

# Diagnoses of sexual abuse and their common registered comorbidities in the total population of Stockholm

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## ABSTRACT

**Background** Prior research based on self-reports has proven sexual abuse to be a risk factor for pain and psychiatric disorders. However, less is known about how this is reflected within the healthcare system. The aim of this study was to study the 2-year prevalence of diagnosis of sexual abuse and concomitant conditions.

**Methods** Using data from VAL, the study population included all living persons in Stockholm County, Sweden, between 1 January 2008 and 31 December 2014 (N=2 549 496). Diagnoses of sexual abuse were identified during 2013–2014, with information on the concomitant conditions somatic pain, depression, anxiety, psychotic disorders and bipolar disorders, stress disorders and alcohol and substance abuse. All diagnoses were prospectively registered. Age and neighbourhood socioeconomic status-adjusted ORs with 95% CIs for individuals with a diagnosis of sexual abuse, using individuals without sexual abuse as referents, were calculated.

**Results** Girls at the ages 13–17 years had the highest 2-year prevalence (0.69%) of sexual abuse followed by girls 5–12 years (0.11%), and girls 0–4 years (0.04%). For women 45 years and older the 2-year prevalence rates were substantially lower (0.008–0.004%). The highest 2-year prevalence of sexual abuse in men was seen in boys 5–12 (0.03%) years. The total 2-year prevalence of diagnoses of sexual abuse among the population in the material was 0.04%. The highest ORs of comorbidities for girls (ages 0–17 years) with sexual abuse versus those without sexual abuse were: Stress disorder; 15.7 (13.1 to 18.9), drug abuse; 10.0 (7.7 to 13.0), and alcohol abuse; 9.7 (7.8 to 12.0). For boys (ages 0–17 years), the highest ORs of comorbidities were: Stress disorder 12.4 (6.0 to 25.7), anxiety disorders; 5.5 (2.6 to 11.5), and alcohol abuse; 3.9 (1.4 to 11.3). The highest ORs of comorbidities for women (18–) with sexual abuse versus those without sexual abuse were: alcohol abuse; 19.3 (12.6 to 29.6), drug abuse; 16.7 (10.7 to 26.1) and psychotic disorders; 15.3 (8.0 to 29.4). For men (18–) the highest ORs of comorbidities were: alcohol abuse; 25.8 (15.2 to 43.9), anxiety disorders; 14.3 (8.5 to 24.2) stress disorder; 12.9 (7.5 to 22.1) and drug abuse; 12.9 (6.9 to 24.1).

**Conclusions** Diagnoses of drug and alcohol abuse, psychotic, bipolar, stress anxiety disorders, depression and somatic pain are more common among individuals with a diagnosis of sexual abuse than among individuals without a diagnosis of sexual abuse.

## INTRODUCTION

Sexual abuse includes rape, other forms of contact abuse and non-contact abuse, and occurs world-wide.<sup>1–2</sup> In a meta-analysis of 331 international

studies it was shown that an overall estimated prevalence of self-reported child sexual abuse to be 12.7% (girls 18.0% and boys 7.6%).<sup>2</sup> In a Nordic literature review, including 26 studies between 1990 and 2014, the prevalence of child sexual abuse (broadly defined) was found to vary between 3–23% for girls and 11–36% boys. The prevalence rates for contact abuse were 6–30% for girls and 1–12% for boys, while 1.1–13.5% of the girls and 0.3–6.8% of the boys reported penetrating abuse.<sup>1</sup> A recurrent Swedish report “Young, sex and internet in a changing world” have, for example, with the use of the same question, found that self-reported penetrative abuse experiences ranged between 9.2–13.5% among women and 3.0–5.5% among men aged 18 years (<http://www.allmannabarnhuset.se>). In another Swedish study 13% of 17-year-olds reported a prior year prevalence of sexual victimisation, broadly defined, including verbal sexual harassment and estimates suggests that between 1% and 3% of US youth experience sexual abuse in any given year but only ~10% of these were reported to the authorities.<sup>3–5</sup> According to the Swedish National Council for Crime Prevention (BRÅ) ~3000 rapes of children and 3000 rapes of adults are reported to the police each year in Sweden. Yet, BRÅ estimates that only 20% of all sexual offense cases in Sweden are reported to the police. In the aforementioned report where child sexual abuse was studied, only ~10% of the sexual offense cases were reported to the police (<http://www.allmannabarnhuset.se>).

International survey and interview studies have shown that the risk of mental illness and substance abuse, as well as physical illness and somatic pain is more common after interpersonal traumas among both women and men, especially when they have occurred during childhood.<sup>6–20</sup> In fact, sexual abuse proved to be one of the most common interpersonal traumas during childhood in the adverse childhood experiences (ACE) study, where 17 337 Americans responded to questions about their childhood experiences.<sup>6–15 17 21</sup> That childhood sexual abuse is both common and associated with a higher risk of psychiatric disorder in young adults was also seen in a study where the prevalence of childhood sexual abuse (CSA) in a cohort (n=1000) in New Zealand was followed for 30 years.<sup>22</sup>

Even though there are many studies confirming the prevalence of sexual abuse and its association with psychiatric symptoms and diagnoses as well as with somatic pain, we have not been able to find

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register-based data of diagnoses of sexual abuse and comorbidities in previous studies. As far as we know, the theoretical and empirical understanding of this topic is based on qualitative and self-report studies based on questionnaires on disclosure as well as on prevalence.

The aim of the present study was to assess how common diagnoses of sexual abuse are among inhabitants in Stockholm County. We also aimed to compare the prevalence of diagnoses of somatic pain, depression, anxiety, stress disorders, psychotic and bipolar disorders and substance abuse among individuals with diagnoses of sexual abuse versus individuals without a diagnosis of sexual abuse, using register-based data from Stockholm Regional Healthcare Data Warehouse (VAL).

Based on the aforementioned studies, we hypothesised that individuals with a diagnosis of sexual abuse more often have concomitant diagnoses of somatic pain, mental illness and substance abuse than individuals without a diagnosis of sexual abuse, and that this study would merge with existing research by replicating the prior results, but through register-based data, quantifying the results with real numbers and their relative magnitude in comparison with the general population in Sweden.

**METHODS**

Stockholm County has today over 2.2 million inhabitants, representing more than one-fifth of Sweden’s entire population. The region includes the capital city of Stockholm and several other cities and towns, as well as large rural areas and a sparsely-populated archipelago. The Stockholm County Council is responsible for financing primary and secondary healthcare, mainly through taxes. With the exception of very few private clinics that operate without subsidies in Stockholm, all consultations and diagnoses are recorded and stored in a central regional database at Stockholm County Council, the Stockholm Regional Healthcare Data Warehouse (VAL). The link to VAL makes it possible to perform prevalence and incidence studies for different diagnoses for all residents.<sup>23</sup>

These database compile and store data on healthcare utilisation from primary care, specialist open care, as well as in-hospital care.<sup>24</sup> As an indication for its accuracy and validity, VAL is used by the Council for updating the National Patient Register kept by the Swedish National Board of Health and Welfare (NBHW) as well as the annual benchmarking reports of the NBHW and the Swedish Association of Local Authorities and Regions.<sup>25</sup> Since 1997, diagnoses have been coded according to WHO’s International Classification of Diseases, 10th edition (ICD-10).

**Study population**

The present study population was not a sample. The study population included all living persons who resided in

Stockholm County at some point, 1 January 2008–31 December 2014. Data on all healthcare consultations in primary care, specialised open care, and in-hospital care during 2013 and 2014 were extracted from VAL. People with at least one visit or one hospital stay, where a diagnosis indicating exposure to sexual abuse was registered during 2013–2014, were identified.

**Sociodemography**

We used the Mosaic tool as classification of neighbourhood socioeconomic status into three levels, that is, high, middle or low. Mosaic is a tool developed by the marketing company Experian, to classify consumers in order to make sale activities more effective. The Mosaic system makes it possible to achieve a nuanced classification of socioeconomic status. It uses a multivariate modelling using over 400 variables to group postcodes into different types and aggregated broader groups. It uses data from 29 different countries, and has been shown to be useful also for classification of cohorts in epidemiological research.<sup>26 27</sup>

**Design**

This was a cross-sectional study comparing individuals with diagnosis of sexual abuse with individuals without such a diagnosis, in regard to some concomitant diseases. Diagnoses were registered at discharge from a hospital or after a consultation and were thus clinically based. The following ICD codes were used to define the individuals diagnosed with sexual abuse: Consultation and observation after a reported rape Z044; sexual abuse by person without weapon Y05; sexual abuse T74.2. The following ICD codes were used to identify possible concomitant diseases; reactions of stress F43; anxiety disorders F40, F41; psychotic disorders F 20, F 23, F 25, F 28 and F 29; bipolar disorders F 30 and F31; alcohol and drug abuse F10-F19; depression F32, F33; pain from stomach, head, muscles and joints R10, R51, R52, G44 and M79. Reactions of stress, F43, were also analysed in five sub groups: F43.0 acute stress reaction, F43.1 post-traumatic stress disorder, F43.2 adjustment disorder, F43.8 other reactions to severe stress, F43.9 reactions to severe stress, unspecified. The rationale for choosing these diagnoses were previous studies<sup>28 29</sup> and the high prevalence of depression and anxiety in the population.<sup>24</sup>

**Ethics**

All data we handled were anonymised and none of the individuals could be identified. Management and analysis based on VAL is part of a continuous quality control of healthcare utilisation in Stockholm County Council. Ethical approval has been obtained from the regional ethical review board in Stockholm

**Table 1** Population of women and men living in Stockholm County at some point between 1 January 2008 and 31 December 2014, divided between those with and without a recorded diagnosis of sexual abuse 2013–2014 in all levels of care

Age group in years	Women			Men		
	All	With sexual abuse	Percentage	All	With sexual abuse	Percentage
0–4	171 134	68	0.04	181 028	18	0.01
5–12	95 674	106	0.11	100 301	32	0.03
13–17	68 420	471	0.69	72 985	19	0.02
18–44	518 947	107	0.02	527 013	55	0.01
45–64	261 411	20	0.008	263 210	13	0.005
65–	166 213	6	0.004	123 160	0	0
All ages	1 281 799	778	0.06	1 267 697	137	0.01

**Table 2** Population of females and males age below and above 18 years—living in Stockholm County at some point between 1 January 2008 and 31 December 2014, divided between those with and without a recorded diagnosis of sexual abuse 2013–2014 in all levels of care

Age group in years	Women			Men		
	All	With sexual abuse	Percentage	All	With sexual abuse	Percentage
0–17	335 228	665	0.2	354 314	69	0.02
18–	946 571	133	0.01	913 383	68	0.006

to study diseases and their comorbidities with these data (permits: 2013/2196-31/2, 2016/638-32).

### Statistical methods

Standard descriptive statistics such as numbers and percentages out of the total population (N) were used. Logistic regression was used to calculate the age and neighbourhood socioeconomic status-adjusted ORs with 95% CIs, to compare the odds of concomitant disorders in individuals with diagnoses of sexual abuse with individuals without diagnoses of sexual abuse, stratified by sex. Statistical analysis and data management was performed using SAS software, V.9.4 (SAS Institute, Cary, North Carolina, USA).

### RESULTS

The 2-year prevalence (numbers and percentages) of diagnoses of sexual abuse was stratified by sex and is shown in different age-groups in [table 1](#). Girls in the ages 13–17 years had the highest prevalence (0.69%) of sexual abuse, followed by girls 5–12 years (0.11%) and girls 0–4 years (0.06%). The 2-year prevalence rates were substantially lower (0.008%–0.004%) for women 45 years and older. The highest 2-year prevalence of sexual abuse in men was seen among boys 5–12 (0.03%) years. The 2-year prevalence (numbers and percentages) of diagnoses of sexual abuse was stratified by gender and is shown for children in the ages 0–17 years and adults in [table 2](#). The total 2-year prevalence among girls was 0.2% and for boys 0.02%. The total 2-year prevalence among women was 0.01%, and for men <0.006%. The total 2-year prevalence of diagnoses of sexual abuse in the population was 0.04%.

The 2-year prevalence (numbers and percentages) of individuals with concomitant disorders and a diagnosis of sexual

abuse is shown stratified by girls and boys age 0–17 years in [table 3](#). The 2-year prevalence was in many cases several-fold higher for the concomitant disorders among individuals with, compared to girls and boys without, a diagnosis of sexual abuse. For example, the prevalence of a diagnosis of stress disorders was 32.4% among girls with a diagnosis of sexual abuse and 1.9% among girls without a diagnosis of sexual abuse, the prevalence of a diagnosis of alcohol abuse was 18.7% among girls with a diagnosis of sexual abuse and 1.2% without a diagnosis of sexual abuse, and the prevalence of a diagnosis of drug abuse 10.5% among girls with a diagnosis of sexual abuse and 0.6% among women without a diagnosis of sexual abuse. Among boys the prevalence of a diagnosis of anxiety was 14.1% among boys with a diagnosis of sexual abuse and 2.3% among boys without a diagnosis of sexual abuse.

The 2-year prevalence (numbers and percentages) of individuals with concomitant disorders and a diagnosis of sexual abuse is shown stratified by women and men in [table 4](#). The 2-year prevalence was in many cases several-fold higher for the concomitant disorders among individuals with, compared to women and men without, a diagnosis of sexual abuse. For women the prevalence of a diagnosis of psychotic disorders was 9.6% among those with a diagnosis of sexual abuse and 0.6% among those without a diagnosis of sexual abuse, and the prevalence of a diagnosis of alcohol abuse was 27.2% among those with a sexual abuse and 1.8% among those without a diagnosis of sexual abuse and the prevalence of a diagnosis of drug abuse was 24.6% among those with diagnosis of sexual abuse and 2.0% among those without a diagnosis of sexual abuse. For men the prevalence of a diagnosis of alcohol abuse was 45.8% among those with a diagnosis of sexual abuse and 3.7% among those without a diagnosis of sexual abuse, the prevalence of a diagnosis of anxiety disorder was 50.8% among those with a diagnosis of sexual abuse and 4.9% among those without a diagnosis of sexual abuse, and the prevalence of a diagnosis of stress disorder was 39.0% among those with diagnosis of sexual abuse and 3.4% among those without diagnosis of sexual abuse.

The ORs for concomitant disorders in girls and boys, adjusted for neighbourhood socioeconomic status, with a diagnosis of sexual abuse using boys and girls without a diagnosis of sexual abuse as referents are shown in [table 5](#). Significantly higher ORs were seen for all the concomitant diseases in individuals with sexual abuse that we studied, with virtually no changes after adjustment for neighbourhood socioeconomic status. Girls with a registered diagnosis of sexual abuse had 15.7 times higher odds for stress disorder (95% CI 13.1 to 18.9), 10.0 times higher odds for drug abuse (95% CI 7.7 to 13.0) and 9.7 times

**Table 3** Comorbidity in all girls and boys 0–17 years old (numbers and percentages) with and without sexual abuse during 2013–2014 living in Stockholm County at some point between 1 January 2008 and 31 December 2014

	Girls (0–17 years)				Boys (0–17 years)			
	With sexual Abuse N (664)		Without sexual abuse N (335 228)		With sexual abuse N (78)		Without sexual abuse N (354 314)	
Pain	404	60.8%	106 430	31.7%	35	44.9%	94 334	26.6%
Depression	128	19.3%	10 093	3.0%	3	3.8%	5643	1.6%
Psychotic disorders	4	0.6%	284	0.08%	0	–	497	0.1%
Bipolar disorders	16	2.4%	683	0.2%	0	–	344	0.1%
Anxiety disorders	176	26.5%	14 875	4.4%	11	14.1%	8107	2.3%
Stress disorder	215	32.4%	6254	1.9%	9	11.5%	3564	1.0%
Alcohol	118	18.7%	4026	1.2%	4	5.1%	4361	1.2%
Drugs	167	10.5%	25 667	0.6%	32	1.3%	44 039	1.2%

**Table 4** Comorbidity in all women and men 18 years and above, (numbers and percentages) with and without sexual abuse during 2013–2014 living in Stockholm County at some point between 1 January 2008 and 31 December 2014

	Women (18 years and above)				Men (18 years and above)			
	With sexual abuse N (114)		Without sexual abuse N (946 571)		With sexual abuse N (59)		Without sexual abuse N (913 383)	
Pain	85	74.6%	481 378	50.9%	35	59.3%	347 999	38.1%
Depression	53	46.5%	120 484	12.3%	20	33.9%	62 547	5.4%
Psychotic disorders	11	9.6%	7498	0.8%	10	1.9%	7999	0.9%
Bipolar disorders	16	2.4%	683	0.2%	0		344	0.1
Anxiety disorders	52	45.6%	104 579	11.0%	30	50.8%	54 553	4.9%
Stress disorder	42	36.8%	99 288	10.5%	23	39.0%	39 749	3.4%
Alcohol	31	27.2%	16 999	1.8%	27	45.8%	33 600	3.7%
Drugs	28	24.6%	19 056	2.0%	14	23.7%	21 738	2.4%

higher odds for alcohol abuse (95% CI 7.8 to 12.0) than girls without a registered diagnosis of sexual abuse. The same associations were observed in boys in the same magnitude as the aforementioned associations in girls.

Women with a diagnosis of sexual abuse had 19.3 times higher odds for alcohol abuse (95% CI 12.6 to 29.6), 16.7 times higher odds for drug abuse (95% CI 10.7 to 26.1) and 15.3 times higher odds for psychotic disorders (95% CI 8.0 to 29.4) than women without a registered diagnosis of sexual abuse. Men with diagnosis of sexual abuse had 25.8 times higher odds for alcohol abuse (95% 15.2 to 43.9), 23.0 times higher odds for psychotic disorders (95% 11.6 to 48.9), 14.3 times higher odds for anxiety disorders (95% 8.5 to 24.2) and 12.9 times higher odds for stress disorders (95% 7.5 to 22.1) than men without a registered diagnosis of sexual abuse.

**DISCUSSION**

The main findings of this study of complete healthcare data from Stockholm County were that the 2-year prevalence of diagnoses of sexual abuse was lower than self-reports and studies based on self-reported sexual abuse. The 2-year prevalence in the study was higher among children and adolescents than among adults. Furthermore, the concomitant diagnoses of pain, depression, anxiety, psychotic disorders and bipolar disorders, stress disorders and alcohol and drug abuse were significantly more common among both women and men with a diagnosis of sexual abuse, than in women and women without a diagnosis of sexual abuse during the 2-year period of the study. Another finding was that the strength of the association between

diagnoses of sexual abuse and concomitant diagnoses differed between children and adults.

Prevalence: The 2-year prevalence of diagnoses of sexual abuse in the present study (0.06% for women, 0.01% for men and 0.04% for the total study population) was much lower than in community-based studies of self-reported sexual abuse. Of theoretical and clinical positions there are reasons to believe that to reveal and talk to the doctor about past sexual abuse is experienced as sensitive and for many shameful in comparison to report this in an anonymous questionnaire. Another most likely explanation for this is that we use a 2-year prevalence of register-based diagnoses in our study, whereas most studies use lifetime prevalence of self-reported sexual abuse. In the ACE-study the prevalence of sexual abuse, (defined as an adult or person at least 5 years older ever touched or fondled the person in a sexual way, or had the person touch their body in a sexual way, or attempted or actually had oral, anal or vaginal intercourse with the person) was 22% for the total study population.<sup>15</sup> In the report ‘Violence and health in Sweden—a National Prevalence Study on Exposure to Violence among Women and Men and its Association to Health’ (N=20 000) the prevalence of experiences and memories of forced intercourse (attempts included) was 10% for women and 5% for men. Similar rates have, as mentioned before, been found in the recurrent Swedish report ‘Young, sex and internet in a changing world’ using the same questions about sexual abuse. (<http://www.nck.uu.se/Kunskapscentrum/Kunskapsbanken/>; <http://www.allmannabarnhuset.se>).

The low 2-year-prevalence of diagnoses of sexual abuse in our study and the low incidence of police reported rapes and/or

**Table 5** Comorbidity in all females and males (ORs with 95% CI) with and without sexual abuse during 2013–2014 living between 1 January 2008 and 31 December 2014 using people without sexual abuse as referents, according to logistic regression analyses

Comorbid diagnoses	Female		Male	
	Age 0–17 years	Age 18 years	Age 0–17 years	Age 18 years
Pain	2.4 (2.0 to 2.8)	3.2 (2.1 to 5.0)	2.3 (1.4 to 3.6)	2.9 (1.7 to 4.9)
Depression	4.2 (3.4 to 5.2)	5.9 (4.1 to 8.6)	2.2 (0.7 to 7.3)	6.7 (3.8 to 11.8)
Psychotic disorder	3.4 (1.2 to 9.1)	15.3 (8.0 to 29.4)	<0.001	23.8 (11.6 to 48.9)
Bipolar disorder	5.9 (3.5 to 9.7)	8.8 (4.4 to 17.3)	<0.001	9.9 (3.1 to 31.9)
Anxiety disorders	4.6 (3.8 to 5.6)	5.8 (4.0 to 8.5)	5.5 (2.6 to 11.5)	14.3 (8.5 to 24.2)
Stress disorder	15.7 (13.1 to 18.9)	4.5 (3.0 to 6.6)	12.4 (6.0 to 25.7)	12.9 (7.5 to 22.1)
Alcohol	9.7 (7.8 to 12.0)	19.3 (12.6 to 29.6)	3.9 (1.4 to 11.3)	25.8 (15.2 to 43.9)
Drugs	10.0 (7.7 to 13.0)	16.7 (10.7 to 26.1)	0.9 (0.1 to 6.5)	12.9 (6.9 to 24.1)

Adjusted for age and neighbourhood socioeconomic status.

sexual coercion, compared with the prevalence of sexual abuse in studies and reports based on self-reported prevalence are in accordance with the low tendency to tell professionals about sexual abuse that is shown in the recurrent Swedish report 'Young, sex and internet in a changing world', where high school students have been asked questions about disclosure (<http://www.allmannabarnhuset.se>). It is also in accordance with Swedish cohort studies analysing different aspects of disclosure among adult women who had all been exposed to childhood sexual abuse (n=120).<sup>30-32</sup> However, it is interesting that our 2-year prevalence is lower than the prevalence of police reported rapes and/or sexual coercion, in Sweden during 2013–2014 (<https://www.bra.se/bra/brott-och-statistik.html>). According to the statistics of the Swedish National Council for Crime Prevention (BRÅ), there were 12 714 police reports on rape and 2776 police reports on sexual coercion during the period, which would represent the 2-year prevalence of 0.16%, while the 2-year prevalence in our study was only 0.04. Is the tendency to tell the doctor lower than the tendency to tell the police? Another reason may be that it is more common for medical staff to refer a patient who report rape or sexual coercion to the police, than the other way around, and/or that sexual abuse victims preferentially consult doctors for physical consequences after violent sexual abuse. Doctors may also be reluctant to set a diagnosis of sexual abuse, even if the patient discloses sexual abuse during the consultation. The obstacles to the communication of sexual abuse in a healthcare setting has been described in a systematic review where two studies showed that providers often failed to inquire about a history of childhood sexual abuse although survivors wished to disclose for the sake of their health and experience of care.<sup>33</sup>

The differences in prevalence between the age groups in our study can be explained by the fact that most sexual abuse, according to both police reports and aforementioned self-report studies, seem to occur during childhood and the teenage years. Since the tendency to report sexual abuse during childhood to professionals (including healthcare workers) is low it is reasonable to assume that only the most severe cases of abuse are diagnosed ('Young, sex and internet in a changing world', <http://www.allmannabarnhuset.se>). This would also explain why our results differ from other studies with our high OR for stress and addiction, compared to our OR for somatic pain. One interpretation would be that concomitant diagnoses of stress and substance abuse are more common closer in time to the sexual abuse, while somatic pain is a comorbidity that develops over the years.

### Concomitant diseases

The differences in odds for individuals with a registered diagnosis of sexual abuse compared with individuals without a registered diagnosis of sexual abuse were highest for substance abuse (alcohol and drugs) followed by psychotic disorders for the adults. For children the difference in odds were the highest for stress disorders followed by alcohol and drugs and anxiety disorders in our study. The high ORs for alcohol and drug abuse are in accordance, but higher than in earlier studies on US adults based on patient samples.<sup>12 14 15 28 29</sup> We believe this can be due to the identification of sexual abuse in our study through registered diagnoses, rather than self-report. Since the tendency to tell the doctor seems to be low, one may assume that only the most severe cases of sexual abuse are being diagnosed, which may explain the high level of concomitant diagnoses.<sup>33</sup>

The higher prevalence of concomitant diagnoses among adults with a diagnosis of sexual abuse compared to the children

with a diagnosis of sexual abuse is interesting. Adverse childhood experiences however, are also risk factors for adult sexual victimisation, and one explanation for the higher prevalence of concomitant diagnoses among the adults could be due to revictimisation among adults with adverse childhood experiences.<sup>34</sup>

We also find the higher prevalence of psychotic disorders among the women than among the girls, all with a diagnosis of sexual abuse, interesting. The women have a prevalence of 9.6% of psychotic disorders, while girls have a prevalence of 0.6%. The results are interesting in the context of the ongoing discussion on overlapping of symptoms in psychotic disorders, dissociative symptoms and stress disorders.<sup>35</sup>

The gender difference when it comes to psychotic disorders and stress disorders, are also of interest. Boys and men with a diagnosis of sexual abuse have a much lower prevalence of psychotic disorders than girls and women with a diagnosis of sexual abuse, and subanalyses showed reversed differences in odds for post-traumatic stress and acute stress reactions when male and female individuals with diagnoses of sexual abuse were compared. We do not know whether this is because male individuals exposed to sexual abuse seek doctors closer to the abuse than female individuals, and therefore are given the diagnosis acute stress disorder instead of post-traumatic stress disorder. Further studies are needed to better understand the differences in the prevalence of comorbidities between the different age groups and gender among the individuals with a diagnosis of sexual abuse.

The findings in the present observational study cannot be deemed causal, since we have not analysed the onset of the diagnoses of sexual abuse, nor of concomitant conditions. Severe sexual abuse, such as rape, is however known to be the event strongest associated with post-traumatic stress for women, and prior studies have demonstrated an association between sexual abuse, trauma and post-traumatic stress, depression, anxiety and psychosis.<sup>28 29 36-41</sup>

Pain had the lowest OR of the analysed concomitant diagnoses in our study. However, an OR of 3.5 for women (3.0 to 4.1) and 2.6 for men (1.9 to 3.7) is clinically highly relevant. Interestingly, these findings in a study of a comprehensive patient population are in line with earlier studies of patient samples.<sup>18</sup>

### Clinical implications

Considering the individual suffering and the high costs of sick leave due to anxiety, depression and stress-related disorders (68% of the total cost for sick-leave 2009, 'Report of costs for different diseases within the social welfare insurance system' and the deleterious effects of substance abuse, it is critical to recognise afflicted individuals early <http://www.forsakringskassan.se>). The present study calls attention to the importance of questioning patients with substance abuse or anxiety, depression and stress disorders for a history of traumatic events, and in particular sexual abuse. It is necessary for doctors to actively probe for sexual abuse, since the tendency to disclose is very low. Vice versa, individuals with sexual abuse should be asked for concomitant conditions. There have been discussions about the costs and benefits of asking patients about a history of abuse. There is now however robust qualitative evidence that asking about a history of abuse can be a healing experience for the patient, and that GP's are motivated to improve knowledge and counselling skills.<sup>33 42 43</sup> We welcome further studies in the field, but we also recommend that existing knowledge about prevalence, treatment possibilities and interview procedures are included in the educational programmes for healthcare professionals.

Focused treatment of symptoms due to sexual abuse could be of importance in the prevention of concomitant conditions.

## Strengths and limitations

As far as we know, the present study is the largest investigation of registered diagnoses of sexual abuse and diagnoses of concomitant conditions. There are few studies of disclosures of sexual abuse to healthcare workers in ordinary consultations. The study population included all living persons who resided in Stockholm County at some point, 1 January 2008–31 December 2013. The well-defined inclusion criteria and diagnoses from all care forms including emergency departments, primary healthcare, in hospital care and specialists in open care are other strengths.

## Some limitations are also of importance

Patients' low tendency to reveal sexual abuse to their doctor is a weakness in this kind of study. The lack of a lifetime history of sexual abuse is another limitation as we only accessed registered diagnoses in two recent years. However, the diagnosis-based definition of sexual abuse makes the specificity in the present study high. Another weakness of the study is the cross-sectional design which cannot show causal relationships. Since the association between diagnoses of sexual abuse and substance abuse in this study was remarkably high, a questionnaire study directed directly to a population with diagnoses of substance abuse, where time for onset of sexual abuse and substance abuse, respectively, were analysed could be of interest.

## CONCLUSIONS

In conclusion, using complete population data with nearly all healthcare visits registered in over two million individuals, the prevalence of concomitant diagnoses was highly elevated in individuals with diagnoses of sexual abuse. We suggest clinicians to view sexual abuse as a warning sign for other relevant disorders such as substance abuse, depression or anxiety but also for psychotic and bipolar disorders. This study also adds to the fact that few do take the opportunity or are questioned about sexual abuse experiences which is the prerequisite for an understanding of the mechanisms behind a specific symptomatology and later diagnosis. Clinicians should probe for exposure to sexual abuse, when individuals seek help for somatic pain, depression, anxiety, stress disorders, substance abuse and psychotic and bipolar disorders. Future studies on long-term prevalence and on concomitant conditions, and of casual relationships would be of interest, and could be performed through a combination of questionnaires and registered diagnoses like in the present study.

### What is already known on this subject

Prior research based on self-reports have proven sexual abuse to be a risk factor for pain and psychiatric disorders.

### What this study adds

This study merge with existing research by replicating the prior results, but through register-based data from the healthcare system, quantifying the results with real numbers and their relative magnitude in comparison with the general population in Sweden.

**Contributors** GR drafted the manuscript and contributed to all sections. GL and PW researched data, were involved in study design and critical revision of the manuscript. LW and C-GS contributed to knowledge in the field, background info and discussion, critical revision of the manuscript. ACC supervised GR and contributed to all sections of the manuscript.

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**Competing interests** GR is the founder and secretary general of the non-profit organisation World of No Sexual Abuse, WONSA.

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