Violence across the life course and physical and mental health trajectories in later life: a 13-year population-based cohort study in England

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Summary

Background Evidence shows that violence in childhood affects health in adulthood, and violence in adulthood is associated with worse health. However, the extent to which violence-related health disparities persist into later life and whether the gap between victims and non-victims narrows, remains stable, or widens over time are unclear. This study aimed to examine the long-term effects of childhood and lifetime violence on health trajectories in older age.

Methods The English Longitudinal Study of Ageing is one of the only cohort studies to cover violence across the lifespan alongside health trajectories in later life. Data were collected every 2 years between 2006 and 2019 and experiences of violence and limiting long-standing illness or disability (LLSID) were self-reported. We used logistic multilevel regressions and growth curve modelling to examine associations between parental physical abuse in childhood, lifetime physical or sexual violence, and any violence across the life course, with subsequent change in LLSID and depressive symptoms in later life, adjusted for demographic (age, gender, marital status, and region), socioeconomic (education, occupational class, tenure, and financial hardship), and social (household size and caregiving) attributes. Depressive symptoms were measured with the Centre for Epidemiological Studies Depression scale.

Findings Of the 9771 participants who responded to the questionnaire, 6171 answered all three questions about experiences of violence and were included in this cohort. Any experience of violence was consistently associated with worse health in older age, including depression scale score of at least 4 (men: adjusted odds ratio 1·99, 95% CI 1·34–2·94; women: 1·38, 1·02–1·86) and LLSID (men: 1·74, 1·08–2·81; women: 2·15, 1·45–3·17). The patterns were evident in men and women.

Interpretation Physical and mental health disadvantages associated with experiencing violence in childhood and adulthood are sustained throughout later life. There was little evidence that health disparities between victims and non-victims reduce over time. Preventing violence in both childhood and adulthood could promote healthy ageing.

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Introduction

Ageing populations present substantial public health challenges, in part due to the higher prevalence of poor health in older age and the subsequent burden on health-care and social-care systems. Some drivers of health deterioration in later life, such as unhealthy behaviours,[1] adverse environmental factors,[2] and stressful socio-economic contexts,[3] are well established. However, there are less explored factors that could also affect people's health in later life. The negative effects of violence on health have been found to potentially accumulate during the life course, be exacerbated by the social environment, and manifest later in life—eg, exposure to violence in adolescence is associated with worse health in young adults.[4] There is evidence of associations between lifetime exposure to violence and worse health in older age,[5] but most studies on the health effects of lifetime violence experiences use cross-sectional designs and therefore have little potential to determine temporal or causal relationships.

Early life abuse is linked to poor health[6,7] and premature death in adulthood,[8] so lifetime experience of violence might plausibly accelerate health deterioration in later life. However, there is little evidence on trajectories of change in health after experiences of violence in the general population. Some research has used longitudinal data to examine associations between cumulative adversity and health, but has not focused specifically on violence.[9] Loxton and colleagues[10] used data from the Australian Longitudinal Study on Women's Health to construct health trajectories for women who did and did not experience intimate partner violence, and found that health differences between the two groups narrowed as the women aged. However, their study was limited to women and did not include experiences of childhood abuse, different types of violence, or violence

Research in context

Evidence before this study

We searched PubMed from database inception to August 19, 2024, with the terms ((violence[Title/Abstract]) OR (abuse[Title/Abstract])) AND ((longitud*[Title/Abstract]) OR (cohort*[Title/Abstract])) AND ((elde*[Title/Abstract]) OR (olde*[Title/Abstract])) AND (health[Title/Abstract]), without language restrictions. Existing evidence showed the associations between violence and abuse and poor health in older age. However, we did not identify any previous national studies that examined whether the gap between later life health trajectories of people who experienced interpersonal violence versus those who did not changes over time. Additionally, studies presenting gender-stratified results were absent.

Added value of this study

From data from a cohort study of a representative sample of older people in England, we provide evidence that previous experience of violence and abuse across the life course contributes to worse physical and mental health in older age. Our study provides new evidence that these health consequences are sustained throughout later life; there was little evidence that disparities between victims and non-victims reduce over time. Whereas previous research focused on women, we show that this pattern is evident both in men and in women.

Implications of all the available evidence

The findings highlight the value of violence prevention measures throughout the life course, as violence and abuse increase the risk of poor health and associated costs throughout older age. Policies and public health strategies should focus more on violence prevention across the lifespan, not only to mitigate more immediate effects of violence but also to reduce the burden of ill health in older age.

from people other than intimate partners. Gaining a nuanced understanding of the long-term relationship between violence and health in later life can contribute to understanding the mechanisms of developing illnesses and inform preventive measures, with the capacity to support healthier ageing.

The aims of the present study were to examine associations between experiences of childhood physical abuse and lifetime physical and sexual violence with physical and mental health in older age, and compare health trajectories in later life by experiences of violence.

We used a nationally representative cohort of adults in England aged 50 years and over across a 13-year follow-up period. The analyses were done separately for men and women due to evidence on differences in violence types and rates experienced,[11] health conditions,[12] and the associations between violence and abuse and men's and women's health.[13]

Methods

Study design and participants

In this nationally representative cohort study, we used waves 3 (2007) to 9 (2019) from the English Longitudinal Study of Ageing (ELSA), which collects data in participants' own homes every 2 years from people aged 50 years and older. The core ELSA sample was drawn from the Health Survey for England (HSE) years 1998, 1999, and 2001, and refreshed with additional participants at waves 3, 4, 6, 7, and 9. Households were excluded from the HSE sampling frame if it was known that there was no adult aged 50 and over in the household who had consented to be recontacted in the future. Individuals in the remaining households formed the basis of the ELSA sample. Participants have remained eligible as long as they have not died or moved outside of Great Britain, thus those who moved to Wales or Scotland remained eligible. For each wave, eligible individuals were sent an advance letter inviting them to take part and a survey leaflet. Interviewers then either telephoned (for existing sample members younger than 80 years who had participated in the previous wave) or visited the households to explain the study, and either conducted interviews with willing individuals straight away or arranged appointments to call back at a convenient time. Consent was provided in a multistep process that included written and verbal consent, with options for linkage to administrative data.[14] At each wave, participants completed a core questionnaire covering demographics, socioeconomics, health, and wellbeing, administered by a computer-aided personal interview and a paper self-completion questionnaire. One-off modules were included at specific waves. Wave 3, done in 2007, included a life history module that gathered information about important life events, spanning participants' family, work, accommodation, travel, health, and childhood.

These analyses were approved by City St George's Research Ethics Committee, University of London (ETH2122–0299). The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. The data were accessed from the UK Data Service (ID: 226513). Further ELSA methodological and ethical approval details are published elsewhere.[15]

Procedures

Information about physical abuse by parents in childhood and lifetime physical and sexual violence (by any perpetrator) was collected in the self-completion section of the wave 3 (2007) life history interview. Participants were asked whether they had experienced any of a list of events and the options included "When under 16 had physical abuse from

parents", "Victim of serious physical attack or assault", and "Experienced sexual assault (rape or harassment)". Endorsing these indicated childhood parental physical abuse (referred to throughout as childhood abuse), and lifetime physical violence and sexual violence. Any experience of violence was indicated (either yes or no) if at least one type of violence was endorsed.

The primary outcome variables were mental and physical health indicators, measured in every wave (3–9) in the core questionnaire.

Chronic illness was measured with two questions. The first was "Do you have any longstanding illness, disability or infirmity? By longstanding I mean anything that has troubled you over a period of time or that is likely to affect you over a period of time."[16] The second was "Does this illness or disability limit your activities in any way?"[17] Endorsing both indicated the presence of a limiting long-standing illness or disability (LLSID).

Depressive symptoms were measured with the eight-item Centre for Epidemiologic Studies Depression Scale, a validated measure for depression screening in older adults.[18] The scale is based on symptoms of negative affect and somatic complaints from the past week, with yes or no response options. Responses were summed to obtain a total score ranging between 0 and 8, which provides a continuous measure. The score was additionally dichotomised with an established cutoff point of 4 or higher, indicating a likelihood of clinically significant symptoms of probable depression.[19]

Gender was self-reported and binary coded in the survey as man or woman. No other options were provided for participants. It was not determined whether participants responded with biological sex or with gender; however, based on self-report we use the terms gender, men, and women here. Age (in years) as a continuous variable and age squared were used simultaneously to account for a likely non-linear relationship between age and health outcomes[20] and improve model fit based on the likelihood ratio test results. Although data on ethnicity were collected (coded White and non-White in the dataset), the sample size was too small to disaggregate by ethnicity. We therefore do not include ethnicity as a control variable in the analyses. Marital status was grouped into "married", "cohabiting", "single, never married", "divorced/separated", and "widowed". Household size represented the number of people living in the participants' households. Housing tenure was dichotomised into "homeowner" ("own outright", "buying with the help of a mortgage or loan", or "shared partnership") and "non-owner" (including "rent" and "live rent free") categories. Residence at the time of the survey was coded to one of nine regions in England: northeast, northwest, Yorkshire and the Humber, east Midlands, west Midlands, east of England, London, southeast, and southwest.[21]

Participants were asked if they had ever had severe financial hardship (yes or no options). National Statistics Socio-economic Classification of most recent paid employment was grouped into four categories: "managerial and professional occupations", "intermediate occupations", "routine and manual occupations", and "never worked and long-term unemployed". Highest educational qualification was dichotomised into having or not having a higher education degree (level four and higher in the UK or equivalent). Participants were asked whether they had caring responsibilities for someone during the last month (yes or no options). Data on all included covariates were collected in every wave, except for financial hardship, which was only asked at wave 3.

Statistical analysis

We produced descriptive profiles (ie, demographic, socioeconomic, health, and social characteristics) for those who did and did not experience childhood abuse, lifetime physical and sexual violence, and any violence with weighted percentages or means and unweighted sample numbers. Weights were applied in analyses to account for selection probabilities and patterns of non-response. To test for differences in the characteristics of those reporting and not reporting experiences of violence at wave 3, we used a series of unadjusted binary logistic regressions, with associated p values. We also did an unweighted analysis as a sensitivity check. Characteristics examined included demographic (ie, age, gender, marital status, and region), socioeconomic (ie, education, occupational class, tenure, and financial hardship), health (ie, depressive symptoms and LLSID) and social (ie, household size and caring responsibilities) attributes. We selected covariates to account for potential confounders, given their known associations with both violence and health.[5,13] We ran four binary adjusted logistic regression analyses for each violence indicator (physical violence, sexual violence, childhood abuse, and any of the three) to assess their associations with each characteristic in wave 3 while controlling for covariates.

To assess the association between reporting lifetime experience of violence or abuse at wave 3 and changes in health from waves 3 to 9, we used multilevel binary regression models for probable depression (dichotomised score) and LLSID, and conditional growth curve models for assessing changes in continuous depression score by age,[22] with maximum likelihood estimation. We included time-varying variables (eg, age, age squared, marital status, number of people in the household, housing tenure, region, education, occupational class, and caregiving) to account for within-person change, whereas time-invariant variables (eg, violence measure, gender, and financial hardship) explained between-person differences. We report adjusted odds ratios (aORs) with associated 95% CIs for binary regression models and change in score (β) with associated SEs for conditional growth curve models. For each of the three health outcomes (depression case, depression score, and LLSID), we produced four models that included one type of violence (childhood abuse, physical violence, sexual violence, or any violence and abuse),

wave, and interaction between wave and the type of violence as independent variables. Additionally, for each health outcome, we produced four models with one of each violence type adjusted for all the covariates including demographic, socioeconomic, and social factors. The models with a dichotomised depression score as an outcome adjusted for an LLSID, as LLSIDs can precede and contribute to the development of depressive symptoms, and to control for a potential confounder.[23] Sample weights were not used in these models to avoid overadjustment,[24] as weights were derived from variables included as confounders.[15]

To illustrate the health trajectories over time, we created a population mean depression score and 95% CI across waves 3–9 for all participants, and separately for men and women with marginal predictions. The trajectories compared the changes in depression score in people who experienced and did not experience childhood abuse, physical violence, sexual violence, or any violence. For binary measures of depressive symptoms and LLSID, we created trajectories showing marginal predicted probabilities and 95% CIs across the waves for all participants, men, and women by the type of violence.

We did all analyses with Stata (version 17).

Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

Results

Of the 9771 participants who responded to the main questionnaire in wave 3, 7855 completed the life history module.[25] Among them, 6566 participants did the self-completion section. Individuals younger than 50 years (ie, younger partners of the survey participants) and those older than 90 years (for whom precise age was not provided to avoid identity disclosure) were removed, resulting in 6280 participants. 6215 of these participants answered the childhood abuse question, 6210 participants answered questions about physical and sexual abuse each, and 6171 answered all three questions about experiences of violence (appendix p 2). Baseline characteristics of participants who answered all questions about experience of violence and abuse are provided in table 1.

See Online for appendix

217 (3·5%) of 6215 participants at wave 3 reported experiencing childhood abuse, 373 (6·0%) of 6210 reported sexual violence during their lifetime, and 374 (6·0%) of 6210 reported physical violence during their lifetime. Overall, 783 (12·7%) of 6171 reported at least one indicator of violence and abuse. Although attrition rates were substantial, the proportion reporting experiences of violence remained similar across waves, indicating non-response was not associated with violence (appendix p 3).

The unadjusted factors significantly associated with reporting childhood abuse were LLSID, depressive

	Cohort (n=6171)
Gender	
Men	2757 (46·7%)
Women	3414 (53·3%)
Missing	0
Age, years	65·3 (10·1)
Marital status	
Married	4212 (68·3%)
Cohabiting	272 (3·9%)
Single—never married	266 (4·7%)
Widowed	908 (14·6%)
Divorced or separated	513 (8·5%)
Missing	0
Region	
Northeast	420 (6·5%)
Northwest	677 (11·9%)
Yorkshire and the Humber	713 (11%)
East Midlands	648 (9·8%)
West Midlands	641 (10·8%)
East of England	815 (12·9%)
London	524 (9·2%)
Southeast	1009 (16·2%)
Southwest	718 (11·6%)
Non-UK	5 (0·1%)
Missing	1 (<0·1%)
Higher education	
No	5033 (83·5%)
Yes	1123 (16·5%)
Missing	15 (0·2%)
Occupational classification	
Managerial and professional	2054 (30·6%)
Intermediate	1604 (25·6%)
Routine and manual	2425 (42·2%)
Never worked or long-term unemployed	66 (1·5%)
Missing	22 (0·1%)
Tenure	
Non-owner	910 (15·9%)
Homeowner	5242 (83·7%)
Missing	19 (0·3%)
Caregiving	
No	5296 (86·1%)
Yes	875 (13·9%)
Missing	0
Household size	
1	1381 (22·3%)
2	3538 (57·8%)
3	778 (12·7%)
≥4	474 (7·0%)
Missing	0
Financial hardship ever	
Not mentioned	4877 (79·9%)
Mentioned	1228 (20·0%)
Missing	66 (1·1%)

(Table 1 continues on next page)

	Cohort (n=6171)
(Continued from previous page)	
Limiting long-standing illness or disability	
No limiting illness	4173 (67·1%)
Has limiting illness	1995 (32·8%)
Missing	3 (0·1%)
Depression (CES-D score ≥4)	
No	4486 (72·2%)
Yes	1685 (27·8%)
Depression score	3·1 (1·5)

Data are n (weighted %) or mean (SD). CES-D=Centre for Epidemiologic Studies Depression Scale.

Table 1: **Demographic, social, health, and economic characteristics of participants at wave 3**

symptoms, younger age, a higher education degree, larger household size (four or more residents), and financial hardship (appendix pp 4–5).

For physical violence, significant associations were with LLSID, depressive symptoms, being a man, younger age, cohabiting, being single (never married), or being divorced, not being a homeowner, larger household size (four or more residents), and financial hardship (appendix pp 6–7).

For sexual violence, significant associations were with depressive symptoms, being a woman, younger age, being single, or divorced, a higher education degree, caregiving responsibilities, larger household size (four or more residents), and financial hardship (appendix pp 8–9).

Unweighted descriptive analyses showed similar results (appendix pp 24–29).

Regression modelling (table 2) showed that, when adjusting for covariates, both LLSID (aOR 1·49; 95% CI 1·10–2·03) and probable depression (1·38; 1·01–1·89), implied by a Centre for Epidemiologic Studies Depression Scale score of at least 4, remained associated with childhood abuse. LLSID (1·63; 1·28–2·07) and probable depression (1·42; 1·11–1·82) both remained associated with physical violence when adjusting for covariates. Additionally, LLSID (1·31; 1·10–1·56) and probable depression (1·34; 1·12–1·60) were associated with any violence. However, in adjusted models, LLSID and probable depression were not significantly associated with sexual violence.

Unadjusted models of depressive symptoms score as an outcome suggested that men and women who experienced childhood abuse, physical violence, or any violence had a significantly higher depression score as they aged. Sexual violence was significantly associated with a higher depression score in women only (appendix pp 10–11).

With adjustments, significant associations between childhood abuse (men: β 0·32, p=0·017; women: β 0·32, p=0·0077), physical violence (men: 0·27, p=0·0025; women: 0·40, p=0·0001), and any violence (men: 0·24, p=0·0008; women: 0·22, p=0·0011) and increased depressive symptoms scores remained for men and women as they aged (appendix pp 12–13). Associations between sexual violence and depression score were not significant in both men (β 0·21, p=0·14) and women (0·12, p=0·13). The trajectories of depressive symptoms also show that the mean score remained consistently higher across the waves for men and women who experienced physical violence, childhood abuse, or any violence (figure 1). However, the interactions between the wave of data collection and violence measured at wave 3 were predominantly not significant, indicating a consistent effect of violence on health across the study period (appendix pp 12–13).

As changes in depression score alone do not quantify the extent of clinically significant change, we also estimated results based on the proportion meeting a recognised threshold for a clinically significant level of depressive symptoms. Unadjusted models for a binary depression outcome showed significant associations between childhood abuse, physical violence, and any violence for both men and women (appendix pp 14–15). For sexual violence, the association was significant only for men (appendix pp 14–15). Adjusted models showed that childhood abuse (men: aOR 2·14, 95% CI 1·05–4·35; women: aOR 1·40, 95% CI 0·82–2·37), lifetime experience of physical violence (men: 2·07, 1·29–3·31; women: 1·54, 0·97–2·45), and lifetime experience of sexual violence (men: 2·29, 1·07–4·87; women: 1·28, 0·88–1·85) predicted probable depression in men but not in women. Significant associations of probable depression with any violence experienced were found in men (aOR 1·99, 95% CI 1·34–2·94) and women (1·38, 1·02–1·86). The non-significant interactions between the experience of violence and waves on depression score indicate sustained associations with violence across time (appendix pp 16–18). The trajectories of depression also showed consistently higher likelihood of depression over time for men who reported child abuse, physical violence, and any violence and for women who reported physical violence and any violence (figure 2).

Unadjusted models suggested that physical violence, childhood abuse, and any violence were significant predictors of LLSID in both men and women but no significant associations were found for sexual violence (appendix pp 19–20). The trajectories of LLSID in adjusted models showed that the likelihood of LLSID remained higher for all types of violence for most waves except for sexual violence in both men and women (figure 3). Experience of physical violence (men: aOR 2·15, 95% CI 1·21–3·81; women: aOR 4·53, 95% CI 2·50–8·24) and experience of any type of violence (men: 1·74, 1·08–2·81; women: 2·15, 1·45–3·17) were significantly associated with LLSID in both men and women. Childhood abuse predicted LLSID in women (aOR 2·53, 95% CI 1·29–4·97) but not in men (2·31, 0·97–5·48). Sexual violence was not associated with LLSID in both men (0·77, 95% CI 0·28–2·12) and women (1·52, 0·94–2·43). The interactions between the wave and experience of violence on LLSID were not significant (appendix pp 21–23).

	Childhood abuse	Physical violence	Sexual violence	Any violence
Gender				
Men	1·00 (ref)	1·00 (ref)	1·00 (ref)	1·00 (ref)
Women	1·22 (0·90–1·65)	0·56 (0·45–0·71)	3·35 (2·55–4·41)	1·13 (0·96–1·34)
Age	0·97 (0·96–0·99)	0·96 (0·94–0·97)	0·94 (0·92–0·95)	0·95 (0·94–0·96)
Martial status				
Married	1·00 (ref)	1·00 (ref)	1·00 (ref)	1·00 (ref)
Cohabiting	1·11 (0·58–2·12)	1·84 (1·20–2·83)	0·78 (0·45–1·36)	1·29 (0·91–1·81)
Single—never married	1·46 (0·76–2·83)	1·64 (0·99–2·72)	1·65 (0·99–2·74)	1·21 (0·81–1·80)
Widowed	0·94 (0·55–1·60)	0·99 (0·63–1·56)	1·10 (0·72–1·68)	1·05 (0·77–1·42)
Divorced	1·14 (0·70–1·88)	2·00 (1·39–2·86)	1·50 (1·03–2·17)	1·61 (1·22–2·13)
Region				
Northeast (ref)	1·00 (ref)	1·00 (ref)	1·00 (ref)	1·00 (ref)
Northwest	0·84 (0·42–1·68)	1·01 (0·59–1·73)	1·77 (0·96–3·28)	1·11 (0·75–1·66)
Yorkshire and the Humber	1·08 (0·57–2·07)	1·22 (0·73–2·06)	1·26 (0·67–2·37)	1·23 (0·83–1·82)
East Midlands	1·08 (0·56–2·10)	1·15 (0·68–1·96)	1·57 (0·84–2·94)	1·19 (0·80–1·77)
West Midlands	1·06 (0·54–2·08)	1·15 (0·67–1·98)	1·64 (0·88–3·08)	1·21 (0·81–1·80)
East of England	0·88 (0·45–1·72)	0·97 (0·57–1·64)	1·86 (1·01–3·39)	1·15 (0·78–1·70)
London	0·93 (0·46–1·91)	1·24 (0·71–2·15)	1·54 (0·80–2·95)	1·21 (0·80–1·84)
Southeast	1·05 (0·56–1·99)	0·93 (0·55–1·58)	1·86 (1·03–3·36)	1·12 (0·77–1·64)
Southwest	0·74 (0·37–1·50)	1·05 (0·61–1·80)	1·88 (1·02–3·47)	1·15 (0·77–1·72)
Higher education				
No	1·00 (ref)	1·00 (ref)	1·00 (ref)	1·00 (ref)
Yes	1·61 (1·10–2·35)	1·25 (0·93–1·69)	1·53 (1·14–2·04)	1·40 (1·13–1·74)
Occupational classification				
Managerial and professional	1·00 (ref)	1·00 (ref)	1·00 (ref)	1·00 (ref)
Intermediate	0·81 (0·54–1·21)	1·10 (0·81–1·48)	1·05 (0·78–1·40)	1·00 (0·80–1·24)
Routine and manual	1·09 (0·76–1·59)	0·94 (0·70–1·26)	0·89 (0·66–1·19)	0·92 (0·74–1·13)
Never worked or long-term unemployed	1·22 (0·35–4·22)	2·00 (0·79–5·07)	1·08 (0·37–3·20)	1·41 (0·67–2·97)
Tenure				
Non-owner	1·00 (ref)	1·00 (ref)	1·00 (ref)	1·00 (ref)
Homeowner	1·04 (0·70–1·54)	0·73 (0·55–0·98)	1·26 (0·90–1·78)	0·89 (0·71–1·11)
Caregiving				
No	1·00 (ref)	1·00 (ref)	1·00 (ref)	1·00 (ref)
Yes	0·95 (0·64–1·41)	0·85 (0·61–1·18)	1·22 (0·92–1·61)	1·08 (0·87–1·34)
Household size	1·08 (0·91–1·28)	1·09 (0·96–1·24)	0·94 (0·81–1·08)	1·03 (0·93–1·14)
Financial hardship				
Not mentioned	1·00 (ref)	1·00 (ref)	1·00 (ref)	1·00 (ref)
Mentioned	4·28 (3·20–5·73)	3·02 (2·40–3·80)	2·53 (1·99–3·21)	2·79 (2·36–3·31)
Limiting long-standing illness or disability				
No limiting illness	1·00 (ref)	1·00 (ref)	1·00 (ref)	1·00 (ref)
Has limiting illness	1·49 (1·10–2·03)	1·63 (1·28–2·07)	1·08 (0·84–1·39)	1·31 (1·10–1·56)
Depression				
No	1·00 (ref)	1·00 (ref)	1·00 (ref)	1·00 (ref)
Yes	1·38 (1·01–1·89)	1·42 (1·11–1·82)	1·26 (0·98–1·62)	1·34 (1·12–1·60)

Data are adjusted odds ratios (95% CIs). Covariates were gender, age, marital status, region, higher education, occupational class, housing tenure, caregiving, household size, financial hardship, limiting long-standing illness or disability, and depression (Centre for Epidemiologic Studies Depression Scale score ≥4).

Table 2: **Factors associated with reporting lifetime experience of violence and abuse at wave 3**

Discussion

Our study shows that violence of different kinds predicts worse physical health and worse mental health in later life, and that the associations between lifetime violence and the health of older people (both men and women) remained consistent over time.

Physical violence was the most prominent predictor of worse health in older age. The associations between childhood abuse and depression score and LLSID also remained significant over time in both men and women, indicating long-lasting effects of childhood abuse.

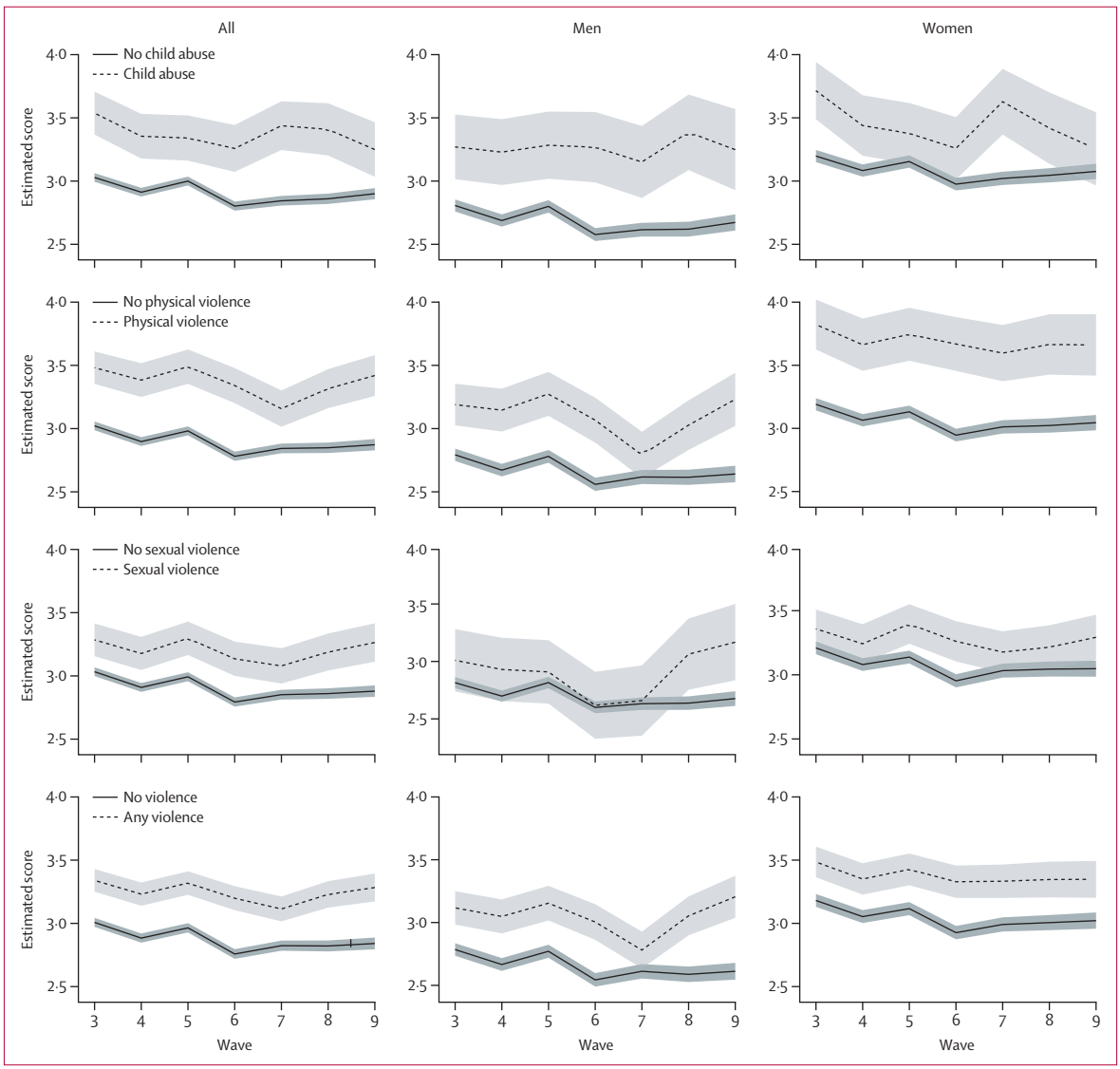

Figure 1: **Mean depressive symptoms score over time by experiences of violence**
Graphs show estimated scores from the Centre for Epidemiologic Studies Depression Scale and 95% CIs, adjusted for covariates (age, age squared, gender, marital status, geographical region, education, occupational class, housing tenure, caregiving, household size, financial hardship, and limiting long-standing illness or disability).

The results for the association between sexual violence and health were mixed depending on the outcome and gender. Sexual violence was least likely to predict negative changes in health outcomes in adjusted models, with the only significant association found with probable depression in men. This finding could be because the question on sexual violence in the survey covered a wide range of types of sexual abuse, including harassment and rape, and the health effects of these two types of violence might differ.[26] Observed gender differences in the associations with violence can also reflect differences in exposure, reflecting the type and severity of sexual violence experienced rather than how men and women are affected by violence. Women might experience a wider range of types of sexual abuse, whereas men might tend to mainly report sexual abuse that involves physical contact, which can lead to mixed evidence on gender interactions in the association between sexual violence and mental health.[27]

We identified differences in associations between violence and depressive symptoms in men and women, which also depended on the outcome variable used. In the adjusted model with depressive symptoms as a continuous outcome, the associations with violence were similar across genders. When the binary measure (with a score ≥4 indicating probable depression) was used, all types of violence predicted probable depression in men, whereas in women the only significant association was with any experience of violence. One explanation for the difference

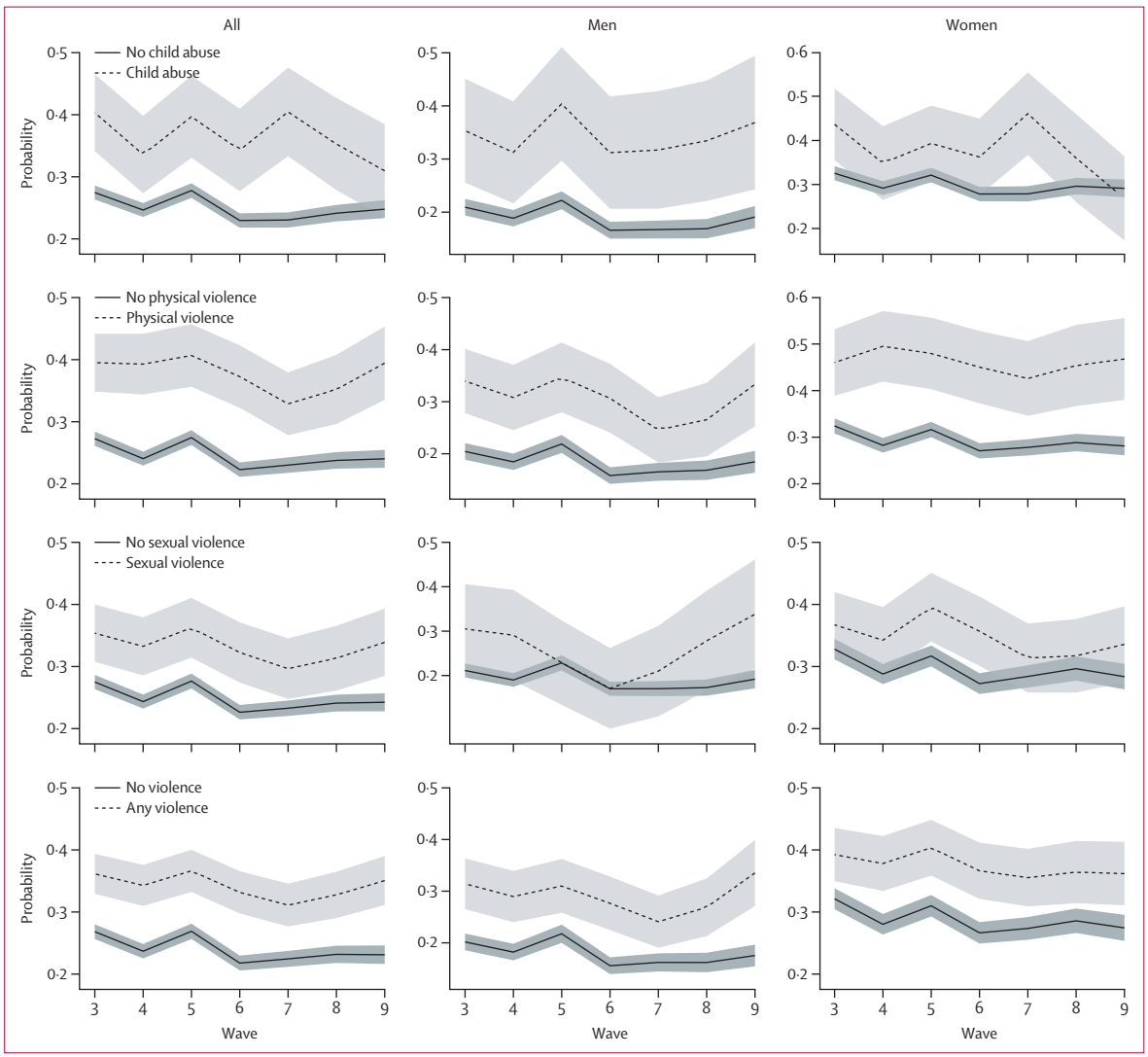

Figure 2: **Likelihood of having depression over time by experiences of violence**
Probable depression is defined as a score on the Centre for Epidemiologic Studies Depression Scale of 4 or more. Graphs show estimated probabilities and 95% CIs, adjusted for covariates (age, age squared, gender, marital status, geographical region, education, occupational class, housing tenure, caregiving, household size, financial hardship, and limiting long-standing illness or disability).

in these results might be that women tend to have more depressive symptoms than men,[28] and increased depression scores in women can be attributable to other factors. There is a possibility of a healthy survivor effect—those who had the most severe health outcomes might not have been able to participate in the survey.

Previous studies used cross-sectional samples of younger people (eg, excluded participants aged 49–74 years) or combined older participants in one subgroup to establish an association between violence and poor health, with little scope to examine longitudinal trajectories across the life course. By using a cohort of older adults followed up for a 13-year period, this study revealed how previous experiences of different types of violence and abuse were associated with physical and mental health disadvantages sustained across years in later life.

The one previous longitudinal study, in Australian women, found trajectories in health between older women who had and had not experienced intimate partner violence converged as they aged.[10] In contrast, we found little to indicate that health disparities between people who experienced violence versus those who did not reduce over time.

This study contributes to the scarce evidence on the long-term effects of violence on health in later life. To our knowledge, this is the first study to use longitudinal data to examine the associations between violence and subsequent health trajectories in older people in England, distinguishing violence from broader categories of adversity.[9]

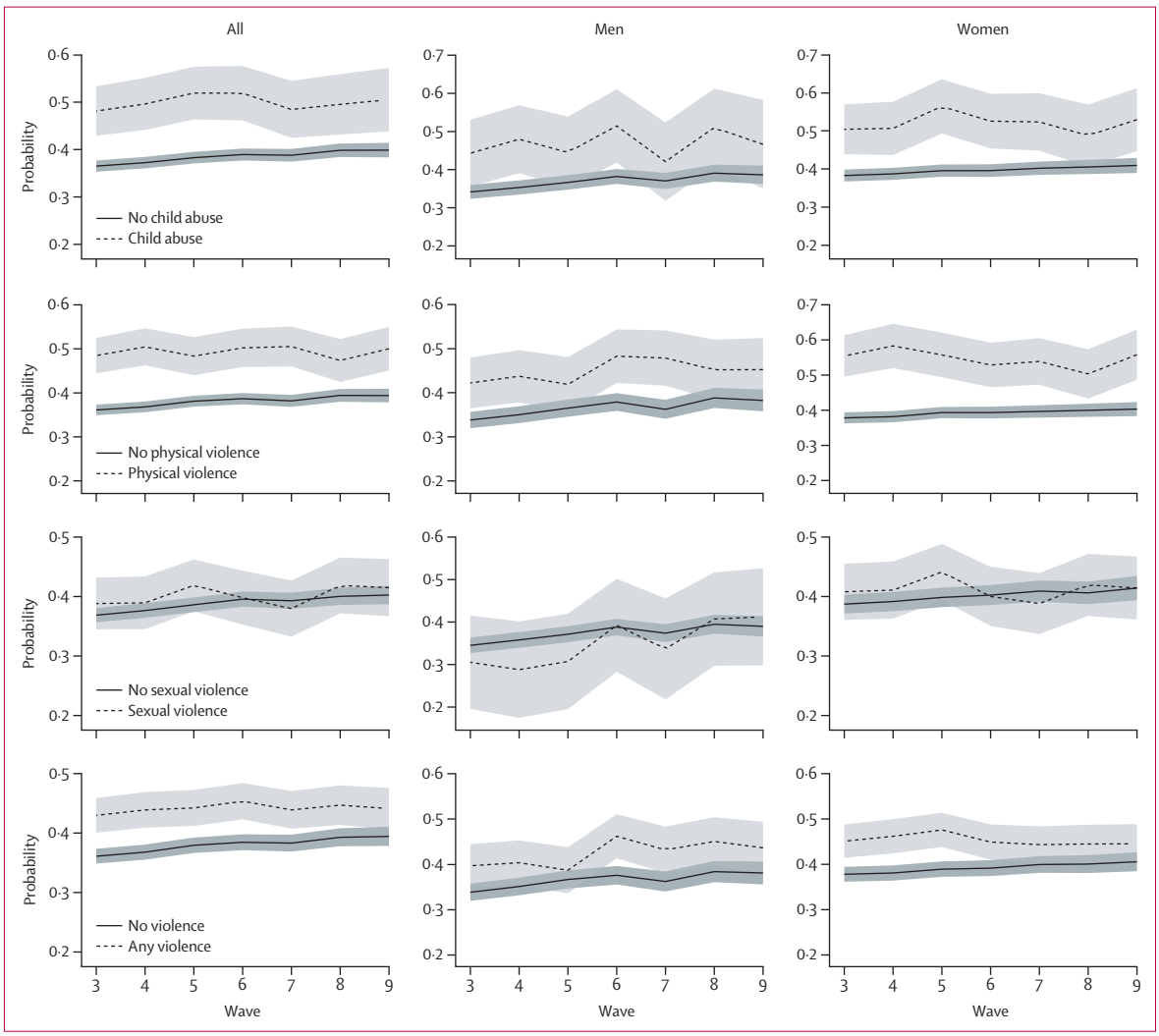

Figure 3: **Likelihood of having a limiting long-standing illness or disability over time by experiences of violence**
Graphs show estimated probabilities and 95% CIs, adjusted for covariates (age, age squared, gender, marital status, geographical region, education, occupational class, housing tenure, caregiving, household size, and financial hardship).

The findings are probably relevant across and beyond the UK. ELSA data included different forms of violence, and the sample size allowed us to distinguish their effects. The lifetime experiences of violence also allowed for measuring potential long-term effects. Although this study did not examine specific health conditions, LLSID includes chronic conditions known to be associated with violence and abuse,[7] and the use of a grouping variable increases statistical power to identify associations with health. Furthermore, the use of self-reported symptom measures for both LLSID and depressive symptoms provided a real-time assessment of participants' health, did not depend on service contact, and reduced recall bias.

Evidence suggests ethnic inequalities in violence prevalence in older age[5] and ethnic variations in associations between violence and health.[29] However, our sample was too small to robustly examine ethnicity in this study. Previous research showed strong associations between childhood sexual abuse and a range of mental health conditions, including depression.[7] The absence of significant associations between health outcomes and sexual violence among men and women separately and relatively wide CIs for associations between childhood abuse and LLSID and probable depression might indicate the need for larger subsamples. The survey did not collect any information on the number of violent incidents and victim–perpetrator relationships (except for childhood abuse), all of which could affect the extent and nature of health harms.[4,30] The survey only collected information about the experience of violence at wave 3, which meant participants' later experiences were not recorded. It is therefore not possible to analyse changes in health associated with changes in exposure to violence. Questions about ever experiencing serious physical violence and

sexual violence capture lifetime experiences of violence, which makes it difficult to differentiate between childhood and adulthood incidents. Also, childhood abuse is associated with increased risk for subsequent abuse or violence,[27] which could result in a cumulative harm to health.

The physical violence question only asked about serious physical violence, and the severe forms were potentially more likely to cause health problems. Our findings support an association between childhood physical abuse by parents and health in older age, but these might be conservative because childhood sexual and emotional abuse, as well as abuse by others (not parents), were not included in the childhood abuse variable.[7]

The survey's sampling frame excludes people in care homes, hospitals, and prisons and people who are homeless, all of whom have elevated risks of violence and health issues. As the survey asked about lifetime experience of violence, which could have occurred long ago, there is potential for recall biases. Finally, experience of violence is a sensitive issue and likely to be under-reported generally.

Experiences of childhood and lifetime violence have long-term health implications, with sustained contributions to worse health throughout older age. Violence prevention can play a role in supporting healthy ageing and reducing disease burden for individuals and society globally. More awareness is needed around the continued effect of violence on physical and mental health in older age among policy makers, health-care professionals, and other service providers. There is a need for more longitudinal data from different countries with detailed information on violence exposure and health, including measurements at multiple timepoints for both. Improved recording of violence in health-care data[31] could present an option for further examining long-term health trajectories and assessing the effects of previous violence exposure on specific chronic conditions and health-care demands in later life.

Contributors

AF and PO were responsible for the study conceptualisation, data verification, data curation, and data analysis. SM, ECB, and GF secured the funding. AF, PO, and SM developed the study methodology. All authors had access to the data and contributed to the interpretation of the results. AF was responsible for the project administration and wrote the original draft. SM provided supervisory support. All authors provided critical revisions, editing, and approved the final version for publication.

Declaration of interests

We declare no competing interests.

Data sharing

The ELSA data are freely available through the UK Data Service at https://beta.ukdataservice.ac.uk/datacatalogue/series/series?id=200011.

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