Prevalence and risk of psychiatric disorders in young people: prospective cohort study exploring the role of childhood trauma (the HUNT study)

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Background

Better knowledge about childhood trauma as a risk factor for psychiatric disorders in young people could help strengthen the timeliness and effectiveness of prevention and treatment efforts.

Aims

To estimate the prevalence and risk of psychiatric disorders in young people following exposure to childhood trauma, including interpersonal violence.

Method

This prospective cohort study followed 8199 adolescents (age range 12–20 years) over 13–15 years, into young adulthood (age range 25–35 years). Data about childhood trauma exposure from adolescents participating in the Trøndelag Health Study (HUNT, 2006–2008) were linked to data about subsequent development of psychiatric disorders from the Norwegian Patient Registry (2008–2021).

Results

One in four (24.3%) adolescents were diagnosed with a psychiatric disorder by young adulthood. Regression analyses showed consistent and significant relationships between childhood exposure to both interpersonal violence and other potentially traumatic events, and subsequent psychiatric disorders and psychiatric comorbidity. The highest estimates were observed for childhood exposure to two or more types of interpersonal violence (polyvictimisation), and development of psychotic disorders (odds ratio 3.41, 95% CI 1.93–5.72), stress and adjustment disorders (odds ratio 4.20, 95% CI 3.05–5.71), personality disorders (odds ratio 3.98, 95% CI 2.70–5.76), alcohol-related disorders (odds ratio 3.28, 95% CI 2.06–5.04) and drug-related disorders (odds ratio 4.67, 95% CI 2.87–7.33).

Conclusions

These findings emphasise the importance of integrating knowledge about childhood trauma as a potent risk factor for psychopathology into the planning and implementation of services for children, adolescents and young adults.

Keywords

Trauma and stressor-related disorders; epidemiology; comorbidity; childhood experience; mental health services.

Psychiatric disorders are a major cause of the disease burden among adolescents and young adults. They contribute to high rates of disability, morbidity and mortality,[1] as well as large societal costs.[2] Psychiatric comorbidity is common and adds to the risk of negative health outcomes, including suicidal behaviour and premature death.[3] Most psychiatric disorders debut during the developmental period between adolescence and young adulthood, with 62.5% having presented by 25 years of age.[4] This makes youth a period of particular importance in terms of identifying potent risk factors that can increase the likelihood of developing psychiatric disorders. Genetic vulnerability,[5] low socioeconomic status[6] and growing up in a household without both parents[7] have previously been established as central risk factors for psychiatric disorders. In addition, over the past several decades, childhood trauma has been identified as a potent risk factor for post-traumatic stress disorder.[8] Furthermore, previous findings indicate that childhood trauma may increase the risk of a wider range of psychiatric disorders in young people.[9,10] Although definitions vary somewhat, childhood trauma may be defined as exposure to an extremely threatening event(s) or condition(s) taking place before adulthood that is experienced either directly or indirectly (witnessed or experienced by a close person), and that 'results in or has high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation'.[11–13] There are some important methodological limitations pertaining to the studies that have been conducted so far. Overall, there is a lack of prospective studies that follow representative, population-based cohorts from childhood into young adulthood that include valid measures of childhood trauma and psychiatric disorders.[14] Knowledge about how childhood trauma is associated with psychiatric comorbidity is also limited, as previous studies have primarily investigated only one, or very few, disorders within a single study population. This has made it challenging to uncover the prevalence of childhood trauma and psychiatric disorders among young people in the general population, potentially contributing to an underappreciation of the full scope of these problems.

Previous studies within the trauma field indicate that exposure to interpersonal violence, including physical violence, sexual abuse and bullying, may be particularly pathogenic with regards to post-traumatic stress disorder and risk of psychopathology.[15,16] Additionally, exposure to multiple types (polyvictimisation) of interpersonal violence may lead to more trauma symptoms.[17] Still, longitudinal studies exploring to what extent various types of childhood trauma and polyvictimisation are associated with psychiatric disorders in young people are lacking, such as studies on whether individuals who have been exposed to interpersonal violence have a higher risk of developing psychiatric disorders compared with individuals who have been exposed to other

potentially traumatic events (e.g. natural disasters or transportation accidents).[14] Moreover, studies with young people have primarily relied on reports on childhood trauma from caregivers or official records, which likely only represent the tip of the iceberg and may not fully account for their experiences.[18] It is also possible that less severe forms of exposure have not been considered.

Aim

The aim of this study was to estimate the prevalence of psychiatric disorders and investigate the role of childhood trauma as a risk factor for development of psychopathology in youth. More specifically, we aimed to explore whether exposure to interpersonal violence (including polyvictimisation) and other types of childhood trauma is associated with an increased risk of developing the full range of psychiatric disorders and psychiatric comorbidity.

Method

Study design and sample

This representative, prospective and population-based cohort study used data from all 8199 adolescents participating in the Young-HUNT 3 study (2006–2008),[19] linked to data from the nationwide Norwegian Patient Registry (NPR) (2008–2021).[20] This made it possible to follow the participants across 13–15 years from adolescence and into young adulthood (age range 25–35 years).

The Young-HUNT 3 study is part of the Trøndelag Health Study (HUNT) and includes various health measures primarily collected through self-report questionnaires, including data on sociodemographic and socioeconomic factors, and childhood trauma exposure.[19,21] Between 2006 and 2008, all 10 464 adolescents living in the Norwegian county formerly known as Nord-Trøndelag (now part of Trøndelag County) were invited to take part in the school-based Young-HUNT 3 survey, including 5614 students in junior high school, 4357 students in senior high school and 493 adolescents not attending school. A total of 8199 (78.4%) adolescents participated (age range 12–20 years), the majority of whom were ethnic Norwegian.[21,22]

The NPR was established by the Norwegian Directorate of Health to support the organisation of governmentally funded specialist healthcare services and to facilitate research on patient trajectories.[20] It contains medical information at the individual level from all specialist healthcare services in Norway that are connected to the public regional health authorities, such as mental healthcare facilities for children and adults, somatic hospitals, rehabilitation institutions and specialised interdisciplinary addiction treatment providers. These have reported to the NPR since 2008 and include public and private institutions, as well as medical specialists contracted to the regional health authorities and private specialists with reimbursement contracts. The data quality of the NPR is routinely assessed by the National Service for Validation and Completeness Analyses,[23] and it has been estimated that the NPR has a high level of completeness, at around 85% or higher for most disorders, indicating that medical information about individuals with a given disorder is continuously being reported to the registry. The psychiatric diagnoses are recorded according to the ICD-10.[12]

In the Nordic countries, unique national identity numbers facilitate linkage of individual data between data sources.[24] In Norway, these are numbers consisting of 11 digits that are issued at birth, or that are issued to immigrants who are coming to stay in the country for at least 6 months.[25] To protect the privacy of individuals, linkage procedures are conducted by a trusted third party, which converts the national identity numbers into pseudonymised identifiers before any data is used in research. This procedure also helps to make sure that each individual is only counted once. For the purpose of the present study, the Norwegian Institute of Public Health was responsible for linking data obtained through the Young-HUNT 3 study and the NPR before the final, pseudonymised data-set was made available to the research group.

Measures

Sociodemographic and socioeconomic factors (Young-HUNT 3; 2006–2008)

Age and gender: Data on age and gender were obtained from the Norwegian National Population Register (gender is referred to as sex within the register).

Family economy: Participants were asked 'How well off do you think your family is compared to most others?', and provided the response alternatives 'about the same as most others', 'better financial situation' and 'worse financial situation'. The first two categories were combined and compared with the 'worse financial situation' group.[26]

Household structure: Participants were asked which family members they were currently living with. Responses were dichotomised between those living with both of their own parents (including adoptive parents) and those living in other types of households.[27]

Childhood trauma (Young-HUNT 3; 2006–2008)

Exposure to potentially traumatic events in childhood was measured by a brief lifetime trauma screening based on the UCLA Post-traumatic Stress Disorder Reaction Index (PTSD-RI),[28] adapted to fit a Norwegian context. Participants were asked 'Have any of the following things happened to you?', with the response alternatives being 'no', 'yes, last year' and 'yes, in my life'. Participants who responded yes, regardless of when the traumatic event happened, were categorised as exposed.

Direct interpersonal violence: To assess exposure to direct physical violence, participants were asked whether they had 'been violently hurt (beaten or injured)'. Two items assessed sexual abuse through asking the participants whether they had 'been subjected to sexually uncomfortable/abusive acts' by either someone about their own age or an adult. Responses were combined into one measure indicating exposure to sexual abuse. To assess bullying, participants were asked whether they had 'been threatened or physically harassed by other students at school for a long time'. A sum score of these three measures was computed and termed 'polyvictimisation',[13] to assess the impact of polyvictimisation of exposure to direct interpersonal violence (range 0–3). Because of low counts, the two upper categories (2–3) were collapsed, leaving the final categories 0, 1 and ≥2.

Other traumatic events: To assess witnessing violence, the participants were asked if they had 'seen others violently hurt'. Illness or death of a close person was assessed by asking the participants whether they had experienced 'that someone in your family has been seriously ill' or 'death of a loved one'. Responses were combined to measure exposure to severe illness or death of a close person. Finally, to assess exposure to accidents, disasters or other events, the participants were asked whether they had experienced 'a disaster (fire, avalanche, tidal wave, hurricane, etc.)', 'a serious accident (ex: a very serious car accident)', 'received painful or frightening treatment at the hospital while being treated for an illness or

injury' or 'experienced something else that was very frightening, dangerous or violent'. Participants responding yes to one or more were categorised as exposed.

Psychiatric disorders in adolescence and young adulthood (NPR; 2008–2021)

All psychiatric disorders registered as ICD codes between 2008 and 2021 were categorised according to ten broad subtypes, which were carefully selected with reference to previous studies on current knowledge of the aetiology of psychopathology.[5,29] Participants who were diagnosed with one of these psychiatric disorders at least once over the course of the follow-up period were considered to have a psychiatric disorder.

Subtypes of psychiatric disorders: These were operationalised as dichotomous outcomes and categorised into ten broad subtypes, as follows: neurodevelopmental disorders, including obsessive–compulsive disorder (ICD-10 code F41), autism spectrum disorders (ICD-10 code F84), attention-deficit hyperactivity disorders (ICD-10 code F90) and tic disorder (ICD-10 code F95); psychotic disorders, including schizophrenia, schizotypal, delusional and other non-mood psychotic disorders (ICD-10 codes F20–F29), manic episode (ICD-10 code F30) and bipolar disorder (ICD-10 code F31); depressive disorders, including other mood disorders (ICD-10 codes F32–F34, F38–F39); anxiety disorders, including phobic and other anxiety disorders (ICD-10 codes F40–F41, F93); stress and adjustment disorders, including reaction to severe stress and adjustment disorders (ICD-10 code F43), dissociative and conversion disorders (ICD-10 code F44), mental and behavioural disorders associated with the puerperium (ICD-10 code F53) and disorders of social functioning with onset specific to childhood and adolescence (ICD-10 code F94); somatoform and other disorders, including somatoform disorders (ICD-10 code F45) and other non-psychotic mental disorders (ICD-10 code F48); eating disorders, including all eating disorders (ICD-10 code F50); personality disorders, including adult personality disorders (ICD-10 codes F60–F62, F68–F69) and conduct disorders (ICD-10 code F91); alcohol-related disorders, including alcohol-related disorders (ICD-10 code F10) and alcoholic liver disease (ICD-10 code K70); and drug-related disorders, including drug-related disorders (ICD-10 codes F11–F19) and abuse of non-psychoactive substances (ICD-10 code F55).

Psychiatric comorbidity: An individual sum score, termed *'psychiatric comorbidity',* was created based on the cumulative number of subtypes of psychiatric disorders (range 0–10) with which each participant had been diagnosed over the course of the follow-up period.

Statistical analyses

The distribution of sociodemographic and socioeconomic factors, childhood trauma exposure and psychiatric disorders was described for the study sample, and differences between females and males were explored by using chi-squared tests for comparing proportions and t-tests for comparing means. Confidence intervals for the prevalence rates were computed by Blaker's procedure.[30] Logistic regression analyses were conducted to investigate the association between childhood trauma exposure and the ten different subtypes of psychiatric disorders. Furthermore, linear regression analyses were conducted to investigate the association between childhood trauma exposure and psychiatric comorbidity. All models were adjusted for age, gender, family economy and household structure. The analyses were conducted in R software (version 4.2.0–4.2.3 for Windows; The R Foundation for Statistical Computing, Vienna,

Austria; see https://cran.r-project.org/bin/windows/base/old/4.2.3/), using the packages haven, readxl, dplyr, data.table and aod to import and prepare the data for analyses, and BlakerCI for computing confidence intervals for the prevalence rates.

Ethical statement and trial registration

All Young-HUNT 3 participants and the parents or guardians of those under the age of 16 years gave written consent to participation and use of data for research, including linkage to the NPR. The study has been approved by the Regional Committees for Medical and Health Research Ethics (reference 2017/2229).

The study is part of the overarching Killing Pain project, which was preregistered through Clinicaltrials.gov on 7 April 2020 (registration number NCT04336605; https://clinicaltrials.gov/ct2/show/record/NCT04336605).

The study was conducted in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cohort studies.[31]

Results

The 8199 participants had a mean age of 15.9 years (s.d. = 1.74) when entering the study as adolescents between 2006 and 2008, with similar representation among females ($n = 4128$, 50.3%) and males (Table 1). Over the following 13–15 years (2008–2021), one in four (24.3%; 25.1% among those exposed to childhood trauma and 20.0% among those not exposed to childhood trauma) of the adolescents were diagnosed with one or more psychiatric disorders as they developed into young adults (age 25–35 years; 28.7% for females and 19.7% for males). Apart from psychotic disorders, which were distributed evenly between the genders, significant gender differences were observed across the subtypes of psychiatric disorders. Females were more often diagnosed with depressive disorders, anxiety disorders, stress and adjustment disorders, somatoform and other disorders, eating disorders and personality disorders, whereas males were more often diagnosed with neurodevelopmental disorders, alcohol-related disorders and drug-related disorders. Females were also more commonly diagnosed with multiple psychiatric disorders (comorbidity) compared with males (15.5 v. 9.6%). In terms of childhood trauma, 80.4% reported having been exposed to at least one type. Females reported higher exposure to sexual abuse, illness or death of a close person, and accidents, disasters and other events, whereas males reported higher exposure to bullying, physical violence and witnessing violence.

Childhood trauma and subtypes of psychiatric disorders

Overall, the results of the logistic regression analyses showed significant and consistent associations between childhood trauma and all the subtypes of psychiatric disorders in adolescence or young adulthood (Table 2). Psychotic disorders, stress and adjustment disorders, personality disorders and drug-related disorders were found to have particularly strong associations to childhood trauma, especially to direct interpersonal violence (physical violence, sexual abuse and bullying), although confidence intervals were highly overlapping. Witnessing violence and having been exposed to accidents, disasters and other traumatic events were also found to be significant risk factors for development of psychiatric disorders. Exposure to illness or death of a close person did not significantly increase this risk.

With regards to polyvictimisation, there were significant associations to all the subtypes of psychiatric disorders, indicating dose–response relationships across neurodevelopmental disorders, psychotic disorders, depressive disorders, anxiety disorders, stress

Table 1 Sociodemographic and socioeconomic factors, trauma exposure in childhood (Young-HUNT 3; 2006–2008) and psychiatric disorders (Norwegian Patient Registry; 2008–2021)

Participants		All			Females			Males			
		N = 8199			n = 4128 (50.3%)			n = 4071 (49.7%)			
	n	n/mean	%/s.d.	95% CI	n/mean	%/s.d.	95% CI	n/mean	%/s.d.	95% CI	P-value
Sociodemographic and socioeconomic factors											
Age	8199	15.9	1.7	Not applicable	15.9	1.8	Not applicable	15.9	1.7	Not applicable	0.184
Below average family economy	7636	708	9.3%	[8.6–9.9%]	399	10.2%	[9.3–11.2%]	309	8.3%	[7.4–9.2%]	0.004
Not living with both parents	8033	3705	46.1%	[45.0–47.2%]	1864	46.0%	[44.5–47.6%]	1841	46.2%	[44.7–47.8%]	0.876
Childhood trauma											
Direct interpersonal violence											
By type of exposure											
Physical violence	7809	789	10.1%	[9.4–10.8%]	304	7.6%	[6.8–8.5%]	485	12.7%	[11.6–13.8%]	<0.001
Sexual abuse	7809	430	5.5%	[5.0–6.0%]	324	8.1%	[7.3–9.0%]	106	2.8%	[2.3–3.3%]	<0.001
Bullying	7803	628	8.0%	[7.5–8.7%]	296	7.5%	[6.7–8.3%]	332	8.7%	[7.8–9.6%]	0.048
By number of types (polyvictimisation)											
0	7745	6402	82.7%	[81.8–83.5%]	3288	83.3%	[82.1–84.5%]	3114	81.9%	[80.7–83.2%]	0.104
1	7745	968	12.5%	[11.8–13.2%]	464	11.8%	[10.8–12.8%]	504	13.3%	[12.2–14.4%]	0.046
≥2	7745	375	4.8%	[4.4–5.3%]	193	4.9%	[4.2–5.6%]	182	4.8%	[4.1–5.5%]	0.833
Other trauma											
Witness to violence	7812	1810	23.2%	[22.2–24.1%]	722	18.1%	[16.9–19.3%]	1088	28.4%	[27.0–29.9%]	<0.001
Illness or death of a close person	7823	5757	73.6%	[72.6–74.6%]	3064	76.8%	[75.4–78.1%]	2693	70.3%	[68.8–71.7%]	<0.001
Accident, disaster or other	7787	2481	31.9%	[30.8–32.9%]	1304	32.9%	[31.4–34.4%]	1177	30.8%	[29.3–32.3%]	0.049
Psychiatric disorders											
By subtype of disorders											
Neurodevelopmental disorders	8199	456	5.6%	[5.1–6.1%]	203	4.9%	[4.3–5.6%]	253	6.2%	[5.5–7.0%]	0.010
Psychotic disorders	8199	144	1.8%	[1.5–2.1%]	73	1.8%	[1.4–2.2%]	71	1.7%	[1.4–2.2%]	0.933
Depressive disorders	8199	913	11.1%	[10.5–11.8%]	598	14.5%	[13.4–15.6%]	315	7.7%	[6.9–8.6%]	<0.001
Anxiety disorders	8199	832	10.1%	[9.5–10.8%]	552	13.4%	[12.4–14.4%]	280	6.9%	[6.1–7.7%]	<0.001
Stress and adjustment disorders	8199	517	6.3%	[5.8–6.8%]	377	9.1%	[8.3–10.0%]	140	3.4%	[2.9–4.0%]	<0.001
Somatoform and other disorders	8199	130	1.6%	[1.3–1.9%]	92	2.2%	[1.8–2.7%]	38	0.9%	[0.7–1.3%]	<0.001
Eating disorders	8199	173	2.1%	[1.8–2.4%]	155	3.8%	[3.2–4.4%]	18	0.4%	[0.3–0.7%]	<0.001
Personality disorders	8199	301	3.7%	[3.3–4.1%]	184	4.5%	[3.9–5.1%]	117	2.9%	[2.4–3.4%]	<0.001
Alcohol-related disorders	8199	246	3.0%	[2.6–3.4%]	108	2.6%	[2.2–3.1%]	138	3.4%	[2.9–4.0%]	0.040
Drug-related disorders	8199	197	2.4%	[2.1–2.8%]	55	1.3%	[1.0–1.7%]	142	3.5%	[2.9–4.1%]	<0.001
By comorbidity											
0	8199	6210	75.7%	[74.8–76.7%]	2942	71.3%	[69.9–72.6%]	3268	80.3%	[79.0–81.5%]	<0.001
1	8199	955	11.6%	[11.0–12.4%]	545	13.2%	[12.2–14.3%]	410	10.1%	[9.2–11.0%]	<0.001
2	8199	523	6.4%	[5.9–6.9%]	315	7.6%	[6.8–8.5%]	208	5.1%	[4.5–5.8%]	<0.001
≥3	8199	511	6.2%	[5.7–6.8%]	326	7.9%	[7.1–8.8%]	185	4.5%	[3.9–5.2%]	<0.001

and adjustment disorders, somatoform and other disorders, eating disorders, personality disorders, alcohol-related disorders and drug-related disorders. However, results were less convincing for neurodevelopmental disorders and somatoform and other disorders.

Childhood trauma and psychiatric comorbidity

Young people exposed to childhood trauma were overall found to have a significantly higher risk of being diagnosed with multiple subtypes of psychiatric disorders throughout adolescence and young adulthood (Table 3). Moreover, there was a positive association between more exposure to victimisation and higher psychiatric morbidity, indicating a dose–response relationship. No significant association was found between exposure to illness or death of a close person and psychiatric comorbidity.

Discussion

The present study is, to our knowledge, the first large and representative cohort study to prospectively assess childhood trauma as a risk factor for developing any psychiatric disorder, and psychiatric comorbidity, among young people transitioning from adolescence into young adulthood. Overall, one in four (24.3%) of the adolescents were diagnosed with a psychiatric disorder by young adulthood (28.7% for females and 19.7% for males). Exposure to all types of childhood trauma (apart from illness or death of a close person) increased the odds of developing all the subtypes of psychiatric disorders in trauma-exposed individuals between 1.5–4.7 times, compared with individuals without such exposure. The risk of developing psychiatric disorders was particularly high following exposure to direct interpersonal violence, including physical violence, sexual abuse and bullying, compared with the other traumatic events. This was especially evident for psychotic disorders, stress and adjustment disorders, personality disorders and drug-related disorders. Comparable results were found with regards to risk of developing psychiatric comorbidity. Moreover, polyvictimisation was found to further increase the risk of psychiatric disorders and psychiatric comorbidity, indicating dose–response relationships.

Prevalence and risk of psychopathology following childhood trauma

The prevalence rates of psychiatric disorders are largely in agreement with previous studies that have estimated that approximately one in four young people will develop a psychiatric disorder of clinical significance, with anxiety disorders, depressive disorders, stress and adjustment disorders, neurodevelopmental disorders and substance use disorders being the most common.[32] Seeing as most of these studies were conducted over a decade ago, this indicates a comparatively stable trend in prevalence over time.

Exposure to childhood trauma was found to be a risk factor for the full range of psychiatric disorders in young people following all

Table 2 Exposure to childhood trauma (Young-HUNT 3; 2006–2008) as a risk factor for subtypes of psychiatric disorders (Norwegian Patient Registry; 2008–2021)

Trauma category N = 8199	Neurodevelopmental disorders n = 456			Psychotic disorders n = 144			Depressive disorders n = 913			Anxiety disorders n = 832			Stress and adjustment disorders n = 517		
	Odds ratio	95% CI	P-value	Odds ratio	95% CI	P-value	Odds ratio	95% CI	P-value	Odds ratio	95% CI	P-value	Odds ratio	95% CI	P-value
Direct interpersonal violence															
By type															
Physical violence	1.78	[1.33–2.37]	<0.001	2.78	[1.77–4.25]	<0.001	1.88	[1.51–2.32]	<0.001	1.87	[1.48–2.33]	<0.001	2.77	[2.14–3.55]	<0.001
Sexual abuse	2.16	[1.49–3.04]	<0.001	2.89	[1.67–4.75]	<0.001	2.34	[1.82–2.98]	<0.001	2.15	[1.65–2.78]	<0.001	3.20	[1.41–4.21]	<0.001
Bullying	2.26	[1.68–3.01]	<0.001	1.48	[0.83–2.47]	0.156	2.42	[1.94–3.00]	<0.001	2.49	[1.98–3.11]	<0.001	2.57	[1.95–3.35]	<0.001
By number of types (polyvictimisation)			<0.001			<0.001			<0.001			<0.001			<0.001
0	Reference			Reference			Reference			Reference			Reference		
1	2.24	[1.71–2.90]	<0.001	1.79	[1.09–2.83]	0.017	1.97	[1.61–2.40]	<0.001	1.83	[1.47–2.25]	<0.001	2.47	[1.92–3.16]	<0.001
≥2	2.29	[1.54–3.32]	<0.001	3.41	[1.93–5.72]	<0.001	3.04	[2.32–3.95]	<0.001	3.03	[2.29–3.98]	<0.001	4.20	[3.05–5.71]	<0.001
Other trauma															
Witness to violence	1.20	[0.94–1.53]	0.136	1.66	[1.11–2.46]	0.012	1.45	[1.22–1.72]	<0.001	1.38	[1.15–1.66]	<0.001	1.50	[1.20–1.88]	<0.001
Illness or death of a close person	1.13	[0.89–1.45]	0.313	1.37	[0.89–2.19]	0.164	1.16	[0.97–1.38]	0.104	1.08	[0.90–1.29]	0.434	1.24	[0.98–1.58]	0.080
Accident, disaster or other	1.62	[1.31–2.00]	<0.001	1.40	[0.97–2.02]	0.072	1.70	[1.46–1.97]	<0.001	1.55	[1.32–1.82]	<0.001	1.94	[1.60–2.37]	<0.001

Trauma category N = 8199	Somatoform and other disorders n = 130			Eating disorders n = 173			Personality disorders n = 301			Alcohol-related disorders n = 246			Drug-related disorders n = 197		
	Odds ratio	95% CI	P-value	Odds ratio	95% CI	P-value	Odds ratio	95% CI	P-value	Odds ratio	95% CI	P-value	Odds ratio	95% CI	P-value
Direct interpersonal violence															
By type															
Physical violence	1.33	[0.72–2.30]	0.333	2.73	[1.75–4.13]	<0.001	2.43	[1.76–3.32]	<0.001	2.20	[1.51–3.12]	<0.001	3.39	[2.34–4.85]	<0.001
Sexual abuse	1.75	[0.92–3.09]	0.068	1.89	[1.13–3.00]	0.011	2.27	[1.52–3.29]	<0.001	2.61	[1.65–3.97]	<0.001	2.90	[1.70–4.72]	<0.001
Bullying	2.55	[1.52–4.09]	<0.001	2.02	[1.23–3.19]	0.004	2.74	[1.96–3.75]	<0.001	1.99	[1.33–2.89]	<0.001	2.41	[1.57–3.60]	<0.001
By number of types (polyvictimisation)			0.003			<0.001			<0.001			<0.001			<0.001
0	Reference			Reference			Reference			Reference			Reference		
1	1.52	[0.89–2.48]	0.107	2.08	[1.35–3.12]	<0.001	2.16	[1.55–2.96]	<0.001	1.89	[1.29–2.71]	<0.001	2.78	[1.87–4.04]	<0.001
≥2	1.93	[0.92–3.66]	0.059	3.01	[1.70–5.04]	<0.001	3.98	[2.70–5.76]	<0.001	3.28	[2.06–5.04]	<0.001	4.67	[2.87–7.33]	<0.001
Other trauma															
Witness to violence	1.51	[0.97–2.30]	0.062	1.51	[1.02–2.19]	0.034	1.48	[1.11–1.97]	0.007	1.95	[1.43–2.63]	<0.001	2.21	[1.57–3.09]	<0.001
Illness or death of a close person	1.17	[0.76–1.85]	0.491	1.19	[0.81–1.80]	0.393	1.12	[0.84–1.52]	0.457	0.87	[0.64–1.18]	0.350	0.84	[0.60–1.18]	0.300
Accident, disaster or other	1.65	[1.13–2.39]	0.009	1.67	[1.20–2.31]	0.002	1.91	[1.48–2.47]	<0.001	2.07	[1.57–2.74]	<0.001	2.43	[1.77–3.33]	<0.001

All models have been adjusted for age, gender, family economy and household structure.

Table 3 Exposure to childhood trauma as a risk factor for psychiatric comorbidity (*N* = 8199)

Trauma category	Psychiatric comorbidity		
	Coefficient	95% CI	*P*-value
Direct interpersonal violence			
By type			
Physical violence	0.41	[0.34–0.49]	<0.001
Sexual abuse	0.58	[0.48–0.68]	<0.001
Bullying	0.51	[0.43–0.60]	<0.001
By number of types (polyvictimisation)			<0.001
0	Reference		
1	0.35	[0.28–0.42]	<0.001
≥2	0.73	[0.62–0.83]	<0.001
Other trauma			
Witness to violence	0.38	[0.31–0.44]	<0.001
Illness or death of a close person	0.04	[–0.01 to 0.09]	0.126
Accident, disaster or other	0.25	[0.20–0.30]	<0.001

Linear regression with psychiatric comorbidity (number of subtypes of psychiatric disorders) as the dependent variable. All models have been adjusted for age, gender, family economy and household structure.

types of childhood trauma exposure, apart from illness or death of a close person. These prospective findings are overall in line with previous studies that have investigated the link between childhood trauma and psychiatric disorders.[9,10,14] Furthermore, the strongest associations were found for psychotic disorders, stress and adjustment disorders, personality disorders and drug-related disorders, which are known to be some of the most severe psychiatric disorders and can be especially hard to treat.[11] Exposure to childhood trauma was also found to increase the risk of psychiatric comorbidity, and these findings are consistent with some previous research on psychiatric comorbidity investigating stress-related disorders specifically.[33]

Exposure to direct interpersonal violence in childhood, including physical violence, sexual abuse and bullying, was found to have the strongest associations with psychiatric disorders and psychiatric comorbidity. Furthermore, the present study contributes new longitudinal evidence to show that polyvictimisation further increases this risk across all the subtypes of psychiatric disorders, as well as for psychiatric comorbidity. These findings align with previous research suggesting that exposure to interpersonal violence may be more harmful than exposure to other traumatic events; however, this has not been documented across the full range of psychiatric disorders previously.[15,16] Similar to direct interpersonal violence, indirect interpersonal violence (witnessing violence) was also found to have a comparatively large impact on risk of development of psychiatric disorders. Although definitions of polyvictimisation vary somewhat, the findings are also in agreement with prior cross-sectional studies on the association between polyvictimisation and psychopathology in young people,[34] stressing the need for prevention efforts that target all types of interpersonal violence, as they often co-occur.

Possible mechanisms at play

The fact that childhood trauma was found to be a strong risk factor for all types of psychiatric disorders indicates that such exposure may trigger some biopsychosocial responses that increase young peoples' susceptibility to psychopathology across diagnoses.[29,35] The vast range of acute trauma-induced reactions that are commonly experienced by children and adolescents, and that span across somatic, psychological and behavioural symptoms, may provide some insight into the underlying mechanisms that are in play following trauma exposure. Unless these are effectively attenuated, persistence of (perceived) threat, or reminders, may fuel physiological reactivity, intrusion and other related psychological and somatic symptoms, including fear, anger, guilt, insomnia and pain, and put young people on severely adverse developmental trajectories over time.[36] Further, the current study's findings strengthen the notion that individual susceptibility to post-trauma psychopathological trajectories varies, and that factors such as gender may represent a biopsychosocial risk factor that currently predisposes females to internalising post-traumatic symptoms, whereas externalising symptoms are more commonly observed among males.[37] Frequent comorbidity between internalising disorders could also help explain why females were found to experience more psychiatric comorbidity compared with males.[5,35]

Childhood is a sensitive developmental period characterised by heightened brain plasticity, and this may contribute to making young people particularly vulnerable to prolonged dysregulation of neural circuits that are responsible for emotion processing following trauma exposure.[38] Moreover, young people have less impulse control on average, and are thus more prone to risk-taking behaviours that can lead to maladaptive coping strategies, such as substance misuse.[39] Subsequently, chronic stress may adversely affect cerebral sensitisation and vital neuroendocrinological, immunological and metabolic mechanisms (i.e. the hypothalamic-pituitary-adrenal axis), potentially leading to dysregulation of basic functions involved in regulation of threat and pain detection and stress response, sleep and higher cognitive and emotional processes, which in turn may heighten risk of psychopathology.[40] Several trauma-specific factors likely contribute to this, including that direct interpersonal violence more often is chronic and involves prolonged periods of trauma exposure within close social relationships. Being exposed to intentional harm by others seems to be especially pathogenic and highlights the need to address childhood trauma exposure through healthcare systems, schools and other arenas that are part of young peoples' wider environment, to reduce the burden of psychiatric illness.

Strengths and limitations

This is the first prospective study to investigate the prevalence and risk factors associated with childhood trauma and the full range of psychiatric disorders in adolescence and young adulthood, based on self-report data from the participants themselves and clinical diagnoses made by specialist healthcare services. The comparatively large sample size and long follow-up period made it possible to include psychiatric disorders that are less common, and study their associations with several types of potentially traumatic events. The study also included a representative sample of young people from the Norwegian general population living in the region.[19,21] Since it is mandatory for all children and adolescents in the country to attend school, and the public school system is widespread, the school-based Young-HUNT 3 survey included the majority of young people residing in all of Nord-Trøndelag County. Furthermore, the public healthcare system also facilitates equitable access to healthcare and a high level of follow-up through the NPR.

Limitations include that the psychiatric diagnoses in the NPR first became available in 2008, thus preventing inclusion of disorders in childhood that the participants may have been diagnosed with before 12 years of age. Although most psychiatric disorders are diagnosed after 12 years of age and followed up into adolescence, depending on their severity, there may have been some exceptions (e.g. transient separation anxiety in children). Furthermore, the NPR does not include diagnoses made by a minority of private healthcare providers that are not linked to the public regional health authorities in Norway. When it comes

to the trauma measure, another limitation is that the adolescents were not asked about emotional abuse and neglect, and seeing as parental consent was required for participation for the adolescents under the age of 16 years in the Young-HUNT 3 study, it is possible that the level of trauma exposure may have been underreported. The short-form and single-item measures in Young-HUNT 3 may also have contributed to low specificity, and there is a small chance of some multiple testing problems. Finally, although efforts were made to recruit a representative group of young people, non-responders of the Young-HUNT 3 questionnaire differed from responders to some degree, as non-responders were slightly older, more often male and less likely to attend school.[19] It is also possible that non-responders had worse health compared with the responders.

In conclusion, the findings presented here indicate that childhood trauma exposure constitutes a robust risk factor for the full range of psychiatric disorders experienced by adolescents and young adults, and contributes to the onset, exacerbation and chronicity of symptoms. Future research should seek to understand how this affects treatment trajectories across psychiatric diagnoses. Investigation into the role of childhood trauma for homotypic and heterotypic continuity of psychiatric illness is also warranted. Furthermore, many trauma-exposed young people seek help through specialised healthcare providers for their ailments, and it may therefore be helpful for clinicians to screen for childhood trauma to make informed treatment decisions from an early stage. In addition to symptoms, young people should be systematically asked about whether they have been exposed to traumatic experiences. Future prevention efforts should also seek to address childhood trauma as an important malleable risk factor that could reduce the illness burden of psychiatric disorders in young people and help identify those at risk, to provide timely and effective interventions, especially within the context of interpersonal violence and polyvictimisation.

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