

Long-Term Effects of Childhood Abuse on the Quality of Life and Health of Older People: Results from the Depression and Early Prevention of Suicide in General Practice Project

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OBJECTIVES: To determine whether childhood physical and sexual abuse are associated with poor mental and physical health outcomes in older age.

DESIGN: Cross-sectional, postal questionnaire survey.

SETTING: Medical clinics of 383 general practitioners (GPs) in Australia.

PARTICIPANTS: More than 21,000 older adults (aged ≥ 60) currently under the care of GPs participating in the Depression and Early Prevention of Suicide in General Practice (DEPS-GP) Study. Participants were divided into two groups according to whether they acknowledged experiencing childhood physical or sexual abuse.

MEASUREMENTS: Main outcome measures targeted participants' current physical health (Medical Outcomes Study 12-item Short Form Survey, Version 2 and Common Medical Morbidities Inventory) and mental health (Patient Health Questionnaire-9 and Hospital Anxiety and Depression Scale).

RESULTS: One thousand four hundred fifty-eight (6.7%) and 1,429 participants (6.5%) reported childhood physical and sexual abuse, respectively. Multivariate models of the associations with childhood abuse indicated that participants who had experienced either childhood sexual or physical abuse had a greater risk of poor physical (odds ratio (OR) = 1.35, 95% confidence interval (CI) = 1.21–1.50) and mental (OR = 1.89, 95% CI = 1.63–2.19) health, after adjustments. Older adults who reported both childhood sexual and physical abuse also had a higher risk of

poor physical (OR = 1.60, 95% CI = 1.33–1.92) and mental (OR = 2.40, 95% CI = 1.97–2.94) health.

CONCLUSION: The effects of childhood abuse appear to last a lifetime. Further research is required to improve understanding of the pathways that lead to such deleterious outcomes and ways to minimize its late-life effects. *J Am Geriatr Soc* 2007.

Key words: childhood abuse; primary care; current health status

Numerous studies have demonstrated an association between childhood sexual and physical abuse and impairments in adult physical and mental health.^{1–5} Adult mental health consequences of childhood abuse include depression, anxiety disorders, eating disorders, sexual disorders, suicidal behavior, and substance abuse, whereas physical health effects include chronic pain, gynecological problems, irritable bowel syndrome, diabetes mellitus, arthritis, headaches, cardiovascular disease, and chronic fatigue syndrome.^{6–8}

Most studies have focused on health outcomes in early and middle adulthood, with only limited data available on older people. One exception is the Adverse Childhood Experiences (ACE) Study from a health maintenance organization, which included a cohort of 5,588 participants aged 65 and older in an analysis of the effects of adverse childhood experiences over four birth cohorts from 1900 to 1978.⁹ Each of the six health outcomes examined (depressed affect, lifetime suicide attempts, multiple sexual partners, sexually transmitted diseases, smoking, and alcoholism) was found to be associated with adverse childhood experiences in each of the four birth cohorts. Furthermore, the risk of developing the health outcome was related to the degree of exposure to adverse childhood experiences. These data suggest that the effects of childhood abuse extend into late life, but data are limited, because other studies that

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have included older participants on mental and physical health outcomes have not examined the late-life cohort separately.^{1,2,4,10}

A number of possible pathways that link childhood abuse with adult health outcomes have been hypothesized, including emotional, behavioral, social, cognitive, and biological.^{9,11} Emotional pathways are particularly focused on mental health outcomes such as depression, posttraumatic stress disorder (PTSD), and suicidal behavior and may operate by conferring susceptibility to mood disorders, by increasing the likelihood of the development of aggressive or impulsive personality traits, and by impairing the individual's sense of personal control.^{6,11-13} Behavioral pathways link childhood abuse and adult health outcomes through health-related behaviors, such as smoking, substance abuse, overeating, high-risk sexual behavior, and suicidal behavior.^{6,11,12} In essence, victims of child abuse are more likely to engage in high-risk behaviors that are deleterious to health. Social pathways link childhood abuse and health outcomes through difficulties in establishing intimate relationships, low self-esteem, and psychological distress.^{6,11} The association between dysfunctional relationships and adverse mental health outcomes in late life, such as depression, has been frequently reported,^{14,15} but there are also physical effects, with evidence of impaired physical health in people with an impoverished social support network.¹⁶

Cognitive pathways include the beliefs and attitudes that shape daily life.^{6,11} Health perception is of particular importance and relates to whether people consider themselves to be healthy. Victims of abuse are more likely to self-rate their health as poor, and self-rated health has been found to be a strong predictor of mortality.¹¹ Biological pathways involve the stress response. Abnormalities in the hypothalamic-pituitary-adrenocortical axis and autonomic responses have been documented in women after childhood sexual and physical abuse.¹⁷ This type of adaptation to stress with chronic hyperarousal might affect cardiovascular health. High levels of physiological reactivity are a consistent finding in survivors of posttraumatic stress, and this might affect diastolic blood pressure and basal heart rate.¹⁸ A history of childhood abuse has been found to increase the risk of cardiovascular disease in middle-aged women but not men.⁸ Increased activity in the hypothalamic-pituitary-adrenocortical axis has also been found to suppress immune functioning in women with PTSD who suffered childhood abuse.¹⁹

The aims of the current study were to ascertain whether childhood physical and sexual abuse are associated with mental and physical health outcomes in late life by examining health measures in a large general practice sample of Australian participants aged 60 and older recruited for the DEPS-GP Study of late-life depression. It was hypothesized that measures of childhood abuse would predict impaired physical and mental health outcomes in late life and that this would be associated with evidence of behavioral and social pathway impairments.

METHODS

Participants

The current study draws on the DEPS-GP project, a multicenter randomized, controlled trial designed to test an

educational intervention in general practice aimed at increasing awareness about depression and suicidality in later life. It is being conducted across five Australian states (New South Wales, Victoria, Queensland, Western Australia, and South Australia) and involves researchers from eight universities. It has ethics approval from the participating universities in each state and from the Royal Australian College of General Practitioners.

Nineteen thousand forty-six general practitioners (GPs) were identified from a list purchased from the Australasian Medical Publishing Company Proprietary Limited and invited by letter to participate. The invitation letter included a project description, ethics information, and a consent form. It also included a brief survey designed to determine whether the given GP met the study's inclusion criteria (namely working at least 2 days a week, having at least 50 patients aged ≥ 60 who spoke English, and not planning to retire or move practice within the next 2 years).

Overview of Protocol

Consenting GPs were randomized into an educational intervention group and a control group. Intervention and control GPs agreed to take part in a practice audit and distribute a postal questionnaire to their older patients. Baseline audits and postal questionnaires were conducted in 2006, and follow-up administrations will occur over the next 2 years. The data reported in the current study are from the baseline postal questionnaire, so additional detail is provided here about the way in which it was conducted.

The baseline postal questionnaire was administered to all patients aged 60 and older of each participating GP and was designed to assess the prevalence of depression and suicidality in this group. GPs were required to generate a list of names and addresses of their older patients (usually from relevant electronic record systems) and could choose to send the questionnaire out themselves or to provide the list to the study team, who sent the questionnaire out on their behalf. Irrespective of the distribution method, each patient received a personalized cover letter from his or her GP, accompanied by the 16-page questionnaire, project information, a consent form, and a reply-paid envelope addressed to the study team. GPs and their reception staff were provided with detailed materials and instructions regarding the postal questionnaire.

Outcomes of Interest

The primary outcomes of interest in this study were poor physical and mental health, which were based on composite scores obtained from a number of relevant measures, as described below.

Poor Physical Health

A medical morbidity inventory was used to ascertain the presence of common medical conditions of older age.²⁰ Briefly, subjects were asked "Have you ever been told *by a doctor* that you have or have had any of the following medical conditions?" The list included arthritis, diabetes mellitus (high blood sugar), hypertension (high blood pressure), stroke, heart attack or angina pectoris (pain from the heart), heart failure, poor circulation to legs, asthma or chronic bronchitis, emphysema, osteoporosis, cancer (ex-

cept for skin cancer), and thyroid disease. Subjects who reported having three or more of the conditions listed above were considered to have a high burden associated with physical health problems.

In addition, the Medical Outcomes Study 12-item Short Form Survey, Version 2 (SF-12v2) Physical Composite Score (PCS) was used as a valid and reliable measure of physical health (estimated reliability of 0.89).²¹ The population norm-based score for the PCS is 50, with a standard deviation of 10.²¹ Hence, participants with PCS scores of 40 or less have physical ratings one standard deviation below that of the population (i.e., the lowest 15.9% health ratings of the population).

For the purposes of this study, participants who reported three or more concurrent medical morbidities or had a total PCS score of 40 or less were considered to have poor physical health.

Poor Mental Health

The assessment of mental health was based on the scores of three widely used and valid measures. The first was the SF-12v2 Mental Composite Score (MCS) (estimated reliability of 0.86).²¹ As previously described for the PCS score, the MCS has a population norm score of 50 and a standard deviation of 10.²¹ Hence, participants with MCS scores of 40 or less have mental health ratings one standard deviation below that of the population (i.e., the lowest 15.9% health ratings of the population).

The second mental health measure was based on the ratings of the Patient Health Questionnaire (PHQ-9), which is the nine-item self-administered depression module of the Primary Care Evaluation of Mental Disorders diagnostic instrument for common mental disorders.²² The PHQ-9 scores each of the nine *Diagnostic and Statistical Manual of Mental Disorders, Fourth Revision*, depression criteria as 0 (not at all) to 3 (nearly every day) over the previous 2 weeks. Higher scores indicate more-severe depression, with scores lower than 5 indicating no depression; 5 to 14, doubtful or mild depression; and 15 or more, clinically significant depression.²² The PHQ-9 has a Cronbach alpha of 0.89 in general practice patient populations.²²

The third measure of mental health used in the study was the Hospital Anxiety and Depression Scale (HADS). The HADS is a 14-item self-report scale with two seven-item subscales that measure symptoms of depression and anxiety.²³ Subjects with an HADS-anxiety (HADS-A) subscore of 11 or higher are considered to have clinically significant anxiety symptoms.²³ The anxiety subscale of the HADS-A has a Cronbach alpha of 0.82.²⁴

Participants with an MCS score of 40 or less, a PHQ-9 score of 15 or more, or an HADS-A score of 11 or more were considered to have poor mental health.

Explanatory Variables

This study was designed to test the hypothesis that childhood physical and sexual abuse are associated with poor physical and mental health. Childhood abuse was assessed with the following two questions. "Were you the victim of any physical abuse before you were 15 years old?" "Were you the victim of any sexual abuse before you were 15 years old?"

Other measured factors included age, sex, birthplace (Australia, other), marital status (single, married, divorced, separated, widowed, living together), highest educational attainment (primary school, secondary school, technical school, university), living arrangements (alone/with others), religion (practicing/not practicing), and whether participants were younger than 15 at the time of the death of their mother or father. Information was also collected about current and lifetime cigarette smoking, alcohol consumption, and physical activity. Participants were considered to drink at a hazardous or harmful level if they consumed more than four units of alcohol per day and to be physically active if they engaged in moderate or vigorous physical activity for at least half an hour per day on 5 or more days of the week. Happiness was assessed with the question "How would you rate the way that you have been feeling lately?" (very happy, fairly happy, not very happy, not happy at all) and the number of lifetime suicide attempts with the question "How often have you attempted to kill yourself in your lifetime?" (0, ≥ 1).

The Subjective Support Subscale from the Duke Social Support Index was used to measure perceived social support.²⁵ The scale has been validated in healthy and sick elderly people, with Cronbach alphas of 0.75 and 0.71, respectively.²⁵ The original seven-item scale was adapted to eight items by splitting the seventh item that in the original scale included family and friends into two items that covered family and friends separately. Higher scores indicate higher levels of social support.

Data Analysis

The data were analyzed using the statistical package Stata 9.2 (Stata Corp., College Station, TX). Participants were separated into groups according to whether they had experienced childhood physical or sexual abuse. The demographic and clinical characteristics of participants are reported, as is the odds ratio associated with either form of abuse. This way of comparing groups expresses the association between variables (ratio of the odds) as a number ranging between 0 and infinity, with ratios below 1 indicating a protective effect; 1, no association, and greater than 1, greater risk. If the 95% confidence interval (CI) includes the ratio 1, the association is nonsignificant. Logistic regression models were used to investigate the association between poor physical and mental health and childhood abuse. This approach was chosen, because physical morbidity ratings were categorical; the distributions of PCS (Shapiro-Wilk test $z = 16.49$, $P < .001$), MCS (Shapiro-Wilk test $z = 18.53$, $P < .001$), PHQ-9 (Shapiro-Wilk test $z = 20.04$, $P < .001$), and HADS-A (Shapiro-Wilk test $z = 17.92$, $P < .001$) were highly skewed; and the distribution could not be improved with logarithmic transformation. In addition, a summary measure of physical and mental health was developed that was based on clinically relevant endpoints. Finally, most explanatory variables were categorical, which further supported the use of a non-linear model.

A stepwise approach was used to adjust the logistic models investigating the association between poor physical and mental health and childhood abuse. The first model was adjusted for the effect of age, sex, marital and migrant sta-

tus, and education. In the second, additional adjustments were made for social support, religion, physical activity, smoking, and alcohol consumption. In the third and most restrictive model, further adjustments were made for poor mental (or physical) health and participants' sense of happiness to investigate the association between childhood abuse and poor physical (or mental) health. All analyses were adjusted for the effect of clustering, with the GP of participants representing the primary sampling unit. (The robust method was used to calculate the standard error of regression coefficients.) Briefly, this adjustment takes into account the fact that participants under the care of one particular GP have more in common with each other than with participants under the care of another GP.

RESULTS

Sociodemographic Measures

The sampling and recruitment strategy yielded 772 GPs who made an initial expression of interest to participate in the project, from whom 383 (49.6%) participated in the postal questionnaire. These GPs were located in New South Wales ($n = 155$), Victoria ($n = 98$), Queensland ($n = 56$), Western Australia ($n = 49$), and South Australia ($n = 25$). The 383 GPs sent out a total of 77,820 questionnaires (an average of 203 each). In total, 22,251 questionnaires (28.6%) were returned. Of these, 21,819 (98.1%) were completed sufficiently enough to be analyzed for the physical abuse question, 21,822 (98.1%) for the sexual abuse question, and 21,755 (97.8%) for both types of abuse. The mean age of participants \pm standard deviation was 71.9 ± 7.7 . There was a larger proportion of women (58.7%) than men (41.3%) in the sample.

One thousand four hundred fifty-eight participants reported childhood physical abuse (6.7%), 1,429 reported childhood sexual abuse (6.5%), 2,186 participants reported childhood physical or sexual abuse (10.0%), and 662 participants reported both types of abuse (3.0%). Participants aged 60 to 69 had the highest rates of both childhood physical (9.0%) and sexual abuse (9.5%), followed by those aged 70 to 79 (physical abuse, 5.7%; sexual abuse, 5.1%), with those aged 80 and older having the lowest rate of physical (3.1%) and sexual abuse (2.6%). Overall, women were significantly more likely to report childhood abuse (OR = 1.34, 95% CI = 1.22–1.47), which was largely accounted for by sexual abuse (OR = 2.20, 95% CI = 1.96–2.48). There were no significant sex differences in the reporting of childhood physical abuse. Death of either parent before the age of 15 was associated with a greater risk of both types of childhood abuse. There were no significant differences between Australian-born participants and migrants in the overall risk of childhood abuse, although Australian-born participants were more likely to report sexual abuse, and migrants were more likely to report physical abuse (Tables 1 to 3).

Both types of childhood abuse were significantly associated with lower rates of marriage in late life, which the higher prevalence of broken relationships largely accounted for (Tables 1 to 3). They also had a slightly greater likelihood of living alone. Both types of childhood abuse were also significantly associated with low levels of participative social support, as measured using the Participative Support

Subscale from the Duke Social Support Index. Victims of physical abuse (but not sexual abuse) were also less likely to be currently practicing their religion. In contrast, both types of childhood abuse were significantly associated with a greater likelihood of having attended tertiary education.

Health Behaviors

Participants who reported either type of childhood abuse were more likely to be currently smoking or to have ever smoked cigarettes. Similarly, participants who reported current alcohol consumption at potentially harmful levels were also significantly more likely to report childhood abuse. Physically active participants reported slightly lower levels of childhood abuse. Both types of abuse were also associated with a significantly higher risk of lifetime suicidal behavior.

Health Outcomes

Physical Health

Overall physical health burden was examined by tallying the number of medical diseases for each participant. Both types of childhood abuse were significantly associated with a greater risk of having three or more medical diseases. There were also significant associations for both types of childhood abuse with low physical function on the SF-12, as defined by a PCS score of 40 or less (Tables 1 to 3). Cardiovascular events (myocardial infarction and stroke) were associated with physical or sexual abuse in women (OR = 1.21, 95% CI = 1.06–1.39) but not men (OR = 1.13, 95% CI = 0.97–1.31). Similarly, cardiovascular events were more frequent in women who had been physically and sexually abused (OR = 1.19, 95% CI = 1.07–1.32) but not men (OR = 1.16, 95% CI = 0.99–1.34).

Mental Health

Both types of childhood abuse were significantly associated with a range of poor mental health outcomes. These included low SF-12 mental function, as defined by an MCS score of 40 or less; high depression scores on the PHQ-9; high anxiety scores on the HADS-A scale; and low happiness ratings (Tables 1 to 3).

Multivariate Models of the Associations of Childhood Abuse

Three multivariate models were developed that examined the associations between childhood abuse and late-life health outcomes. All models were adjusted for the effect of clustering. Poor physical health was defined as a PCS score of 40 or less or presence of three or more medical conditions. Poor mental health was defined as an MCS score of 40 or less, a PHQ-9 score of 15 or greater, or an HADS-A score of 11 or greater.

Model 1 was adjusted for age, sex, marital and migrant status, and education. Participants who had experienced either childhood sexual abuse or childhood physical abuse had a greater risk of poor physical (OR = 1.70, 95% CI = 1.54–1.86) and mental (OR = 2.83, 95% CI = 2.52–3.17) health (Table 4). Participants who experienced both childhood sexual and physical abuse were at even higher risk of poor physical (OR = 2.55, 95% CI = 1.79–2.47)

Table 1. Demographic, Social, Lifestyle, and Health Effects of Childhood Physical Abuse

Variable	Not Physically Abused (n = 20,361)	Physically Abused (n = 1,458)	Odds Ratio* (95% Confidence Interval)
	n (%)		
Sociodemographic factors			
Age			
60–69	8,716 (43.2)	858 (59.5)	1
70–79	7,639 (37.9)	461 (31.9)	0.61 (0.54–0.70)
≥80	3,821 (18.9)	124 (8.6)	0.33 (0.27–0.40)
Female	11,956 (58.8)	856 (58.7)	1.00 (0.89–1.11)
Australian migrant	5,164 (25.5)	425 (29.3)	1.21 (1.06–1.37)
Aged <15 when mother died	925 (4.5)	133 (9.2)	2.12 (1.75–2.57)
Aged <15 when father died	1,718 (8.5)	178 (12.4)	1.53 (1.28–1.84)
Marital status			
Married	13,593 (67.2)	885 (60.9)	1
Single	687 (3.4)	67 (4.6)	1.50 (1.15–1.94)
Separated or divorced	1,679 (8.3)	249 (17.1)	2.28 (1.95–2.66)
Widowed	4,281 (21.1)	251 (17.3)	0.90 (0.77–1.05)
University education	2,897 (14.6)	250 (17.5)	1.24 (1.07–1.44)
Living alone	4,875 (24.1)	387 (26.7)	1.15 (1.01–1.31)
Duke Social Support quartile (score range)			
1 (<32)	4,748 (24.1)	655 (46.5)	1
2 (32–34)	4,955 (25.2)	344 (24.4)	0.50 (0.44–0.57)
3 (35–37)	4,592 (23.3)	230 (16.3)	0.36 (0.31–0.42)
4 (38–40)	5,368 (27.3)	178 (12.6)	0.24 (0.21–0.28)
Practicing religion	9,309 (47.4)	607 (43.9)	0.87 (0.77–0.98)
Health behaviors			
Physically active	12,679 (63.1)	883 (61.4)	0.93 (0.83–1.04)
Ever smoker	9,497 (47.0)	911 (63.0)	1.92 (1.73–2.13)
Current smoker	1,208 (6.0)	173 (11.9)	2.13 (1.81–2.53)
Harmful or hazardous alcohol use	1,112 (5.5)	145 (9.9)	1.91 (1.61–2.26)
Health-related measures			
Medical Outcomes Study 12-item Short Form Survey			
Physical Component Summary score ≤40	6,713 (35.9)	601 (45.3)	1.47 (1.31–1.65)
Mental Component Summary score ≤40	1,312 (7.0)	245 (18.4)	3.00 (2.59–3.46)
Diabetes mellitus	3,257 (16.0)	278 (19.1)	1.23 (1.08–1.42)
Stroke or myocardial infarction	4,396 (21.6)	378 (25.9)	1.27 (1.13–1.43)
Emphysema	870 (4.3)	88 (6.0)	1.44 (1.17–1.77)
Cancer	2,604 (12.8)	203 (13.9)	1.10 (0.95–1.28)
≥3 medical diseases	8,258 (40.6)	736 (50.5)	1.49 (1.33–1.67)
Happiness rating			
Very happy	7,882 (39.0)	330 (22.8)	1
Fairly happy	10,908 (54.0)	868 (60.0)	1.90 (1.68–2.15)
Not very happy	1,181 (5.8)	188 (13.0)	3.80 (3.12–4.63)
Not happy at all	237 (1.2)	61 (4.2)	6.15 (4.51–8.37)
9-item Patient Health Questionnaire score			
<5	14,903 (79.1)	769 (58.1)	1
5–14	3,438 (18.2)	431 (32.5)	2.43 (2.14–2.75)
≥15	507 (2.7)	124 (9.4)	4.74 (3.88–5.78)
Hospital Anxiety and Depression Scale anxiety subscale score			
<8	16,550 (85.1)	923 (65.7)	1
8–10	1,795 (9.2)	217 (15.5)	2.17 (1.85–2.54)
≥11	1,090 (5.6)	264 (18.8)	4.34 (3.72–5.07)
Ever suicide attempt	373 (1.8)	138 (9.5)	5.60 (4.57–6.87)

Note: The numbers and percentages reported in the cells describe the true number of subjects for whom information was available (e.g., information on age was missing for 200 of 21,819 participants).

* Adjusted for the effect of clustering.

Table 2. Demographic, Social, Lifestyle, and Health Effects of Childhood Sexual Abuse

Variable	Not Sexually Abused (n = 20,393)	Sexually Abused (n = 1,429)	Odds Ratio* (95% Confidence Interval)
	n (%)		
Sociodemographic factors			
Age			
60–69	8,670 (42.9)	906 (63.9)	1
70–79	7,685 (38.0)	412 (29.1)	0.51 (0.46–0.58)
≥80	3,846 (19.0)	99 (7.0)	0.25 (0.20–0.31)
Female	11,733 (57.6)	1,070 (74.9)	2.20 (1.96–2.48)
Australian migrant	5,262 (26.0)	328 (23.1)	0.86 (0.75–0.99)
Aged < 15 when mother died	944 (4.6)	111 (7.8)	1.74 (1.42–2.13)
Aged < 15 when father died	1,719 (8.5)	177 (12.6)	1.55 (1.33–1.81)
Marital status			
Married	13,639 (67.3)	849 (59.8)	1
Single	695 (3.4)	60 (4.2)	1.39 (1.06–1.80)
Separated or divorced	1,676 (8.3)	253 (17.8)	2.42 (2.10–2.79)
Widowed	4,265 (21.0)	257 (18.1)	0.97 (0.84–1.12)
University education	2,871 (14.4)	280 (20.0)	1.48 (1.28–1.72)
Living alone	4,868 (24.0)	390 (27.5)	1.20 (1.07–1.34)
Duke Social Support quartile (score range)			
1 (< 32)	4,856 (24.7)	560 (40.4)	1
2 (32–34)	4,931 (25.0)	367 (26.5)	0.65 (0.57–0.73)
3 (35–37)	4,553 (23.1)	264 (19.1)	0.50 (0.44–0.58)
4 (38–40)	5,353 (27.2)	194 (14.0)	0.31 (0.27–0.37)
Practicing religion	9,287 (47.3)	630 (45.9)	0.95 (0.84–1.06)
Health-related measures			
Physically active	12,740 (63.3)	823 (58.4)	0.82 (0.73–0.91)
Ever smoker	9,626 (47.5)	787 (55.3)	1.36 (1.23–1.51)
Current smoker	1,228 (6.0)	159 (11.1)	1.95 (1.62–2.34)
Harmful or hazardous alcohol use	1,165 (5.7)	92 (6.4)	1.14 (0.91–1.42)
Health outcomes			
Medical Outcomes Study 12-item Short Form Survey			
Physical Component Summary score ≤40	6,742 (36.1)	586 (44.3)	1.41 (1.26–1.59)
Mental Component Summary score ≤40	1,353 (7.2)	204 (15.4)	2.34 (2.02–2.71)
Diabetes mellitus	3,315 (16.3)	219 (15.3)	0.93 (0.80–1.08)
Stroke or myocardial infraction	4,459 (21.9)	318 (25.2)	1.02 (0.90–1.16)
Emphysema	867 (4.2)	92 (6.4)	1.55 (1.24–1.93)
Cancer	2,637 (12.9)	175 (12.2)	0.94 (0.80–1.10)
≥3 medical diseases	8,323 (40.8)	677 (47.4)	1.31 (1.18–1.45)
Happiness rating			
Very happy	7,833 (38.7)	377 (26.5)	1
Fairly happy	10,962 (54.2)	826 (58.1)	1.57 (1.39–1.76)
Not very happy	1,195 (5.9)	173 (12.2)	3.01 (2.47–3.66)
Not happy at all	251 (1.2)	45 (3.2)	3.72 (2.71–5.11)
9-item Patient Health Questionnaire score			
<5	14,870 (78.7)	803 (61.8)	1
5–14	3,483 (18.4)	397 (30.5)	2.11 (1.88–2.37)
≥15	530 (2.8)	100 (7.7)	3.49 (2.82–4.33)
Hospital Anxiety and Depression Scale anxiety subscale score			
<8	16,528 (84.9)	950 (68.6)	1
8–10	1,809 (9.3)	205 (14.8)	1.97 (1.68–2.31)
≥11	1,125 (5.8)	229 (16.5)	3.54 (3.06–4.10)
Ever suicide attempt	389 (1.9)	120 (8.4)	4.71 (3.84–5.79)

The numbers and percentages reported in the cells describe the true number of subjects for whom information was available (e.g., information on age was missing for 200/21,819 participants).

* Adjusted for the effect of clustering.

Table 3. Demography, Social, Lifestyle and Health Effects of Childhood Physical and Sexual Abuse

Variable	Not Abused (n = 19,569)	Physically or Sexually Abused (n = 2,186)		Physically and Sexually Abused (n = 662)	
		n (%)	OR** (95% CI)	n (%)	OR*† (95% CI)
Sociodemographic factors					
Age					
60–69	8,232 (42.4)	1,315 (60.7)	1	427 (65.1)	1
70–79	7,396 (38.1)	680 (31.4)	0.58 (0.52–0.64)	183 (27.9)	0.48 (0.40–0.57)
≥80	3,762 (19.4)	171 (7.9)	0.28 (0.24–0.33)	46 (7.0)	0.24 (0.17–0.32)
Female	11,346 (58.0)	1,418 (64.9)	1.34 (1.22–1.47)	480 (72.5)	1.91 (1.61–2.26)
Australian migrant	5,002 (25.7)	574 (26.4)	1.03 (0.93–1.15)	169 (25.7)	1.00 (0.83–1.20)
Marital status					
Married	13,104 (67.4)	1,341 (61.7)	1	373 (56.6)	1
Single	657 (3.4)	94 (4.3)	1.40 (1.12–1.74)	30 (4.5)	1.60 (1.09–2.36)
Separated or divorced	1,556 (8.0)	364 (16.7)	2.28 (2.01–2.60)	132 (20.0)	2.98 (2.45–3.62)
Widowed	4,137 (21.3)	375 (17.2)	0.88 (0.78–1.01)	124 (18.8)	1.05 (0.86–1.29)
University education	2,728 (14.3)	409 (19.0)	1.41 (1.25–1.59)	117 (18.1)	1.33 (1.07–1.65)
Living alone	4,672 (24.0)	568 (26.4)	1.12 (1.01–1.24)	194 (29.6)	1.33 (1.13–1.56)
Duke Social Support quartile					
1 (<32)	4,493 (23.8)	889 (42.0)	1	300 (47.0)	1
2 (32–34)	4,734 (25.0)	549 (25.9)	0.59 (0.53–0.65)	158 (24.8)	0.50 (0.41–0.61)
3 (35–37)	4,424 (23.4)	386 (18.2)	0.44 (0.39–0.50)	103 (16.1)	0.35 (0.28–0.43)
4 (38–40)	5,248 (27.8)	292 (13.8)	0.28 (0.25–0.32)	77 (12.1)	0.22 (0.17–0.28)
Practicing religion	8,965 (47.5)	921 (44.0)	0.87 (0.79–0.95)	303 (48.1)	1.02 (0.87–1.21)
Health-related measures					
Physically active	12,230 (63.3)	1,295 (60.0)	0.87 (0.79–0.95)	389 (59.7)	0.86 (0.73–1.01)
Ever smoker	9,099 (46.8)	1,281 (58.9)	1.63 (1.49–1.78)	401 (60.8)	1.76 (1.52–2.05)
Current smoker	1,144 (5.9)	237 (10.9)	1.96 (1.67–2.29)	92 (19.4)	2.35 (1.83–3.01)
Harmful or hazardous alcohol use	1,072 (5.5)	179 (8.2)	1.54 (1.32–1.79)	51 (7.7)	1.44 (1.08–1.91)
Health outcomes					
Medical Outcomes Study 12-item Short Form Survey					
Physical Component Summary score ≤40	6,416 (35.7)	884 (43.8)	1.40 (1.28–1.54)	289 (47.8)	1.65 (1.40–1.95)
Mental Component Summary score ≤40	1,228 (6.8)	322 (16.0)	2.59 (2.29–2.92)	122 (20.2)	3.45 (2.82–4.22)
Diabetes mellitus	3,139 (16.0)	383 (17.5)	1.11 (0.99–1.25)	110 (16.6)	1.04 (0.83–1.31)
Stroke or myocardial infarction	4,242 (21.7)	517 (23.6)	1.19 (1.01–1.23)	170 (25.7)	1.25 (1.05–1.48)
Emphysema	825 (4.2)	129 (5.9)	1.43 (1.18–1.72)	50 (7.5)	1.86 (1.41–2.45)
Cancer	2,516 (12.9)	284 (13.0)	1.01 (0.88–1.16)	89 (13.4)	1.05 (0.85–1.31)
≥3 medical diseases	7,926 (40.5)	1,043 (47.7)	1.34 (1.23–1.47)	351 (53.0)	1.66 (1.41–1.95)
Happiness rating					
Very happy	7,641 (39.3)	556 (25.6)	1	147 (22.4)	1
Fairly happy	10,460 (53.7)	1,282 (59.0)	1.68 (1.53–1.86)	384 (58.5)	1.91 (1.58–2.30)
Not very happy	1,097 (5.6)	264 (12.1)	3.31 (2.81–3.89)	91 (13.9)	4.31 (3.27–5.68)
Not happy at all	224 (1.1)	71 (3.3)	4.35 (3.27–5.79)	34 (5.2)	7.89 (5.43–11.45)
9-item Patient Health Questionnaire score					
<5	14,406 (79.5)	1,234 (61.6)	1	323 (54.6)	1
5–14	3,252 (17.9)	606 (30.3)	2.17 (1.96–2.41)	208 (35.2)	2.85 (2.41–3.37)
≥15	466 (2.6)	162 (8.1)	4.06 (3.40–4.84)	60 (10.1)	5.74 (4.34–7.59)
Hospital Anxiety and Depression Scale anxiety subscale score					
<8	15,976 (85.6)	1,457 (68.9)	1	392 (61.3)	1
8–10	1,696 (9.1)	308 (14.6)	1.99 (1.73–2.29)	107 (16.7)	2.57 (2.08–3.17)
≥11	998 (5.3)	350 (16.5)	3.84 (3.39–4.36)	140 (21.9)	5.71 (4.67–6.99)
Ever suicide attempt	328 (1.7)	179 (8.2)	5.23 (4.37–6.26)	77 (11.6)	7.72 (5.95–10.01)

Note: The numbers and percentages reported in the cells describe the true number of subjects for whom information was available (e.g., information on age was missing for 200/21,819 participants).

* Adjusted for the effect of clustering.

† No abuse versus physical or sexual abuse.

‡ No abuse versus physical and sexual abuse.

OR = odds ratio; CI = confidence interval.

Table 4. Multivariate Models of the Association Between Physical Health in Later Life and Childhood Physical or Sexual Abuse

Health Outcome	Model 1*	Model 2†	Model 3‡
	Odds Ratio (95% Confidence Interval)		
Poor physical health [§]	1.70 (1.54–1.86)	1.46 (1.31–1.62)	1.35 (1.21–1.50)
Poor mental health	2.83 (2.52–3.17)	2.11 (1.86–2.40)	1.89 (1.63–2.19)

Note: All models were adjusted for the effect of clustering.

Dependent variable was physical or sexual abuse during childhood.

* Adjusted for age, sex, marital and migrant status, and education.

† Adjusted for the factors in Model 1 plus social support, active religion practice, physical activity, ever or current smoking, and harmful or hazardous drinking.

‡ Adjusted for the factors in Model 2 plus poor mental health and happiness, in the case of poor physical health outcome and poor physical health and happiness in the case of poor mental health outcome.

§ Medical Outcomes Study 12-item Short Form Survey (SF-12) Physical Component Summary score ≤ 40 or presence of ≥ 3 clinical morbidities.

|| SF-12 score Mental Component Summary ≤ 40 , 9-item Patient Health Questionnaire score ≥ 15 , or Hospital Anxiety and Depression Scale anxiety subscale score ≥ 11 .

and mental (OR = 3.60, 95% CI = 3.01–4.31) health (Table 5).

Model 2 was the same as Model 1, with the addition of adjustments for social support, active religion practice, physical activity, ever or current smoking, and harmful or hazardous alcohol use. These adjustments reduced the associations, but participants who had experienced either childhood sexual or physical abuse still had a greater risk of poor physical (OR = 1.46, 95% CI = 1.31–1.62) and mental (OR = 2.11, 95% CI = 1.86–2.40) health. Similarly, participants who experienced both childhood sexual and physical abuse also had a higher risk of poor physical (OR = 1.75, 95% CI = 1.46–2.10) and mental (OR = 2.58, 95% CI = 2.11–3.14) health.

Model 3 was the same as Model 2, with the addition of adjustments for poor mental health and happiness in the case of poor physical health outcome and for poor physical health and happiness in the case of poor mental health outcome. The purpose of this final adjustment was to ensure that the association between childhood abuse and poor physical health in later life was not due to poor mental health and that the association between childhood abuse and poor mental health in later life was not due to poor physical health. These final adjustments further reduced the associations, but participants who had experienced either childhood sexual abuse or childhood physical abuse still

had a greater risk of poor physical (OR = 1.35, 95% CI = 1.21–1.50) and mental (OR = 1.89, 95% CI = 1.63–2.19) health. Similarly, participants who experienced both childhood sexual and physical abuse also had a higher risk of poor physical (OR = 1.60, 95% CI = 1.33–1.92) and mental (OR = 2.40, 95% CI = 1.97–2.94) health.

DISCUSSION

The findings from this study suggest that childhood sexual and physical abuse are associated with poor physical and mental health outcomes well into late life. This extends knowledge in this field, because previous studies have only examined depressed affect and health behavior in older participants⁹ or not specifically reported health outcomes in the older cohort.^{1,2,4,10}

Before the findings are discussed, it is necessary to acknowledge a number of potential limitations to the study. The self-report questions that were used to identify childhood abuse have not been externally validated and did not inquire about the participants' perceptions of the effect of the abuse on their lives. The use of the term "abuse" in the questions and lack of specific questions on psychological abuse or neglect are likely to result in lower rates of abuse than have been previously reported. In addition, retrospective self-reporting of childhood experiences may also intro-

Table 5. Multivariate Models of the Association Between Physical Health in Later Life and Childhood Physical and Sexual Abuse (n = 662/21,755)*

Health Outcome	Model 1*	Model 2†	Model 3‡
	Odds Ratio (95% Confidence Interval)		
Poor physical health [§]	2.55 (1.79–2.47)	1.75 (1.46–2.10)	1.60 (1.33–1.92)
Poor mental health	3.60 (3.01–4.31)	2.58 (2.11–3.14)	2.40 (1.97–2.94)

Note: All models were adjusted for the effect of clustering.

Dependent variable was physical and sexual abuse during childhood.

* Adjusted for age, sex, marital and migrant status, and education.

† Adjusted for the factors in Model 1 plus social support, active religion practice, physical activity, ever or current smoking, and harmful or hazardous drinking.

‡ Adjusted for the factors in Model 2 plus poor mental health and happiness, in the case of poor physical health outcome and poor physical health and happiness in the case of poor mental health outcome.

§ Medical Outcomes Study 12-item Short Form Survey (SF-12) Physical Component Summary score ≤ 40 or presence of ≥ 3 clinical morbidities.

|| SF-12 score Mental Component Summary ≤ 40 , 9-item Patient Health Questionnaire score ≥ 15 , or Hospital Anxiety and Depression Scale anxiety subscale score ≥ 11 .

duce inaccuracies, but previous studies in which there has been longitudinal follow-up of adults whose childhood abuse was well documented found that retrospective reports are likely to underestimate rather than overestimate the prevalence of abuse.^{26,27} Furthermore, cross-sectional modeling of late-life associations with childhood abuse cannot infer causality. Finally, the response rate for the overall survey was 28.6%, and it is unclear whether any sort of bias was introduced as a result.

Alternatively, this study has a number of strengths that merit comment. As far as the authors are aware, this is the largest sample of older adults ever assembled to investigate the long-term effects of childhood abuse (sample size >22,000). This provided the study with sufficient power to investigate the relevant associations and adjust the analyses for numerous potential confounding factors that were systematically ascertained in the survey. In addition, the measures used in this study (SF-12, PHQ-9, HADS) have been well validated in population health surveys.

The rates of reported childhood abuse declined with each age cohort older than 60. This is consistent with previous studies, with one possible explanation being that recipients of childhood abuse are at greater risk of early death.^{2,9} Other possibilities include a decline in the recall of childhood abuse with age and a cohort effect with greater risk of childhood abuse in successive birth cohorts.

The models of the effects of childhood abuse take into account hypothesized pathways that link childhood abuse and adult health outcomes through health-related behaviors such as smoking and hazardous alcohol consumption and psychosocial pathways that link health outcomes with difficulties in establishing intimate relationships such as low self-esteem and psychological distress.⁶ Childhood abuse is associated with impairments in social functioning, current and past smoking, and current and past hazardous alcohol consumption, but even after these effects and the interactive effects of poor physical and mental health were adjusted for, the associations with poor health outcomes remained. These effects are more pronounced in the case of mental health outcomes, for which participants who reported both types of abuse had a 2.4 times greater risk of poor health. These findings further extend the known potential long-term effects of childhood abuse on depression from late middle age to late life.⁴ It also adds to the literature that has demonstrated the persisting effects of childhood abuse upon mental health across the lifespan.^{9,28}

However, not all potentially relevant aspects of lifestyle and health behaviors were measured. Although current alcohol use was measured, past use or the use of illicit drugs was not asked about. Similarly, current mental health was adjusted for, but it is likely that past mental health functioning would have had greater bearing on current physical health. In addition, diet or overeating were not inquired about, with the role of obesity in the development of cardiovascular disease, diabetes mellitus, and arthritis being well documented.²⁹ Health care utilization and compliance with treatments was also unmeasured. Hence, it is possible that health behaviors might account for more of the physical health effect observed in our study.

Although only childhood physical and sexual abuse were specifically examined, the findings corroborate previous studies that have demonstrated that greater exposure to

childhood abuse is associated with significantly worse health outcomes.^{2,9} Participants who reported both sexual and physical abuse had worse physical and mental health outcomes than those who reported either type of abuse alone.

Although these findings that link childhood abuse with late-life health outcomes are important, the greater risk of adverse outcomes is relatively small. Other unmeasured factors, including genetic risk, childhood adversity unrelated to abuse, social class, nutrition, ethnicity, traumatic life events, and environmental exposures, are likely to be crucial and might have confounded the results.

The effects of childhood abuse appear to last a lifetime, although maturation through life experience may ameliorate its effects in some individuals who are more resilient and cope better under stress. Such resilience has been shown to be associated with successful aging.³⁰ Similarly, childhood temperament and adult personality factors also play a role in late-life mortality.^{30,31} Additionally, religious or spiritual coping has been shown to be a protective factor for suicidal behavior in depressed adult victims of child abuse.³² It is possible that routine screening for childhood abuse in late life might lead to better health outcomes, because there is evidence from controlled trials in women with PTSD associated with childhood abuse that cognitive behavioral therapy can relieve suffering.⁶ Community-based educational programs for older people have been shown to improve their sense of mastery and reduce loneliness and stress, constructs that are associated with better health.³³ Lifestyle changes that are associated with better health, such as cessation of smoking, improved diet, and exercise programs, can be achieved in late life^{34–36} and may contribute to improving the health outcomes of victims of childhood abuse.

Further research is required to improve understanding of the pathways to health outcomes and ways to minimize the effects of childhood adversity in late life.

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Author Contributions: Professor Almeida and Dr. Pfaff had full access to all of the data in the study. Professor Almeida takes responsibility for the integrity of the data and the accuracy of the data analysis. Professor Almeida and Associate Professor Draper conceived the study. Professor Almeida, Associate Professor Draper, Dr. Pfaff, Associate Professor Pirkis, Professor Snowdon, Professor Lauten-

schlager, and Professor Wilson contributed to the design of the study. The acquisition of data was undertaken by Dr. Pfaff and Professor Almeida, and Professor Almeida and Associate Professor Draper conducted the analysis and interpretation of data. Associate Professor Draper, Dr. Pfaff, and Professor Almeida took the lead in drafting the manuscript, and all authors revised the manuscript critically and contributed to its intellectual content.

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