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Violence from childhood to adulthood: The influence of child victimization and domestic violence on physical health in later life

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ABSTRACT

Objective: Previous research has shown a detrimental effect of child victimization (CV) on physical disease and mortality. Additionally, individuals with adverse experiences in childhood frequently face domestic violence (DV) in later life. As DV has also been observed to harm physical health, a potential cumulative effect has been proposed. Currently, however, only limited data on such a cumulative effect and its impact on patients' physical health are available.

Methods: A cross-sectional observational study at the University Hospital of Innsbruck was conducted. Data on CV, DV and physical health were collected using self-report questionnaires. To evaluate the impact of CV and DV on patients' health, odds ratios (OR) were calculated using binary logistic regression.

Results: A total of 1480 patients from various departments participated in the study. CV was found for 38% and DV for 16% of participants. A significantly higher occurrence of physical disease was observed in patients with poly-victimization (4+ CVs). When accounting for the cumulative effect of CV and DV, the occurrence was further increased for musculoskeletal disorders (OR:5.1), chronic pain (OR:5.0), gastrointestinal diseases (OR:3.0), metabolic diseases (OR:2.8) and respiratory diseases (OR:2.4).

Conclusion: CV and DV were found to be prevalent and highly correlated in patients treated in a primary care hospital. CV and DV – individually, combined and cumulatively – may thus present risks for physical health. Screening patients for the risk of DV as well as assessing CV may aid in early identification and initiation of psychosocial interventions to avoid further aggravation of physical and psychological problems.

1. Background

In 1998, Felitti and colleagues published a groundbreaking study – the *Adverse Childhood Experiences Study* – examining the long-term impact of abuse during childhood on physical and mental health in adulthood [1]. Since then, a wave of academic research has substantiated their findings on the relationship between child abuse and health in later life. Among others, Finkelhor, Ormrod and Turner [2] have largely contributed to the child abuse and neglect literature, coined as “childhood victimization” (CV). Chronic exposure to a stressful environment may lead to alterations in the nervous, endocrine and immune systems; the results are referred to as the ‘allostatic load’ [3,4]. Clinical observations also suggest that individuals with CV have a higher risk of developing patterns of health-harming behaviors, such as

substance abuse, sexual risk taking and physical inactivity [5]. The cumulative effects of negative experiences in childhood and maladaptive coping strategies harm later cognitive, social and emotional functioning [6–8], ultimately leading to impaired health and increased mortality in later life [1,5,9]. The harmful effects of CV on physical health have been shown to increase with the number of events. In poly-victimized individuals (i.e. those with four or more different kinds of victimization), a significantly higher hazard ratio for common physical diseases and mortality has been observed [9]. Prevalences for poly-victimization range from 1% to 38%, depending on country and population (e.g. military, general public, schools, universities) [5]. So far, the vast majority of studies focusing on the influence of CV on physical and mental health have been conducted in the U.S. or the U.K. To our knowledge, only scarce information is available on the prevalence of

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different forms of childhood victimization in German-speaking countries and in primary health care settings [e.g. 10,11,12].

Moreover, poly-victimization has been associated with significantly higher odds of violence victimization (7.5 times higher) over the course of adulthood. DV includes various forms and intensities of verbal and physical abuse, threats and sexual assault. Worldwide, the estimated lifetime prevalence of DV ranges between 11% and 71%, with women significantly more at risk than men [13]. The lifetime prevalence of experiences of physical or sexual violence towards women has been estimated at approximately 22% across Europe, and up to 43% report experiences of psychological violence [14]. Chronic stress has been discussed as a consequence of any form of DV, ultimately harming physical and psychosocial health. Previous reports describe increased risks for cardiovascular disease, anxiety, posttraumatic stress, substance abuse, suicidality, risky sexual behavior and criminality in individuals who have experienced DV [15–19].

In short, currently available data suggest that CV and DV are highly correlated and pose individual, combined and cumulative risks to physical and psychosocial health. However, only limited data on the prevalence of CV and DV in primary health care settings are available, and reported rates vary highly among samples. To our knowledge, no information on combined prevalences of different kinds of victimization in childhood and DV in hospitals in German-speaking countries is available, and the harmful cumulative effects of CV and DV on physical health have not yet been explored. Furthermore, psychological distress is closely linked to patients' subjective impairment due to physical disease [20].

The aim of the current study was to provide data on the harmful effects of CV and DV. Our study assesses the prevalence of CV and DV and investigates the individual and cumulative effects of CV and DV on physical health and subjective impairment when compared to patients without CV and DV. We hypothesized that high levels of CV and DV would be associated with poor health and that a cumulative occurrence in the form of adult re-victimization might even further impact patients' health.

2. Methods

2.1. Sample and procedure

In this cross-sectional observational study, inpatients and outpatients from various departments at the University Hospital of Innsbruck were included between October 2015 and March 2017. In Austria, free and universal health care is offered to all patients, regardless of origin or socioeconomic background. We may therefore assume that the sample includes individuals from a broad range of socioeconomic backgrounds. Departments used for recruiting had to meet two criteria) the heads of department agreed and (b) the waiting periods in the respective departments were sufficiently long for patients to have time to complete the questionnaire. For a period of 3 months (per department), trained undergraduate psychology students and medical students approached patients in waiting areas four mornings per week at the hospital. Patients were informed about the study, and those who gave oral and written consent completed the paper-and-pencil questionnaire on their own; questionnaires were then collected by the students. All patients received a handout with information about the study and were offered psychological support should they experience distress as a result of the questionnaire. Moreover, staff at the participating departments was informed about the study prior to its start and were instructed to pay attention to potentially distressed patients. The study design was in accordance with the Declaration of Helsinki (1964) and its later amendments and was approved by the research ethics committee of the Medical University of Innsbruck (AN2015-0175 351/4.18).

2.2. Measures

2.2.1. Maltreatment and Abuse Chronology of Exposure Scale (MACE)

Childhood victimization (CV) was assessed with the German version of the Maltreatment and Abuse Chronology of Exposure Scale [KERF; 21, 22]. It consists of 75 items that retrospectively gauge the severity of exposure to ten types of maltreatment: emotional neglect (EN), non-verbal emotional abuse (NVEA), parental physical maltreatment (PPA), parental verbal abuse (PVA), peer emotional abuse (PEERE), peer physical bullying (PEERP), physical neglect (PN), sexual abuse (SEXA), witnessing interparental violence (WITP) and witnessing violence to siblings (WITS). Each item includes an age range from 0 to 18 years, and respondents indicate when during childhood the maltreatment took place. The MACE provides an overall severity score and multiplicity score (number of types of maltreatment experienced) and has good test-retest reliability and validity [21,22].

2.2.2. Hurt-Insult-Threaten-Scream-Scale (HITS)

To evaluate DV levels, we employed an adapted German version of the “Hurt-Insult-Threaten-Scream” Scale (HITS), a paper-and-pencil screening instrument [23]. The HITS consisted of four items asking whether the participant was (1) screamed at or insulted, (2) threatened, (3) cursed at, talked down to or (4) physically hurt by a partner. The items were answered on a five-point scale: *never* (1), *rarely* (2), *sometimes* (3), *fairly often* (4) and *frequently* (5). Adding the score for each item yielded a total score between 4 and 20 points, with higher scores indicating more frequent DV. The cut-off for DV was reached when participants reported physical violence (item 4) at least “rarely” or psychological violence (item 1–3) at least “sometimes”. As many patients also suffer from violence by other people living in the household (e.g. father, mother, sibling, brother-in-law) the HITS in our study was therefore extended to “your partner or other persons living in the same household”.

2.2.3. Health checklist (German Pain Questionnaire)

We used a comprehensive list of diseases derived from the German Pain Questionnaire [24] to retrospectively assess the lifetime prevalence of disease as rated by the patients. The health checklist consisted of ten major physical disease clusters (cancer; cardiovascular diseases; neurological disorders; gastrointestinal diseases; metabolic diseases; musculoskeletal disorders; diseases of kidney, urinary tract or genitals; respiratory diseases; skin diseases; chronic pain) as well as overall emotional distress. For each category, examples of diseases and conditions were given. Patients were asked whether they suffered from each disease cluster using a dichotomized answer (yes / no). Additionally, using a four-point scale from “not at all” (0) to “strongly” (4), patients rated how strongly impaired they felt by each disease cluster.

2.3. Statistical procedure

Sample characteristics and prevalence of CV in the sample are expressed with descriptive statistics. Analyses were limited to individuals with complete data relating to CV, DV, age and sex. When data was available, excluded patients were compared to the included sample to test for bias. Group differences were analyzed using chi-square tests for nominal data, Man-Whitney *U* tests for ordinal data, and independent sample *t*-tests and Pearson correlation coefficients for continuous data.

Poly-victimization was established by counting the number of KERF trauma categories each individual reported, with subsequent division into three groups: 0 forms of CV, 1–3 forms of CV, and 4+ forms of CV (poly-victimization), which is consistent with previous study methodology [5,25]. To investigate the influence of CV on current DV, a binary logistic regression analysis was calculated, adjusted for age and sex. The influence of the severity of CV on physical health was assessed with binary logistic regression for each disease cluster separately,

adjusted for age and sex. To determine the additional influence of DV on physical health, we repeated the analyses first with DV as an independent factor for patients with no CV, subsequently including an interaction term of CV and DV. To allow optimal comparability to previous research, we divided physical and psychological DV in this calculation. Odds ratios are presented with 95% confidence intervals. To investigate the subjective impairment caused by disease, the influence of the dichotomized forms of CV on subjective impairment by disease were evaluated using multiple linear regression analyses with sex and age as covariates. *P*-values < .05 (two-sided) were considered statistically significant. All statistical analyses were performed with IBM SPSS (v22.0).

3. Results

Of all patients approached, 84.2% were willing to participate in the study. The primary reasons patients gave for non-participation were lack of interest, not having enough time or finding the questionnaire too long. Some patients had already participated in other studies and were not willing to fill out further questionnaires. For some patients, the topic of the study was too personal. Of the 2199 patients who were willing to participate, another 719 (32.7%) were excluded after initial data analysis because of missing data (sociodemographic data: 10.6%, CV items: 12.8%, DV items: 9.2%). The remaining *n* = 1480 (67.3%) patients were included in the analyses. The excluded patients reported significantly fewer CV (*t* = 3.03, *p* < .001) and were significantly older than the included sample (*t* = 4.04, *p* < .001). The effect of these differences, however, was small (*d* = .14 and .19, respectively). No significant differences regarding sex ($\chi^2 = 0.69$, *p* = .41) or mean HITS score (*t* = 0.75, *p* = .55) were found between the included and excluded patients.

Of the included sample, 55.2% were female, and the mean age was 42.1 years. The majority of patients were married or in a long-term relationship (70.1%). About half (50.4%) had received higher education or a university degree. Most patients were in treatment as outpatients (81.1%). Details are shown in Table 1.

Table 1
Sociodemographic data.

Sex	
Male	663 (44.8%)
Female	817 (55.2%)
Mean age (SD; range)	42.1 (15.6; 18–85)
18–30 years	30.7%
30–50 years	37.3%
50–70 years	27.3%
> 70 years	4.7%
Relationship status	
Married/long-term relationship	1038 (70.1%)
Single	302 (20.4%)
Divorced	83 (5.6%)
Widowed	13 (0.9%)
Missing data	44 (3.0%)
Level of education	
School not finished	25 (1.7%)
Compulsory school	108 (7.3%)
Compulsory school and apprenticeship	500 (33.8%)
Higher education	446 (30.1%)
University degree	301 (20.3%)
Missing data	100 (6.8%)
Living situation	
Living alone	243 (16.4%)
Living with partner/family	908 (61.4%)
Living with family of origin	113 (7.6%)
Living in shared apartment	106 (7.2%)
Missing data	110 (7.4%)
Parenthood	616 (41.6%)

3.1. Physical health

The majority of patients (70.0%) reported one of the assessed disease groups, with 2.8% reporting more than six and 0.5% all ten disease types. The highest prevalence was found for chronic pain (29.7%), followed by neurological disorders (16.7%), musculoskeletal disorders (15.9%), respiratory diseases (15.2%), gastrointestinal diseases (13.2%), metabolic diseases (13.0%), cardiovascular diseases (13.0%) and cancer (12.8%). Overall, 12.7% of the patients reported being strongly impaired by at least one physical disease, 18.3% at least quite impaired, 22.2% at least a little impaired, and 46.8% did not feel impaired at all by any of their diseases. Older patients (*r* = .26, *p* < .001) reported a higher total number of physical diseases, and sex differences were not significant (*t* = 1.31, *p* = .19). Furthermore, patients with higher numbers of different forms of CV also reported a significantly higher impairment by their disease ($\beta = .54$, *p* < .001, $R^2 = .29$). Details are shown in Table 2.

3.2. Prevalence of CV and DV

Overall, 62.4% reported no CV at all, 31.1% reported 1–3 different forms of CV, and the remaining 6.4% reported 4 or more different forms of CV, with a maximum of ten kinds of CV. The most frequently reported adverse experiences were: emotional abuse (18.6%), peer abuse (15.4%), physical or emotional neglect (12.9%), witnessing physical violence towards siblings or between parents (9.9%), physical violence (6.1%) and sexual violence (5.0%). Women reported higher overall numbers of different forms of CV (*t* = 2.74, *p* = .006) and reported significantly more experiences of emotional abuse (22.6% vs. 13.7%; $\chi^2 = 19.18$, *p* < .001) and sexual violence (6.6% vs. 3.0%; $\chi^2 = 9.95$, *p* = .002) than men. No sex differences were found for physical violence, neglect, peer abuse or for witnessing violence towards siblings or between parents.

The odds for polytraumatized patients to experience DV was 9.2 times higher than for patients without any CV (*p* < .001; 95% CI: 3.65–12.39), even after controlling for age and sex. 15.9% reported experiences of DV. The most prevalent forms of violence were: being screamed at or insulted (10.1%), being cursed at or talked down to (9.8%), physical violence (7.6%) and being threatened (1.8%). The prevalence of DV was 7.9% among patients with no CV, 25.8% for patients with 1–3 different forms of CV and 45.3% for polytraumatized patients. A substantial proportion of the patients with DV reported having children (41.7%). We compared patients who reported DV within the preceding year to patients with no DV: in this group, we found significantly higher rates of current DV for women (14.1% vs. 7.7%; $\chi^2 = 5.92$, *p* = .02) and for patients with disabilities (25.6% vs. 9.9%; $\chi^2 = 9.97$, *p* = .002). Furthermore, patients with current DV had received treatment significantly more often, both as inpatients ($\chi^2 = 12.69$, *p* = .01) and as outpatients ($\chi^2 = 16.38$, *p* = .003). Also, patients with DV reported significantly higher impairment by their disease than patients without DV (*U* = 14,626.0, *p* = .05). No significant differences were found for educational level, relationship status or living situation.

3.3. The relationship of CV and DV with physical health

The likelihood of suffering from a physical disease significantly increased with the number of different forms of CV that patients had experienced. For chronic pain, gastrointestinal diseases, respiratory diseases, musculoskeletal disorders and diseases of the skin, significantly higher odds ratios were found for patients with 1–3 different forms of CV, while higher odds for metabolic disorders and diseases of kidney, urinary tract or genitalia were only found in polytraumatized patients. Overall, the odds ratios to suffer from a physical disease were substantially higher in polytraumatized patients than in patients with 1–3 forms of CV, with highest odds for chronic pain (OR: 3.7),

Table 2
Prevalence of physical diseases and impairment by disease.

	Prevalence	Impairment			
		Not impaired	Little impaired	Quite impaired	Strongly impaired
Chronic pain	29.7%	74.5%	10.3%	8.7%	6.5%
Neurological disorders	16.7%	62.0%	18.2%	11.3%	8.5%
Musculoskeletal disorders	15.9%	62.0%	11.7%	18.5%	7.8%
Respiratory diseases	15.2%	67.2%	21.6%	7.9%	3.3%
Gastrointestinal diseases	13.2%	68.5%	19.7%	7.8%	3.9%
Metabolic diseases	13.0%	79.6%	13.1%	5.0%	2.2%
Cardiovascular diseases	13.0%	75.5%	15.4%	8.2%	0.9%
Cancer	12.8%	72.5%	9.5%	12.6%	5.4%
Diseases of kidney, urinary tract or genitals	9.4%	77.6%	10.7%	7.4%	4.3%
Disease of the skin	9.9%	78.7%	13.8%	5.3%	2.2%

musculoskeletal disorders (OR: 2.5) and gastrointestinal diseases (OR: 2.3).

To investigate the independent effect of DV, the analyses were repeated with DV as the independent variable (first step: physical DV; second step: physical or psychological DV) for patients with no forms of CV. When including physical DV only, we found a significantly higher likelihood only for chronic pain ($p = .007$; OR: 3.0; CI 95% 1.4–6.8), while no significant influence of DV was found on gastrointestinal disorders ($p = .21$), diseases of kidney, urinary tract or genitals ($p = .28$), respiratory diseases ($p = .88$), metabolic diseases ($p = .73$), musculoskeletal disorders ($p = .08$), cardiovascular diseases ($p = .69$), cancer ($p = .85$), neurological disease ($p = .73$) and diseases of the skin ($p = .86$). The inclusion of physical or psychological DV resulted in no further increased risk for a physical disease, except for diseases of kidney, urinary tract or genitals ($p = .02$; OR: 2.22; CI 95% 1.12–4.37).

To test for the *cumulative effect of DV and CV* for the development of a physical disease, we repeated the analyses for all patients using an interaction term for CV groups and DV (first step: physical DV; second step: physical or psychological DV). In the case of a significant relationship between CV and a physical disease, even higher odds for all physical disorders – except for musculoskeletal disorders – were found when including the interaction of CV and physical DV in the regression models. The highest odds were found for patients with poly-traumatization and DV, with highest values for musculoskeletal disorders (OR: 5.1), chronic pain (OR: 5.0) and gastrointestinal diseases (OR: 3.0). The inclusion of psychological DV in addition to physical DV led to no further increased hazard risk, except skin disease ($p < .001$; OR: 2.5; CI 95% 1.53–4.14). For cardiovascular diseases, cancer, neurological diseases and diseases of the skin, the interaction of poly-victimization and DV could not be calculated because of the small numbers of positive cases ($n < 7$). See Table 3 and Fig. 1 for details.

4. Discussion

The results of our study show that CV and DV are highly prevalent in patients in primary health care institutions and are strongly correlated with each other. A high rate of different forms of CV in combination with DV appears to significantly increase the risk for physical diseases and subjective impairment when compared to patients with neither CV or DV. In the present patient sample, 38% reported some sort of CV, with highest prevalences for verbal abuse and emotional neglect. A total of 6% of the patients were poly-victimized (i.e. experienced four or more different forms of CV).

The percentage of patients with childhood poly-victimization in our sample was in line with previous reports, including Felitti's study (6%) [1] and other surveys on adverse childhood events and CV conducted in European general population samples (8–9%) [26–28]. In our sample, poly-victimization was associated with a 3.7 times higher likelihood of suffering from chronic pain as well as a more than doubled likelihood of developing gastrointestinal diseases, respiratory diseases, metabolic

diseases or musculoskeletal disorders compared to patients without experiences of CV. Similar observations have been made previously, which suggests a possible association between chronic stress and the onset and exacerbation of chronic pain, gastrointestinal diseases, respiratory diseases or metabolic diseases [5,29–34]. Furthermore, in our sample, patients with higher numbers of different forms of CV showed a 9 times higher likelihood of living in a violent domestic environment in adulthood. Almost 16% of the patients reported a lifetime prevalence of DV, which is slightly less than previously reported for Western European countries (19%) and Northern America (21%) [35]. Most previous studies have focused primarily on lifetime prevalence rates of DV in women, which might explain the slightly lower numbers in our mixed sample. Yet the number of current DV (i.e. within the last year) was even higher than previously reported for women being treated at an emergency department [36]. This difference may partially be caused by our broader definition of DV, including violent acts by household members other than intimate partners (e.g. father, mother, sibling, brother-in-law). Almost 50% of the patients with childhood poly-traumatization in our sample experienced DV during adulthood. This is in line with previous studies and indicates that growing up in a violent environment increases the risk of violence victimization in adulthood [13].

In our study, the cumulative impairing effects of childhood poly-traumatization and physical DV were associated with a substantially increased risk of developing physical diseases, one that was higher than for different forms of CV and DV alone. Patients in this group showed a 5 times higher risk for chronic pain and musculoskeletal disorders, a 3 times higher risk for gastrointestinal diseases and an almost 3 times higher risk for metabolic diseases. Our data indicated that especially physical DV increased the risk of suffering from a physical disease. In combination with the increased stress vulnerability in patients with childhood victimization, DV may be a significant additional stressor that amplifies the harmful effects of childhood victimization on patients' physical health. DV may represent a re-traumatization in patients with a history of CV and consequently affect physical and mental health through an increased allostatic load.

5. Limitations

One limitation of this study was the patient-rated assessment of physical health and disease, which is, of course, a subjective measure. However, this approach allows the assessment of subjective impairment due to disease and thus provides a picture of the health problems that are most important to the individual patient, which is helpful when developing a treatment strategy. Also, the questionnaire was long, which, as seen above, may have influenced the response rate. Moreover, a considerable number of patients had to be excluded because of (partially) missing data. The excluded patients did not differ in regard to DV and reported marginally fewer different forms of CV. Although this bias may be negligible, the results should still be interpreted with

Table 3
Odds ratios for increasing childhood victimization with and without physical domestic violence.

	Chronic pain	Gastrointestinal diseases	Respiratory diseases	Metabolic diseases	Musculoskeletal disorders	Cardiovascular diseases	Cancer	Neurological disorders	Diseases of kidney, urinary tract or genitals	Disease of the skin
CV	p ^a < .001	< .001	.004	.14	< .001	.38	.97	.42	.04	.02
CV with DV	p ^a < .001	.007	.04	.12	.003	.34	.89	.47	.009	.06
0 CV no DV	(ref.) 1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0 CV with DV	p ^b 3.04 (1.35–6.83)	1.90 (0.70–5.15)	0.88 (0.37–3.21)	1.22 (0.41–3.64)	2.25 (0.90–5.63)	0.78 (0.23–2.70)	1.11 (0.37–3.35)	1.19 (0.44–3.22)	1.85 (0.61–5.58)	0.88 (0.20–3.78)
1–3 CV no DV	p ^b .007	.21	.88	.73	.08	.69	.85	.73	.28	.86
1–3 CV with DV	AOR 1.72 (1.33–2.21)	1.56 (1.12–2.16)	1.36 (1.00–1.85)	1.03 (0.73–1.45)	1.52 (1.11–2.09)	0.99 (0.70–1.41)	0.99 (0.70–1.41)	1.19 (0.89–1.62)	1.16 (0.78–1.72)	1.48 (1.03–2.14)
1–3 CV with DV	p ^b < .001	.008	.046	.88	.009	.95	.96	.24	.46	.04
1–3 CV with DV	AOR 1.63 (0.93–2.86)	1.81 (0.94–3.49)	1.57 (0.83–2.96)	0.85 (0.36–2.01)	1.03 (0.47–2.24)	0.88 (0.37–2.11)	0.71 (0.28–1.83)	1.47 (0.78–2.78)	1.53 (0.67–3.47)	1.92 (0.95–3.89)
4+ CV no DV	p ^b .09	.08	.17	.71	.95	.77	.48	.24	.31	.07
4+ CV with DV	AOR 3.73 (2.38–5.84)	2.34 (1.38–3.98)	1.93 (1.15–3.23)	1.76 (1.01–3.04)	2.50 (1.48–4.23)	1.51 (0.83–2.76)	1.03 (0.54–1.99)	1.03 (0.57–1.84)	2.08 (1.13–3.83)	1.73 (0.92–3.23)
4+ CV with DV	p ^b < .001	.002	.01	.045	.001	.18	.92	.93	.02	.09
4+ CV with DV	AOR 4.95 (2.14–11.44)	2.97 (1.21–7.29)	2.43 (0.99–5.96)	2.76 (1.11–6.86)	5.07 (2.14–12.03)	–	–	–	–	–
4+ CV with DV	p ^b < .001	.02	.052	.03	< .001	–	–	–	–	–
Covariates										
Age	(AOR) O (1.03)	–	–	O (1.02)	O (1.04)	O (1.04)	O (1.04)	O (1.01)	O (1.03)	–
Sex	p < .001	.91	.32	< .001	< .001	< .001	< .001	.002	< .001	.71
Sex	(AOR) –	–	–	F (1.72)	–	M (1.43)	F (1.41)	–	–	–
Sex	p .16	.91	.12	.001	.22	.03	.04	.76	.06	.80

CV = childhood victimization (e.g. emotional or physical neglect, physical or verbal abuse, sexual abuse, peer abuse).

DV = domestic violence (i.e. being physically hurt by members of the household).

p^a refers to the overall significance of association between the outcome measure and CV counts.

p^b refers to the significance of association between the outcome measure and individual CV categories, with 0 CV as the reference category.

Ref. = reference category.

AOR = adjusted odds ratio.

Covariates: Sex was entered as a categorical variable and age as a continuous variable; Letters indicate direction of increasing odds: Y = higher odds with decreasing age (younger); O = higher odds with increasing age (older); F, female; M, male; in case of non-significance no AORs are shown.

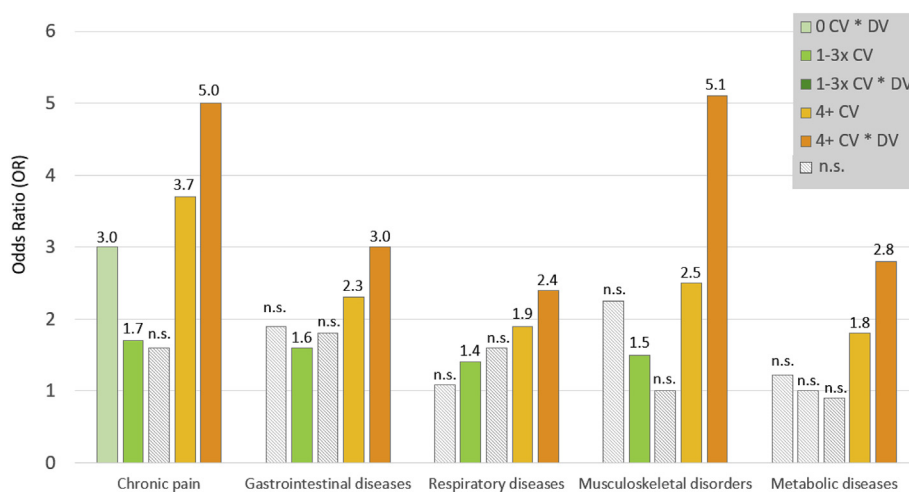


Fig. 1. Odds ratios for physical diseases for different levels of childhood victimization and physical domestic violence. CV = childhood victimization (e.g. emotional or physical neglect, physical or verbal abuse, sexual abuse, peer abuse). DV = domestic violence (i.e. being physically hurt by members of the household).

caution.

Because of the large number of questionnaire items, most of the included patients were from departments with longer waiting periods and busy outpatient clinics. As the self-reported health checklist assesses physical health retrospectively, we were able to include a broad and mixed sample of major diseases. However, since the numbers of poly-traumatized patients were rather small for some diseases, it was not possible to calculate odds ratios for all disease types. Also, the rate of well-educated and highly-educated patients in our sample was relatively high. Given that the same easy access to health care is offered to all patients in Austria, irrespective of age, place of residence, origin or socioeconomic background, we feel that this bias may be due to the length of the questionnaire rather than to a structural selection bias. Finally, although we offered translated versions of the questionnaire in the languages of the major immigrant groups in Tyrol, the proportion of immigrants in our sample was small. The language barrier as well as sociocultural factors may have contributed to this fact. Future studies should try to include diverse cultural backgrounds in the research team to enable a better inclusion of non-native speakers.

6. Conclusions

Our findings are in line with previous research and show that chronic stress harms the development of the nervous, endocrine and immune systems, leading to poorer stress tolerance. Animal studies have demonstrated that early attachment experiences – such as deprivation or high levels of distress – lead to epigenetic modification of the glucocorticoid receptor gene, which influences stress response [37] and muscular pain [38] in later life. Similarly, it has been shown that epigenetic regulation of the glucocorticoid receptor is altered in individuals with a history of childhood abuse [39]. Furthermore, individuals with CV often show impaired cognitive, social and emotional functioning in later life [3,6–8]. As a result, dysfunctional and maladaptive coping strategies may be adopted, which in return results in increased health risk behavior (e.g. substance abuse, smoking, binge-eating) [40].

Despite the increasing number of studies exploring the harmful effects of CV on physical and mental health and the associated costs for health care systems, preventive strategies have not been implemented widely. The results of our study strongly suggest that early identification and appropriate psychosocial support of patients who were victims of child maltreatment and are experiencing current DV is crucial. This is specifically important as our data show that a substantial number of patients with DV have children. Witnessing violence is a key form of CV

with detrimental effects on physical and mental health. To protect children from transgenerational cycles of violence, early intervention is necessary. Psychosocial intervention can include better self-care, functional coping strategies, reduction of self-harming behavior and – in the case of parents – improving bonding strategies. The latter may not only reduce the distress for parents themselves but is also an important strategy to prevent the transfer of dysfunctional self-regulation strategies to the next generation. Previous studies have reported that psychotherapeutic intervention may reverse the epigenetic modulations caused by chronic stress and different forms of CV [41].

Psychosocial prevention should thus be implemented on numerous levels (personal and family, institutional, ecological) to achieve best results [42]. Health care professionals in primary health care institutions play an important role in the identification of people affected by violence [14]. Although a clear majority of patients do not mind being asked about experiences of violence, only very few are actually asked by health care professionals about current experiences of violence [43,44]. It is an important task for health care professionals and members of psychological or psychiatric conciliar and liaison services to identify victims of violence at an early stage and to offer them professional help. Specific skill training (e.g. SIGNAL) [45] may help to empower health care professionals in various professions (e.g. physicians, nurses, social workers) to identify and properly approach patients who may be victims of violence. In order to prevent the continuing cycle of chronic distress, psychological and physical disease, it is essential to sensitize health care professionals so that they can identify patients with DV.

Competing interest statement

The authors have no competing interests to report.

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References

- [1] V.J. Felitti, R.F. Anda, D. Nordenberg, D.F. Williamson, A.M. Spitz, V. Edwards, M.P. Koss, J.S. Marks, Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study, *Am. J. Prevent. Med.* 14 (4) (1998) 245–258.
- [2] D. Finkelhor, R.K. Ormrod, H.A. Turner, Polyvictimization and trauma in a national longitudinal cohort, *Dev. Psychopathol.* 19 (1) (2007) 149–166.
- [3] A. Danese, B.S. McEwen, Adverse childhood experiences, allostasis, allostatic load, and age-related disease, *Physiol. Behav.* 106 (1) (2012) 29–39.
- [4] C. Barboza Solis, M. Kelly-Irving, R. Fantin, M. Darnaudery, J. Torrisani, T. Lang, C. Delplere, Adverse childhood experiences and physiological wear-and-tear in midlife: findings from the 1958 British birth cohort, *Proc. Natl. Acad. Sci. U. S. A.* 112 (7) (2015) E738–E746.
- [5] K. Hughes, M.A. Bellis, K.A. Hardcastle, D. Sethi, A. Butchart, C. Mikton, L. Jones, M.P. Dunne, The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis, *Lancet Public Health* 2 (8) (2017) e356–e366.
- [6] P. Pechtel, D.A. Pizzagalli, Effects of early life stress on cognitive and affective function: an integrated review of human literature, *Psychopharmacology* 214 (1) (2011) 55–70.
- [7] J.P. Shonkoff, W.T. Boyce, B.S. McEwen, Neuroscience, molecular biology, and the childhood roots of health disparities: building a new framework for health promotion and disease prevention, *JAMA* 301 (21) (2009) 2252–2259.
- [8] C. Schubert, Psychoneuroimmunology of the life span: impact of childhood stress on immune dysregulation and inflammatory disease in later life, *Psychother. Psychosom. Med. Psychol.* 64 (5) (2014) 171–180.
- [9] M.A. Bellis, K. Hughes, N. Leckenby, K.A. Hardcastle, C. Perkins, H. Lowey, Measuring mortality and the burden of adult disease associated with adverse childhood experiences in England: a national survey, *J. Public Health* 37 (3) (2015) 445–454 (Oxford, England).
- [10] M. LaNoue, D. Graeber, B.U. de Hernandez, T.D. Warner, D.L. Helitzer, Direct and indirect effects of childhood adversity on adult depression, *Community Ment. Health J.* 48 (2) (2012) 187–192.
- [11] C.P. Mouton, M.K. Hargreaves, J. Liu, S. Fadeyi, W.J. Blot, Adult cancer risk behaviors associated with adverse childhood experiences in a low income population in the Southeastern United States, *J. Health Care Poor Underserved* 27 (1) (2016) 68–83.
- [12] M.E. Beutel, A.N. Tibubos, E.M. Klein, G. Schmutzer, I. Reiner, R.D. Kocalevent, E. Brahler, Childhood adversities and distress – the role of resilience in a representative sample, *PLoS One* 12 (3) (2017) e0173826.
- [13] M. Kimber, S. Adham, S. Gill, J. McTavish, H.L. MacMillan, The association between child exposure to intimate partner violence (IPV) and perpetration of IPV in adulthood—a systematic review, *Child Abuse Negl.* 76 (2018) 273–286.
- [14] FRA, Violence Against Women: A European Survey, European Union Agency for Fundamental Rights, Vienna, 2014.
- [15] M.J. Breiding, S.G. Smith, K.C. Basile, M.L. Walters, J. Chen, M.T. Merrick, Prevalence and characteristics of sexual violence, stalking, and intimate partner violence victimization—national intimate partner and sexual violence survey, United States, 2011, Morbidity and mortality weekly report, *Surveill. Summ.* 63 (8) (2014) 1–18 (Washington, D.C. : 2002).
- [16] D.M. Capaldi, N.B. Knoble, J.W. Shortt, H.K. Kim, A systematic review of risk factors for intimate partner violence, *Partner Abuse* 3 (2) (2012) 231–280.
- [17] B.E. Carlson, L.A. McNutt, D.Y. Choi, Childhood and adult abuse among women in primary health care: effects on mental health, *J. Interpers. Violence* 18 (8) (2003) 924–941.
- [18] S.A. Kaura, B.J. Lohman, Dating violence victimization, relationship satisfaction, mental health problems, and acceptability of violence: a comparison of men and women, *J. Fam. Violence* 22 (6) (2007) 367–381.
- [19] S.A. Kaura, B.J. Lohman, Does acceptability of violence impact the relationship between satisfaction, victimization, and commitment levels in emerging adult dating relationships? *J. Fam. Violence* 24 (6) (2009) 349–359.
- [20] L.J. Crofford, Psychological aspects of chronic musculoskeletal pain, *Best Pract. Res. Clin. Rheumatol.* 29 (1) (2015) 147–155.
- [21] D. Isele, M.H. Teicher, M. Ruf-Leuschner, T. Elbert, I.-T. Kolassa, K. Schury, M. Schauer, KERF—An instrument for measuring adverse childhood experiences: construction and psychometric evaluation of the German MACE (Maltreatment and Abuse Chronology of Exposure) Scale, *Zeitschrift für Klinische Psychologie und Psychotherapie: Forschung und Praxis* 43 (2) (2014) 121–130.
- [22] M.H. Teicher, A. Parigger, The 'Maltreatment and Abuse Chronology of Exposure' (MACE) scale for the retrospective assessment of abuse and neglect during development, *PLoS One* 10 (2) (2015) e0117423.
- [23] K.M. Sherin, J.M. Sinacore, X.Q. Li, R.E. Zitter, A. Shakil, HITS: a short domestic violence screening tool for use in a family practice setting, *Fam. Med.* 30 (7) (1998) 508–512.
- [24] G.P. Association, German Pain Questionnaire, <https://www.dgss.org/deutscher-schmerzfragebogen/>, (2015).
- [25] D. Finkelhor, R.K. Ormrod, H.A. Turner, Poly-victimization: a neglected component in child victimization, *Child Abuse Negl.* 31 (1) (2007) 7–26.
- [26] K. Hughes, H. Lowey, Z. Quigg, M.A. Bellis, Relationships between adverse childhood experiences and adult mental well-being: results from an English national household survey, *BMC Public Health* 16 (2016) 222.
- [27] S. Pirkola, E. Isometsa, H. Aro, L. Kestila, J. Hamalainen, J. Veijola, O. Kiviruusu, J. Lonnqvist, Childhood adversities as risk factors for adult mental disorders: results from the Health 2000 study, *Soc. Psychiatry Psychiatr. Epidemiol.* 40 (10) (2005) 769–777.
- [28] K. Harkonmaki, K. Korkeila, J. Vahtera, M. Kivimaki, S. Suominen, L. Sillanmaki, M. Koskenvuo, Childhood adversities as a predictor of disability retirement, *J. Epidemiol. Community Health* 61 (6) (2007) 479–484.
- [29] A.A. Abajobir, S. Kisely, G. Williams, L. Strathearn, S. Suresh, J.M. Najman, The association between substantiated childhood maltreatment, asthma and lung function: a prospective investigation, *J. Psychosom. Res.* 101 (2017) 58–65.
- [30] N.J. Sachs-Ericsson, J.L. Sheffler, I.H. Stanley, J.R. Piazza, K.J. Preacher, When emotional pain becomes physical: adverse childhood experiences, pain, and the role of mood and anxiety disorders, *J. Clin. Psychol.* 73 (10) (2017) 1403–1428.
- [31] S. Brennenstuhl, E. Fuller-Thomson, The painful legacy of childhood violence: migraine headaches among adult survivors of adverse childhood experiences, *Headache* 55 (7) (2015) 973–983.
- [32] D.A. Davis, L.J. Luecken, A.J. Zautra, Are reports of childhood abuse related to the experience of chronic pain in adulthood? A meta-analytic review of the literature, *Clin. J. Pain* 21 (5) (2005) 398–405.
- [33] U.T. Egle, N. Eglhoff, R. von Känel, Stress-induced hyperalgesia (SIH) as a consequence of emotional deprivation and psychosocial traumatization in childhood: implications for the treatment of chronic pain, *Schmerz* 30 (6) (2016) 526–536 (Berlin, Germany).
- [34] A. Lampe, S. Doering, G. Rumpold, E. Solder, M. Krismer, W. Kantner-Rumplmair, C. Schubert, W. Sollner, Chronic pain syndromes and their relation to childhood abuse and stressful life events, *J. Psychosom. Res.* 54 (4) (2003) 361–367.
- [35] K.M. Devries, J.Y. Mak, C. Garcia-Moreno, M. Petzold, J.C. Child, G. Falder, S. Lim, L.J. Bacchus, R.E. Engell, L. Rosenfeld, C. Pallitto, T. Vos, N. Abrahams, C.H. Watts, Global health. The global prevalence of intimate partner violence against women, *Science* 340 (6140) (2013) 1527–1528 (New York, N.Y.).
- [36] P. Brzank, H. Hellbernd, U. Maschewsky-Schneider, G. Kallischnigg, Domestic violence against women and health care demands. Results of a female emergency department patient survey, *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitschutz* 48 (3) (2005) 337–345.
- [37] M.J. Meaney, M. Szyf, Environmental programming of stress responses through DNA methylation: life at the interface between a dynamic environment and a fixed genome, *Dialogues Clin. Neurosci.* 7 (2) (2005) 103–123.
- [38] P. Alvarez, P.G. Green, J.D. Levine, Stress in the adult rat exacerbates muscle pain induced by early-life stress, *Biol. Psychiatry* 74 (9) (2013) 688–695.
- [39] P.O. McGowan, A. Sasaki, A.C. D'Alessio, S. Dymov, B. Labonte, M. Szyf, G. Turecki, M.J. Meaney, Epigenetic regulation of the glucocorticoid receptor in human brain associates with childhood abuse, *Nat. Neurosci.* 12 (3) (2009) 342–348.
- [40] U.T. Egle, Gesundheitliche Langzeitfolgen psychisch traumatisierender und emotional deprivierender Entwicklungsbedingungen in Kindheit und Jugend, in: U.T. Egle, P. Joraschky, A. Lampe, I. Seiffge-Krenke, M. Cierpka (Eds.), Sexueller Missbrauch, Misshandlung, Vernachlässigung, Erkennung, Therapie und Prävention der Folgen früher Stresserfahrungen, Schattauer, Stuttgart, 2016, pp. 24–39.
- [41] N. Perroud, A. Salzmann, P. Prada, R. Nicastro, M.E. Hoespli, S. Furrer, S. Ardu, I. Krejci, F. Karege, A. Malafosse, Response to psychotherapy in borderline personality disorder and methylation status of the BDNF gene, *Transl. Psychiatry* 3 (2013) e207.
- [42] M. Cierpka, Psychosoziale Prävention – ein Mehrebenenansatz, in: U.T. Egle, P. Joraschky, A. Lampe, I. Seiffge-Krenke, M. Cierpka (Eds.), Sexueller Missbrauch, Misshandlung, Vernachlässigung, Erkennung, Therapie und Prävention der Folgen früher Stresserfahrungen, Schattauer, Stuttgart, 2016, pp. 677–696.
- [43] D. Riedl, T. Beck, S. Exenberger, D. Dejaco, A. Lampe, How to ask patients about domestic violence? Patients preferences and clinical reality – findings from an observational study, *Zeitschrift Für Psychosomatische Medizin Und Psychotherapie* (2018) (submitted for publication, Unpublished data).
- [44] E. Goldstein, N. Athale, A.F. Sciollo, S.L. Catz, Patient preferences for discussing childhood trauma in primary care, *Permanente J.* 21 (2017).
- [45] K. Wieners, M. Winterholler, Domestic and sexual violence against women. Implications of WHO guidelines for Germany, *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitschutz* 59 (1) (2016) 73–80.