exposures	Geriatric Syndrome s or other Outcomes	Main outcome's findings	Additional comments
Reyes-Ortiz, 2018; USA	Cross-sectional, 2,000 participant s aged ≥60; SABE Bogota	History of abuse (ever being a victim): emotional, physical, or sexual. Polyvictimization (≥2 types of abuse vs. 0-1)	Falls during past 12 months. Any fall (≥1 vs. 0) or recurrent falls (≥2 vs. 0-1)	Abuse types: emotional (OR=1.43 95% CI 1.07-1.91), physical (OR=2.05 95% CI 1.51-2.77), or sexual (OR=2.11 95% CI 1.12-3.99), and polyvictimization (OR=2.39 95% CI 1.72- 3.33) were associated with recurrent falls.	
Reyes-Ortiz, 2021; USA	Cross-sectional, 5,227 participant s aged ≥60; neglect.	History of abuse (ever being a victim): physical, emotional, sexual, financial, or caregiver	Falls during past 12 months. Recurrent falls (≥2 vs. 0-1)	Polyvictimization was associated with higher odds of recurrent falling (OR=1.45 95% CI 1.20-1.76)	Depressive symptoms were a mediator

	SABE Ecuador	Polyvictimization (≥ 2 types of abuse vs. 0-1)			
Reyes-Ortiz, 2022; USA	Cross-sectional, 19,004 participant SAGE Colombia	Everyday discrimination (ever had discrimination e.g., racial, SES, gender, age, religion, sexual orientation, or disability), childhood discrimination score (0-3), and discrimination last 5 years due to skin color (score 0-4; at group activities, public places, family, or health centers)	Falls during past 12 months. Recurrent falls (≥ 2 vs. 0-1)	Everyday discrimination (OR=1.27 95% CI 1.21-1.33), childhood discrimination score (OR=1.23 95% CI 1.13-1.33), and number of situations for discrimination (OR=1.12 95% CI 1.08-1.17) were associated with recurrent falling.	
Reyes-Ortiz, 2024; USA	Cross-sectional, 18,875 participant SAGE Colombia	History of age discrimination or ageism by 1) the neighborhood 2) family 3) health services 4) public services	Falls during past 12 months. Recurrent falls (≥ 2 vs. 0-1).	Any ageism (OR=1.81 95% CI 1.61-2.02, $p < .0001$) was associated with recurrent falling.	Mediators were depressive symptoms, low IADL & multimorbidity
Huang, 2024; China	Longitudinal, 12,061 participant CHARLS	ACEs (12- item, self-report) (physical abuse, childhood environment status, death of parents, neighborhood safety, hunger, bullying]	Falls since last survey	Those with ≥ 5 ACEs vs. ≤ 2 ACEs (OR=1.85 95% CI 1.65-2.08) were more likely to experience falls; higher number of ACEs (OR=1.16 95% CI 1.13-1.19) was associated with higher risk of fall.	Depressive symptoms were a mediator
Tan, 2025; China	Cross-sectional; 14,582 middle-aged, older adults, CHARLS	ACEs (12- item, self-report) (e.g., physical abuse, emotional neglect, household dysfunction, parental divorce or death, bullying)	Falls since last survey	ACEs were associated with falls (≥ 4 ACEs vs. 0; OR=2.56 95% CI 2.12-3.09, $p < .001$)	Pain and depressive symptoms were mediators
Reyes-Ortiz, 2025; USA	Cross-sectional; 38,437 participant SAGE 80, BRFSS	ACEs (11- item, self-report) abuse domain (5 questions) and household dysfunction domain (6 questions)	Falls during past 12 month (Any falls: ≥ 1 vs. 0) among middle-aged (45-64 years) and older adults (≥ 65)	Those with ≥ 2 ACEs have increased odds of falling among middle-aged (OR=1.34 95% CI 1.18-1.52) and older adults (OR=1.28 95% CI 1.15-1.43)	Mediators: depression, functional difficulties, multimorbidity & difficulty remembering

Only significant ($p < .05$) multivariate results are reported in the table. SES=socioeconomic status. ACEs=Adverse Childhood Experiences. OR=odds ratios; CI=confidence intervals. IADL=

instrumental activities of daily living. SABE= Health, Well-being, and Aging; CHARLS= China Health and Retirement Longitudinal Study; BRFSS=Behavioral Risk Factor Surveillance System.

3.5. Low Muscle Strength or Sarcopenia

Six studies on low muscle strength or sarcopenia published from 2018 to 2025 are in Table 5 [75–80]. In one longitudinal study, the less disadvantaged in early life had a lower risk of lower handgrip strength than the most disadvantaged [75]. In another study, men with childhood adversities showed a steeper decline in handgrip strength over time [77]. In a cohort study, a higher number of ACEs was associated with increased risk of low muscle strength among women but not in men [76]. In a cross-sectional study, a higher number of ACEs was associated with increased odds of low muscle strength [78]. In a longitudinal study, a higher number of ACEs (all or those with either threat or deprivation related) was associated with increased risk of sarcopenia [79]. By contrast, in a cross-sectional study, ACEs showed a protective association with sarcopenia among the oldest participants (75-85 years) [80].

Table 5. Studies related to Low Muscle Strength or Sarcopenia.

Authors	Design, population	Exposures	Geriatric Syndrome s or other Outcomes	Main outcome's findings	Additional comments
Cheval, 2018, Switzerland and	Cohort, 24,179 aged 50-96, SHARE	Early-life SEC (socioeconomic circumstances) at age 10; based on 4 SEC indicators, 5-level variable from most disadvantaged to most advantaged.	Handgrip strength, defined low muscle strength (LMS) (cut-off obtained after being stratified by gender and BMI quartiles)	Among women early-life SEC (OR=0.79 95% CI 0.64–0.99), middle (OR=0.69 95% CI 0.54–0.86), and advantaged (OR=0.58 95% CI 0.44–0.77) had lower risk for low muscle strength compared to those most disadvantaged.	In men those disadvantaged (OR=0.67 95% CI 0.51–0.88), & middle (OR=0.74 95% CI 0.56–0.98) had lower risk for low muscle strength compared to those most disadvantaged.
Cheval, 2019, Switzerland and	Cohort, 24,179 aged 50-96, SHARE	ACEs (child in care, parental death, parental mental illness, parental drinking, period of hunger, or property taken away)	Handgrip strength, defined low muscle strength (LMS) (cut-off obtained after being stratified by gender and BMI quartiles)	For women, there was a gradual increase in the risk of LMS with the number of experienced ACEs (OR=1.22 for 1 ACE, OR=1.74 for ≥2 ACEs compared to no ACE)	No significant association among men.
Smith, 2019, USA	Cohort, 4,459 aged ≥50, HRS	Childhood misfortune (conditions experienced before age 18) 5 domains: infectious disease, chronic disease,	Handgrip strength (HGS) in Kg	For men, at follow-up (Time 2), there was a steeper decline in HGS (B= 0.60, p<.05) when having one	At follow-up, no significant association among women.

		impairment, SES, and risky parental behavior)		childhood impairment	
Lin, 2022, China	Cross-sectional, 7,209 participants aged ≥ 45 , CHARLS	ACEs before age 17: physical abuse, emotional neglect, household substance abuse, household mental illness, domestic violence, incarcerated household member, parental separation or divorce, unsafe neighborhood, bullying, parental death, sibling death, and parental disability	Handgrip strength (HGS) in kilograms (continuous); low muscle strength (LMS; defined based in sex and BMI)	Having ≥ 3 ACEs (vs. 0) was negatively associated with lower HGS in Kg ($\beta = -0.93$, 95% CI -1.37, -0.49) and positively associated with having LMS (OR=1.34 95% CI 1.12-1.61).	
Huang, 2024, China	Longitudinal, 6,859 participants aged ≥ 45 ; CHARLS	ACEs, two adversities domains, 5 threat-related (physical abuse, household substance abuse, domestic violence, unsafe neighborhood, or bullying), and 5 deprivation-related (emotional neglect, household mental illness or incarceration, parental or death).	Sarcopenia (Asian Working Group for Sarcopenia 2019 algorithm), was diagnosed when low muscle mass, and low muscle strength or poor physical performance were detected	ACEs were associated with increased risk for sarcopenia: ≥ 3 ACEs (vs. 0) (HR=1.31 95% CI 1.10–1.56); participants with ≥ 2 threat-related ACEs related) (vs. 0) (HR=1.22 95% CI 1.04–1.43) or with ≥ 2 deprivation-related ACEs (vs. 0) (HR=1.22 95% CI 1.02–1.46)	Active social participation modified the association between ACEs, (especially threat-related ACEs), and sarcopenia
Dimitria, 2025, Canada	Cross-sectional, 25,327 participants aged 45–85 years; CLSA	ACEs: War experiences, a parent death, excessive alcohol use of a relative, sexual abuse, severe problems at home, parents' poverty, physical illness of respondent	Sarcopenia was defined using the revised EWGSOP2 guidelines	Significant protective association for ACEs (Two ACEs vs. No ACE) on sarcopenia emerged in the oldest group (75–85 years; OR=0.72 95% CI 0.54–0.95 p=0.021)	Findings might be explained by bias due to survival of the fittest

Only significant ($p < .05$) multivariate results are reported in the table. OR=odds ratios; HR=hazard ratios; B= unstandardized beta estimated; β = standardized beta estimated; CI=confidence intervals; BMI=body mass index; ACEs=Adverse Childhood Experiences. SHARE= Survey of Health, Ageing, and Retirement in Europe; HRS= Health and Retirement Study; CHARLS= China Health and Retirement Longitudinal Study; CLSA=Canadian Longitudinal Study on Aging; EWGSOP2=European Working Group of Sarcopenia in Older People.

3.6. Multimorbidity

Five studies on multimorbidity published from 2019 to 2024 are in Table 6 [81–85]. Any ACEs were associated with somatic and psychiatric multimorbidity among middle-aged adults but not

among older adults in a US study [81]. Middle-aged and older adults exposed to a higher number of ACEs had higher odds for multimorbidity [82] and an increased number of chronic diseases [85] in two Chinese studies. A lifetime exposure to racial discrimination was associated with higher odds for multimorbidity among Colombian older adults [83]. ACEs related to childhood health were associated with multimorbidity from middle age onward in a Scottish longitudinal study [84].

Table 6. Studies related to Multimorbidity.

Authors	Design, population	Exposures	Geriatric Syndrome or other Outcomes	Main outcome's findings	Additional comments
Vásquez, 2019, USA	Cross-sectional, 10,727 participants aged ≥55, 2012-13 NESARC-III	Before age 18 a) maltreatment (#5): physical, emotional/sexual abuse; physical/emotional neglect; b) others (#11): i.e., witnessing domestic violence; parents divorced, parents died; c) past year stressful life events (#9), i.e., unemployed, bankruptcy. ACEs defined any maltreatment or other adverse events (1 = Yes, 0 = No)	Multimorbidity based on # of somatic conditions (i.e., heart disease, hypertension, stroke, diabetes, arthritis, cancer, osteoporosis & chronic lung problems) & DSM-5 psychiatric disorders (i.e., depression) during past 12 months, adjusted means ± SE	History of ACEs, compared with no history, had greater numbers of somatic & psychiatric multimorbidity (1.37 ± 0.04 vs. 1.13 ± 0.04) among racial and ethnic middle-aged adults (55-64)	No association among older adults (≥65)
Lin, 2021, China	Cross-sectional, 11,972 participants aged ≥45, CHARLS	ACEs (0-12), 7 conventional (physical abuse, emotional neglect, household substance abuse, household mental illness, domestic violence, incarcerated household member, & parental separation or divorce), 2 expanded (unsafe neighborhood & bullying), & 3 others (parental death, sibling death, and parental disability)	Multimorbidity, defined as ≥2 of 14 chronic diseases.	Having ≥ 4 ACEs (vs. 0) was associated with higher odds for multimorbidity (OR=2.03 95% CI 1.70-2.41). In addition, using only the 7 conventional ACEs, having ≥ 4 ACEs (vs. 0) was also associated with multimorbidity (OR=2.52 95% CI 1.81-3.50).	
Reyes-Ortiz, 2023, USA	Cross-sectional, 18,873 participants aged ≥60; had SABE Colombia	Three racial discrimination measures: 1) everyday discrimination (ever had), 2) childhood discrimination score (0-3), and 3) situations of discrimination in the last 5 years (score 0-4 [group	Multimorbidity, defined as having 2 or more chronic conditions	Multimorbidity was associated with experiencing everyday discrimination (OR=2.21 95% CI 1.62-3.02), childhood discrimination	

		activities, public places, inside the family, health centers]).	(OR=1.27 95% CI 1.10–1.47), and the number of situations of discrimination (OR=1.56 95% CI 1.22–2.00).
Chandra Sekar, 2023, UK	Longitudinal cohort members, ages 36-, 43-, 53-, 63- & 69- years. NSHD	Nine ACEs in 3 groups: a) psychosocial, b) parental health, and c) childhood health.	Multimorbidity, based on 18 health disorders, its score was defined as the unweighted sum of disorders accumulated by an individual at each assessment
			Combined childhood health ACEs were associated with higher and progressively increasing multimorbidity scores across adulthood (from 0.18 at age 36 to 0.45 at age 69).
Liu, 2024, China	Longitudinal cohort, 6,428 participants aged ≥45. CHARLS	ACEs: physical abuse, emotional neglect, household substance abuse, household mental illness, domestic violence, incarcerated household member, parental separation or divorce, unsafe neighborhood, bullying, parental death, sibling death & parental disability	Multimorbidity was the number of physician diagnoses of 14 chronic diseases, the Chinese multimorbidity-weighted index (CMWI)
			ACEs were associated with an increased number of chronic diseases at the baseline (intercept= 0.28, 95% CI 0.20-0.36) and a more rapid increase in the number of chronic diseases over 7 years (intercept= 0.03, 95% CI 0.01-0.05).

Only significant ($p < .05$) multivariate results are reported in the table. OR=odds ratios; CI=confidence intervals; ACEs=Adverse Childhood Experiences. NESARC=National Epidemiologic Survey on Alcohol and Related Conditions; CHARLS= China Health and Retirement Longitudinal Study; SABE=Health, Well-being, and Aging. NSHD=National Survey of Health and Development.

3.7. Functional Decline

Four studies on functional decline from 2016 to 2023 are in Table 7 [86–89]. Middle-aged and older adults exposed to childhood physical abuse or violence had higher odds for poor lower extremity functioning [86,89]. Middle-aged and older adults exposed to a higher number of ACEs had increased odds for instrumental activities of daily living (IADL) [87] and activities of daily living (ADL) limitations [88]. Chronic conditions and depression were mediators, as potential pathways, in two studies: first, in the relationship between physical abuse and lower extremity functioning [86], and second, in the relationship between ACEs and ADL scores [88]. One study included lifetime exposures in childhood (physical abuse) and adulthood (intimate partner/family member violence) [86].

Table 7. Studies related to Functional Decline.

Authors	Design, population	Exposures	Geriatric Syndromes or other Outcomes	Main outcome's findings	Additional comments
Guedes, 2016, Albania, Brazil, Canada, Colombi a	Cross-sectional, 1,995 participant s aged 65-74, IMIAS	Childhood physical abuse (CPA) (first 15 years of life). Adulthood domestic violence as intimate partner/family member violence (physical or psychological) (PA=physical abuse)	Lower extremity functioning measured by the SPPB= Short Physical Performance Battery including standing balance, 4-m walk, & chair stand test. Mobility disability was defined as SPPB<8 or self-reported limitation in walking/climbing stairs.	CPA (OR=1.69 95% CI 1.14-2.51), partner PA (OR=1.78 95% CI 1.15-2.28) and family PA (OR=1.62 95% CI 1.16-2.27) were associated with SPPB<8. CPA (OR=1.43 95% CI 1.03-1.99) and family PA (OR=1.39 95% CI 1.06-1.83) were associated with mobility disability.	Chronic conditions & depression were mediators between physical violence and both mobility measures.
Amemiya, 2018, Japan	Cross-sectional, 19,220 participant s aged ≥65; JAGES	ACEs before age of 18 including seven adversities: parental death, parental divorce, parental mental illness, family violence, physical abuse, psychological neglect, and psychological abuse	Higher-level functional limitations (HLFL), using the Lawton IADLs scale, 13 items with instrumental self-maintenance (5 items), intellectual activities (4 items), & social role (4 items).	ACEs (1 vs. 0) (PR=1.06 95% CI = 1.02–1.10) and ACEs (≥2 vs. 0) (PR=1.19 95% CI = 1.12–1.27) were associated with HLFL	Socio-demographic health behaviors, and health status were mediators
Li, 2022, China	Longitudinal, 10,651 participant s aged ≥45, CHARLS	ACEs: 13 items including physical abuse, emotional neglect, domestic violence, household substance abuse, household mental illness, incarcerated household member, parental separation or divorce, parental death, sibling death, parental disability, bullying, peer rejection, & unsafe neighborhood.	ADLs disability, having difficulty or could not perform the activity. A 6-item summary ADLs, score 0-6.	Participants who had ≥4 ACEs had increased risk for being on low-mild trajectory (OR=1.32 95% CI 1.11-1.57) and mild-increasing trajectory (OR=1.41 95% CI 1.06-1.89), compared with those with 0 ACEs.	Chronic diseases were mediators: arthritis, digestive system disease, respiratory disease, and cardio-metabolic disease.
Lee, 2023, USA	Cross-sectional, 3,387 participant s aged ≥50, NSHAP	ACEs= childhood experience of violence/abuse, witnessing violence, financial insecurity, parental separation, or	Lower extremity functioning (tandem balance, 3-m walk & chair stand tests); physical mobility	Childhood experience of violence was associated with greater physical mobility	

serious illness (exposures between ages 6 to 16)	impairment was defined if those tests fell below clinical standards. Also, cognitive testing (MoCA) and reported functional disability (difficulty with ADLs or IADLs).	impairment (OR=1.38, 95% CI 1.11–1.71) and functional disability (OR=1.86, 95% CI 1.49–2.33).
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Only significant ($p < .05$) multivariate results are reported in the table. OR=odds ratios; PR= prevalence ratios; CI=confidence intervals ACEs=Adverse Childhood Experiences; ADLs=activities of daily living; IADLs= instrumental activities of daily living; MoCa= Montreal Cognitive Assessment. IMIAS= International Mobility in Aging Study; JAGES=Japan Gerontological Evaluation Study; CHARLS= China Health and Retirement Longitudinal Study; NSHAP= National Social Life, Health and Aging Project.

3.8. Other Diagnoses or Several Geriatric Syndromes

Twelve studies on other diagnoses or several geriatric syndromes from 2019 to 2026 are in Table 8 [90–101]. In an American study, child maltreatment was associated with adult interpersonal violence and later with elder abuse [90]. In a Bhutanese study, ACEs (WHO version) were associated with lung disease, vision impairment, insomnia, high blood pressure, and memory decline [93]. In another American study, ACEs were associated with worse sleep quality [94]. In a Chinese longitudinal study, a higher number of ACEs was associated with pain, chronic diseases, falls, multimorbidity, ADL, and IADL limitations [95]. In four Chinese cross-sectional studies, a higher number of ACEs was associated with chronic respiratory diseases (chronic bronchitis, emphysema, and asthma) [96,98], anemia [97], and musculoskeletal pain [99]. In a Chinese study, fetal exposure to severe famine was associated with higher odds for chronic kidney disease [92]. In a South African study, life course exposure to traumatic events (e.g., community violence) was associated with depressive symptoms, PTSD symptoms, and ADL limitations [91]. In one Chinese longitudinal study, ACEs were associated with dementia, and AAEs were associated with stroke at follow-up; in these associations, depressive symptoms were mediators [100]. In a US clinical study, ACEs were associated with severe obstructive defecation syndrome [101].

Table 8. Studies related to Other Diagnoses or Several Geriatric Syndromes.

Authors	Design, population	Exposures	Geriatric Syndrome s or other Outcomes	Main outcome's findings	Additional comments
Wang, 2019, USA	Cross-sectional, 3,157 participant s aged ≥ 60 , PINE	Child maltreatment (CM) and intimate partner violence (IPV) cases (been physically hurt, insulted, threatened with harm, screamed and cursed at, and a private part touched when it was unwanted during each age-related period.	Elder abuse (EA) phenotype (psychological, physical & sexual abuse; financial exploitation & caregiver neglect) (total 56 items)	CM physical/sexual was associated with increased risks for IPV physical/sexual (OR=1.86 95% CI 1.02-3.38), EA psychological (OR=1.70 95% CI 1.20-2.42), and EA financial exploitation (OR=2.38 95% CI 1.72-3.30).	

Payne, 2020, South Africa	Cross-sectional, 2,473 participant s aged ≥ 40 , HAALSI	16 Traumatic Experiences (TEs) during their lifetime- five categories: childhood environment, community violence, illness/accident/disaster, social/family environment, and war violence	Depressive symptoms (7-item CES-D) score ≥ 3 . PTSD symptoms (Short Screening Scale for PTSD battery; score ≥ 4). Katz ADLs scale. Cognitive impairment (< 1.5 SD below the mean in the HAALSI cognitive battery	TEs were associated with depressive symptoms (OR=1.08 95% CI 1.03-1.14), PTSD symptoms (OR=1.17 95% CI 1.07-1.29), ADL limitations OR=1.11 95% CI 1.03, 1.18).	No association and later life cognitive impairment
Dorji, 2020, Buthan	Cross-sectional, 337 participant s aged ≥ 60 ,	WHO ACEs International Questionnaire (13-item): physical or emotional abuse, neglect, someone chronically depressed in a household, incarcerated household member, parental separation or divorce, alcohol or drug abuser or member treated violently in the household, bullying, witnessing of community violence, forced to physical labor, ≥ 2 weeks had difficulty with basic needs of life	Heart disease, high blood pressure (HBP), diabetes, depression, mobility impairment, lung disease, visual impairment (VI), insomnia, memory decline (MD)	Having ≥ 7 ACEs [vs. 0-2] was associated with higher odds for lung disease (OR=2.15 95% CI 1.03-4.49), VI (OR=2.38 95% CI 1.16-4.85), insomnia (OR=2.35 95% CI 1.11-4.98), MD (OR=2.30 95% CI 1.10-4.78), HBP (OR=3.21 95% CI 1.39-7.38), diabetes (OR=5.12 95% CI 1.06-24.72).	
Lv, 2020, China	Cross-sectional, 6,267 participant s aged ≥ 45 , CHARLS	Famine fetal exposed, preschool exposed, and school-aged, exposed groups when compared to the non-exposed group	Chronic kidney disease (CKD) was defined as eGFR less than 60 mL/min per 1.73 m ² .	Fetal exposure to the severe famine was associated with the elevated risk of CKD among male participants (OR=4.44 95% CI 1.10-17.92)	
Sheffler, 2023, USA	Cross-sectional, 348 participant s aged ≥ 55 ; North Florida	ACEs, 10-item questionnaire including childhood abuse, parental psychopathology and divorce, and violence in the home occurring before the age of 18.	Sleep quality: Pittsburgh Sleep Quality Index (PSQI). Rating their "sleep quality overall" during the past month from 1 (Very Good) to 4 (Very Bad)	ACEs were associated with significantly worse sleep quality ($B=0.156, p=.008$); higher PSQI score indicates lower sleep quality	Adaptive emotion regulation skills had a moderation effect
Ren, 2023, China	Longitudinal, 10,695 participant	ACEs (14- item, self-report) (physical abuse, emotional neglect, family or community	New-onset pain, falls, chronic diseases, multimorbidity,	≥ 4 ACEs vs. 0 were associated with new-onset pain (HR=1.57 95% CI	For all outcomes, depressive symptoms

	s aged ≥45, violence, parental CHARLS [divorce, disability, substance abuse, incarceration or death], economic adversity, loneliness, bullying	ADL limitations, and IADL limitations	1.37–1.79), falls (HR=1.84 95% CI 1.55–2.18), chronic diseases (HR=1.43 95% CI 1.19–1.72), multimorbidity (HR=1.55 95% CI 1.32–1.83), ADL limitations (HR=1.85 95% CI 1.54–2.23), and IADL limitations, (HR=1.46 95% CI 1.24–1.71)	was a mediator	
Li, 2024, Cross-China	sectional, 12,277 participant s aged ≥45, alone, peer bullied, self- CHARLS	ACEs (12- item) physical abuse, parental health, guardians' bad habits, hunger, feel reported health status, the health limitations, death of parents, death of siblings, childhood neighborhood quality, and childhood neighborhood safety	Chronic lung diseases (CLDs) such as chronic bronchitis, emphysema	ACEs that were associated with CLDs include physical abuse (OR=1.28), parents mental health (OR=1.50), hunger (OR=1.20), feel alone (OR=1.33), peer bullied (OR=1.56), poor health status (OR=1.86), health limitation (OR=1.97), parents' death (OR=1.27), siblings' death (OR=1.42), unsafe neighborhood (OR=1.23), & poor neighborhood quality (OR=1.11)	Depressive symptoms were a partial mediator on the association between CLDs and 7 ACEs
He, 2024, China	Cross-sectional, 24,116 participant s aged ≥50, and GBCS	ACEs: 5 items reflected separation, traumatic experience, emotional abuse, domestic violence and parental death	Hemoglobin (Hb)(g/dL). Anemia defined as Hb <12.0 g/dL for men and <11.0 g/dL for women	Participants with ≥2 ACEs, (vs. 0 ACEs), had lower Hb ($\beta = -0.08$, 95% CI - 0.12 to - 0.03) & higher odds of anemia (OR=1.26 95% CI 1.01-1.59).	
Cheng, 2025, China	Cross-sectional; 14,582 participant s middle-aged, older adults, CHARLS	ACEs (11- item, before age 17)- bullying, corporal punishment, domestic violence, parental substance abuse, poor parental mental health, parental criminality, parental divorce, parental	Chronic respiratory diseases [CRD] (COPD & asthma)	Individuals with ≥4 ACEs had OR=1.48 (95% CI 1.10-1.99) for CRD compared to those with no ACEs	Long sleep duration combined with ACEs increased the risk of CRD

		disability, parental death, emotional neglect, and insecurity.		
Jin, 2025, China	Cross-sectional; 11,905 participants middle-aged, older adults, CHARLS	ACEs (12-item)- physical abuse, emotional neglect, domestic violence, peer bullying, unsafe neighborhood, parental death, parental disability, sibling death, household mental illness, substance abuse, parental separation or divorce, and incarcerated household members.	Musculoskeletal pain (MSP)	Individuals with ≥ 4 ACEs had OR=2.46 (95% CI 2.13-2.83) for MSP compared to those with 0-1 ACEs; depressive symptoms were a partial mediator
Chen, 2025, China	Longitudinal; 11,601 participants aged ≥ 45 , CHARLS	ACEs 10 items before the age of 18 (e.g., parental divorce, childhood hunger). Five items for Adverse Adult Experiences (AAEs) (e.g., death of a child, lifetime discrimination)	Dementia diagnosis based on cognitive battery and ADL scale. Stroke (self-reported physician diagnosis)	ACEs (HR=1.11 95% CI 1.05-1.18) and AAEs (HR=1.23 95% CI 1.14-1.33) were associated with dementia. AAEs (HR=1.19 95% CI 1.12-1.26) were associated with stroke.
Karhu, 2025, USA	Cross-sectional; 128 patients aged 55 (± 16), Cleveland Clinic	ACEs are a 10-item screening tool that assesses exposure to various forms of abuse, neglect, and household dysfunction during the first 18 years of life.	Obstructed Defecation Syndrome (ODS): excessive straining, incomplete rectal evacuation, enemas and laxatives' use, vaginal-anal-perineal maneuvers to attempt defecation, and abdominal discomfort/pain caused by obstructed defecation. CCFI measures severity of fecal incontinence.	Patients with ACEs had more severe ODS (not CCFI) scores which correlated with higher HADS anxiety and depression scores.

Only significant ($p < .05$) multivariate results are reported in the table. OR=odds ratios; HR=hazard ratios; β = standardized beta estimated; B= beta estimated; CI=confidence intervals; ACEs=Adverse Childhood Experiences; ADL=activities of daily living; IADL=instrumental activities of daily living; CES-D =Center for Epidemiological Studies–Depression scale; PTSD=Post-Traumatic Stress Disorder. PINE= Population Study of Chinese Elderly in Chicago; HAALSI= Health and Aging in Africa: A Longitudinal Study of an INDEPTH Community in South Africa; CHARLS= China Health and Retirement Longitudinal Study; GBCS= Guangzhou Biobank Cohort Study.

4. Discussion

This comprehensive review summarized studies on the relationship between life course exposures and geriatric syndromes. Our review showed that ACEs and other adversity measures across life are associated with greater probabilities for the occurrence of geriatric syndromes such as dementia, frailty, depression, falls, low muscle strength, multimorbidity, and functional decline. However, a limitation of the review is the heterogeneity of the available data in our selection.

Our review using the life course approach and the eco-social model together [10,102–104] suggests that biological, psychological, behavioral, social factors, and environments act throughout the aging process and the older person's life, which are biologically embedded, modifying health and functional status over time, leading to many geriatric syndromes as we describe in our results. Figure 1 depicts the life-course perspective periods and eco-social perspective levels applied to the relationship between exposures across the life cycle and geriatric syndromes. Our results in this comprehensive review also support the idea that many geriatric syndromes are associated with early-life exposures from the perinatal period through later ages. Therefore, in addition to usual risk factors, health professionals should consider early exposures at several levels, such as individual (e.g., victim of abuse), family (e.g., violence or deprivation), social network (e.g., peer bullying), and neighborhood environments (e.g., unsafety), in the pathways of common geriatric syndromes throughout the entire life course, from the perinatal period (e.g., famine), followed by childhood and adolescence (e.g. parental deaths), adulthood (e.g., unemployment), and later life (e.g., illness). Thus, it is essential to understand the full impact of early adversity on geriatric syndromes later in life and to design interventions that address the multiple levels of influence to break cycles of harm.

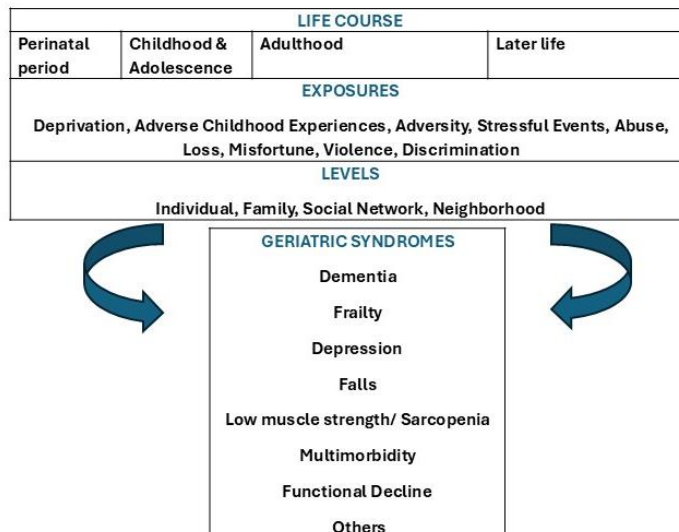


Figure 1. Life course perspective periods and eco-social perspective levels applied in the relationship between exposures across the life cycle and geriatric syndromes

There 105. resulting in increased allostatic load, inflammatory markers, and epigenetic dysregulation, conducting to alterations in DNA methylation, histone modifications, and microRNA synthesis [11–14,105–108]. These metabolic and genetic alterations across the life course may contribute to the geriatric syndromes we describe herein, which are associated with life-course adverse exposures [16,17,109].

This review provides a comprehensive overview of studies examining the relationship between multiple life-course exposures, from the prenatal period to older age, and geriatric syndromes. These life-course exposures occur across individuals, families, and neighborhoods. We also identified mediators [the most common was depression] as potential modifiable pathways between the exposures and the geriatric syndromes. However, this review has some limitations. This review did not use a systematic approach to article selection because of the heterogeneity in study designs and reported outcomes. Articles have been incorporated based on the authors' assessment of relevance, potentially introducing selection bias. In addition, the heterogeneity of the included studies, with different designs, populations, and methodological procedures, makes any direct or statistical comparison impractical.

5. Conclusions

In conclusion, our synthesis showed that ACEs and other adversity measures during the life course are usually associated with greater probabilities for the occurrence of geriatric syndromes such as dementia, frailty, falls, sarcopenia, functional decline, depression, and multimorbidity. There are also some reports for mediators that may partially explain those associations.

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