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BASIC RESEARCH ARTICLE

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The association between different traumatic life events and suicidality

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ABSTRACT

Background: Traumatic life events have been associated with increased risk of various psychiatric disorders, even suicidality. Our aim was to investigate the association between different traumatic life events and suicidality, by type of event and gender.

Methods: Women attending a cancer screening programme in Iceland (n = 689) and a random sample of men from the general population (n = 709) were invited to participate. In a web-based questionnaire, life events were assessed with the Life Stressor Checklist – Revised, and the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criterion was used to identify traumatic life events. Reports of lifetime suicidal thoughts, self-harm with suicidal intent and suicide attempt were considered as lifetime suicidality. We used Poisson regression, adjusted for demographic factors, to express relative risks (RRs) as a measure of the associations between traumatic events and suicidality.

Results: Response rate was 66% (922/1398). The prevalence of lifetime traumatic events was 76% among women and 77% among men. Lifetime suicidality was 11% among women and 16% among men. An overall association of having experienced traumatic life events with suicidality was observed [RR 2.05, 95% confidence interval (CI) 1.21–3.75], with a stronger association for men (RR 3.14, 95% CI 1.25–7.89) than for women (RR 1.45, 95% CI 0.70–2.99). Increased likelihood for suicidality was observed among those who had experienced interpersonal trauma (RR 2.97, 95% CI 1.67–5.67), childhood trauma (RR 4.09, 95% CI 2.27–7.36) and sexual trauma (RR 3.44, 95% CI 1.85–6.37), with a higher likelihood for men. In addition, an association between non-interpersonal trauma and suicidality was noted among men (RR 3.27, 95% CI 1.30–8.25) but not women (RR 1.27, 95% CI 0.59–2.70).

Conclusion: Findings indicate that traumatic life events are associated with suicidality, especially among men, with the strongest association for interpersonal trauma.

La asociación de diferentes eventos traumáticos vitales y suicidalidad

Antecedentes: Los eventos vitales traumáticos han sido asociados con un riesgo más alto de trastornos mentales, incluso suicidalidad. Nuestro objetivo fue investigar la asociación entre diferentes eventos vitales traumáticos diferentes y suicidalidad, por tipo de evento y género.

Método: Fueron invitados a participar las mujeres que se atiendian un programa de detección de cáncer en Islandia (N=698) y una muestra aleatoria de hombres de la población general (N=709) . En un cuestionario online, los eventos vitales fueron evaluados con la Lista de Chequeo de Estresores Vitales-Revisada y se usaron los criterios DSM-5 para identificar eventos vitales traumáticos. Los reportes de pensamientos suicidas, autoflagelación con intención suicida e intento suicida a lo largo de la vida fueron considerados como suicidalidad a lo largo de la vida. Usamos la regresión de Poisson, ajustada por factores demográficos, para mostrar los riesgos relativos como una medida de las asociaciones entre eventos traumáticos y suicidalidad.

Resultados: La tasa de respuesta fue de un 66% (922/1398). La prevalencia de eventos traumáticos a lo largo de la vida fue de 76% para mujeres y de 77% para hombres. La suicidalidad a lo largo de la vida fue de 11% para mujeres y de 17% para hombres. Se observó una asociación global entre haber experimentado eventos vitales traumáticos con suicidalidad (RR 2.05, IC 1.21–3.75), con una asociación más fuerte en hombres (RR 3.14, IC 1.25–7.89) que mujeres (RR 1.45, CI 0.70–2.99). Una mayor probabilidad de suicidalidad fue observada entre quienes han experimentado trauma interpersonal (RR 2.97, IC 1.67–5.67), trauma infantil (RR 4.09, IC 2.27–7.36) y trauma sexual (RR 3.44, IC 1.85–6.37), con una más alta probabilidad para hombres. Además, la asociación entre trauma no-interpersonal y suicidalidad fue identificado en hombres (RR 3.27, IC 1.30–8.25) pero no en mujeres (RR 1.27, IC 0.59–2.70).

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Trauma; Eventos vitales; Ideación y conducta suicida; género

关键词
创伤; 生活事件; 自杀念头和行为; 性别

HIGHLIGHTS

- Traumatic life events were associated with suicidality.
- Non-interpersonal trauma was associated with suicidality among men, but not women.
- Interpersonal trauma was associated with suicidality for both genders, with a higher likelihood among men.

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Conclusiones: Los hallazgos indican que los eventos vitales traumáticos están asociados con suicidalidad, especialmente entre hombres, con una asociación más fuerte para el trauma interpersonal.

不同创伤生活事件与自杀的关系

背景：创伤性生活事件与多种精神疾病的患病风险增加有关，其中也包括自杀风险。我们的研究目的是根据事件类型和性别，分别考察不同创伤生活事件和自杀之间的关系。

方法：被试由参加癌症筛查的冰岛妇女（N = 689）和随机抽样的一般人群（N = 709）组成，在网络上完成调查问卷。生活事件通过《生活压力源检查表 - 修订版》测量，根据DSM-5判断创伤性生活事件。自我报告的自杀念头，有自杀意图的自残和自杀未遂都被视为'终身自杀'（lifetime suicidality）。 我们使用泊松回归，控制人口统计学因素，计算相对风险（relative risks ）来度量创伤事件与自杀之间的关联性。

结果：被试回应率为66%（922/1398）。 终身创伤事件的发生率在女性中为76%，在男性中为77%。 终身自杀率在女性中为11%，在男性中为17%。 经历过创伤事件与自杀的总体相关（RR 2.05，CI 1.21–3.75），在男性中（RR 3.14，CI 1.25–7.89）相比女性（RR 1.45，CI 0.70–2.99）这种关联性更强。 经历人际创伤（RR 2.97，CI 1.67–5.67），童年创伤（RR 4.09，CI 2.27–7.36）和性创伤（RR 3.44，CI 1.85–6.37）的被试自杀的可能性更高，男性尤甚。此外，还在男性中发现非人际创伤与自杀之间存在关联（RR 3.27，CI 1.30–8.25），但在女性中则没有出现关联（RR 1.27，CI 0.59–2.70）。

结论：研究结果表明，自杀与创伤性生活事件有关，尤其是与男性和人际创伤相关最强。

1. Introduction

Suicides are currently a major public health threat and increased understanding of risk factors is important. Suicidality (e.g. suicidal thoughts, suicidal self-harm and suicide attempts) is one of the most important risk factors for completed suicides (Christiansen & Jensen, 2007; Kim et al., 2018). The lifetime prevalence of suicidality in the general population has been shown to be 9% for suicide ideation, 3% for suicide planning and 3% for suicide attempts (Nock et al., 2008). Non-suicidal self-harm is generally not considered as suicidal behaviour, although a strong relationship between self-harm and suicide has been shown (Hawton, Zahl, & Weatherall, 2003; Zahl & Hawton, 2004). Studies have demonstrated a lifetime prevalence for self-harm of 6–24% in the general population, varying between different study groups and definitions of self-harm (Cipriano, Cella, & Cotrufo, 2017; Klonsky, 2011). Even though some risk factors for suicidality are known (e.g. young age, female gender) (Nock et al., 2008; Zalsman et al., 2016), the interaction among social, psychological and behavioural risk factors is complex. Mental disorders are, for example, known to be among the strongest predictors of suicidal behaviour (Harris & Barraclough, 1997; Nock, Hwang, Sampson, & Kessler, 2010). Yet, a large cross-national analysis from the World Health Organization (WHO) world mental health surveys (n = 108,664) found that only close to half of individuals who reported having had serious suicidal thoughts actually reported a previous psychiatric disorder (Nock et al., 2009). For effective prevention of suicidality and suicide risk, this highlights the need to understand more about other risk factors, such as exposure to traumatic events.

A majority (60–90%) of individuals will experience a traumatic event in their lifetime (Kessler et al., 2017; Kilpatrick et al., 2013; Thordardottir et al., 2015). While most individuals adjust to the trauma and recover from the emotional strain that follows, it remains unexplained why some suffer more than others and experience mental health decline, even to the point of suicidal risk . A minority may experience post-traumatic stress disorder (PTSD) following trauma, which has been linked to suicidality (Ford & Gomez, 2015; Krysinska & Lester, 2010; Panagioti, Gooding, Triantafyllou, & Tarrier, 2015). The risk of PTSD may, however, vary according to trauma event type (Kessler et al., 2017; Ozer, Best, Lipsey, & Weiss, 2003). The risk of suicidality may also vary according to type of traumatic event. For example, a study based on the WHO's mental health surveys implemented in 21 countries (n = 102,245) and investigating a range of traumatic events and suicidal behaviour (Stein et al., 2010) found that the strongest associations were found for violence-related events. In addition, previous studies have shown increased risk of suicidal behaviour subsequent to adverse and traumatic life events during childhood (Afifi et al., 2016; Bruffaerts et al., 2010), for both suicidal ideation (Stansfeld et al., 2017) and suicide attempts (Dube et al., 2001; Enns et al., 2006; Ford & Gomez, 2015). Furthermore, studies have found that non-interpersonal events such as the loss of a loved one can increase the risk of self-injury (Bylund Grenklo et al., 2013), suicide attempts and suicides (Jakobsen & Christiansen, 2011; Niederkrotenthaler, Floderus, Alexanderson, Rasmussen, & Mittendorfer-Rutz, 2012). Knowledge on how various types of traumatic event may predict suicidality (Yoo et al., 2018) is, however, still scarce, especially with regard to gender.

Studies have shown that men are more likely than women to experience various types of trauma, except for sexual and violent trauma (de Vries & Olff, 2009; Tolin & Foa, 2006). Women are, however, more likely to engage in self-harm and suicide attempts than men (Nock et al., 2008; World Health Organization, 2014).

The knowledge on trauma event exposure is limited in Iceland and, to our knowledge, no study has studied its association with suicidality. With the overall aim of enhancing current understanding of suicidal behaviour, the objective of this study was to increase knowledge on the association of traumatic life events and suicidality, focusing on type of event and gender.

2. Methods

2.1. Study design and population

With the principal aim of significantly advancing current understanding of the effects of stress, lifestyle and inheritance on health, the Stress And Gene Analysis (SAGA) cohort study was launched with a pilot phase in February to April 2014. We invited 1640 individuals, aged 20–69 years, to participate in the pilot study. Women were invited through the cancer screening programme at the Icelandic Cancer Society (ICS), where the majority of all women accept a screening invitation whether or not they have a history or increased risk of cancer. A sample of women who had accepted a screening invitation and were attending regular breast and cervical cancer screening at the ICS were invited to participate in the study (n = 742). For men, we invited a random sample from the Icelandic population registry living in the area of the capital, Reykjavik, to participate (n = 898). Apart from the method of invitation, the enrolment procedure was the same for both genders. Participants received an invitation letter containing information about the questionnaire and study details. The invitation letter was followed by a telephone call from a professional working at the study centre, introducing the study aims and procedure and offering further information. All participants received a secure link to the questionnaire via e-mail.

2.2. Measurements

2.2.1. Stressful life events

We evaluated stressful and traumatic life events with the assessment instrument Life Stressor Checklist – Revised (LSC-R) (Wolfe, Kimerling, Brown, Chrestman, & Levin, 1996). This 30-item questionnaire covers various types of life stressor such as loss of significant others, exposure to natural disasters, accidents, and interpersonal, physical or sexual assaults. We used the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) definition of trauma-related disorders to evaluate events as traumatic (where trauma is defined as direct exposure to actual or threatened death, serious injury and/or sexual violence, witnessing these events happening to others, learning that they happened to a loved one, or repeatedly being exposed to details of such events) (American Psychiatric Association, 2018). In total, 11 types of event from the LSC-R were classified as traumatic, which we subcategorized into: (1) all traumatic events, classified into (A) non-interpersonal traumatic events and (B) interpersonal traumatic events. We further divided the interpersonal traumatic events into (B1) childhood trauma and (B2) sexual trauma (see Table 3 footnotes).

2.2.2. Assessment of suicidality

For the outcome measurement, we asked participants about current suicidal thoughts, as well as lifetime history of suicidal thoughts, self-harm, suicide planning and suicide attempts. The question on current suicidal thoughts came from a validated depression questionnaire, the Patient Health Questionnaire (PHQ-9), while questions on suicide planning, self-harm and suicide attempts were single-item questions (see Appendix for detailed prescription). We combined all suicidal outcomes as one outcome of lifetime suicidality (present suicidal thoughts, lifetime suicidal thoughts/planning and suicide attempts) and included self-harm with suicidal intent in that measure of suicidality.

2.2.3. Other measures

We asked whether participants had experienced a 2 week depressive period in their lifetime, and whether they had a history of psychiatric morbidity such as depression or PTSD (see Appendix).

2.2.4. Sociodemographic factors

The SAGA questionnaire included questions on participants' gender, age, education, place of residence, marital status, employment and social support (Loucks, Berkman, Gruenewald, & Seeman, 2006). Before conducting the analyses, we divided age into four categories: 20–35 years, 36–45 years, 46–55 years, and 56 years and older. We categorized educational level into: basic (elementary), middle (high school), university education (completed) and other/not stated; and divided residence by postal codes into habitation in the centre of Reykjavik, suburbs of Reykjavik and other municipalities surrounding the capital area. Marital status was divided into: married/cohabiting, in a relationship, single, widow/widower and not stated. We categorized employment status as: employed (including being a student and being on parental

leave), unemployed, disabled/on sick leave, retired and not stated.

2.3. Statistical analysis

We used descriptive statistics to evaluate the demographic background of the participants, using the chi-squared test to evaluate the differences between the groups with and without a history of trauma. We calculated the prevalence for suicidal thoughts, suicidal self-harm, suicide planning and suicide attempts, and evaluated the prevalence for each characteristic category. We calculated the prevalence for the classified groups of traumatic life events, and to evaluate the risk of lifetime suicidality we used Poisson regression for each group with a comparison group experiencing no trauma (or non-equivalent trauma type), overall and by gender. With the same measures, we conducted a sensitivity analysis to evaluate the risk of current suicidality. We performed all statistical analyses with the R statistical program (R Core Team, 2013).

The study was approved by the National Bioethics Committee in Iceland (reference: VSNb2013010025/03.7) and announced to the Data Protection Authorities in Iceland.

3. Results

Individuals who had a listed address and telephone number and spoke Icelandic (n = 1398, 689 women and 709 men) met the inclusion criteria, and out of these, 1038/1398 (74%) started answering the SAGA cohort study questionnaire. We excluded individuals who did not answer the question on gender and those who did not complete the questionnaire, leaving 922 participants (66%). Slightly over half of the participants were female (56%). The total response rate was 58% for men (403/689) and 73% for women (519/709). Female participants had similar educational levels, employment and marital status to women in the general population (Statistics Iceland, 2018). The mean age was 52.6 years for females in the study and 45.6 years for males.

Table 1. Demographics of the Stress And Gene Analysis (SAGA) cohort study population by history of trauma.

	Total	No previous trauma	History of trauma	*p*
Total	922	205/872	667/872	
Men	403 (44)	87 (42)	293 (44)	0.76
Women	519 (56)	118 (58)	374 (56)	
Age group	922	205	667	0.23
18–35 years	149 (16)	39 (19)	102 (15)	
36–45 years	179 (19)	45 (22)	119 (18)	
46–55 years	265 (29)	52 (25)	195 (29)	
≥ 56 years	329 (36)	69 (34)	251 (38)	
Education	920	204	666	0.009
Basic	163 (18)	26 (13)	129 (19)	
Middle	264 (29)	50 (25)	198 (30)	
University (completed)	377 (41)	103 (50)	255 (38)	
Other	116 (13)	25 (12)	84 (13)	
Residence	902	202	663	0.63
Reykjavik centre	272 (30)	66 (33)	196 (30)	
Reykjavik suburbs	232 (26)	53 (26)	172 (26)	
Surrounding municipalities	398 (44)	83 (41)	295 (44)	
Marital status	905	202	655	0.25
Married/cohabiting	668 (74)	158 (78)	477 (73)	
In a relationship	50 (6)	13 (6)	33 (5)	
Single	175 (19)	30 (15)	134 (20)	
Widow/widower	12 (1)	1 (0)	11 (2)	
Employment	912	202	665	0.002
Employed/studying/parental leave	775 (85)	187 (93)	548 (82)	
Unemployed	28 (3)	2 (1)	23 (3)	
Disabled/sick leave	61 (7)	5 (2)	55 (8)	
Retired	48 (5)	8 (4)	39 (6)	
Social connectedness	922	205	667	0.43
Low	201 (22)	42 (20)	134 (20)	
Medium	273 (30)	69 (34)	195 (29)	
Medium high	317 (34)	71 (35)	237 (36)	
High	131 (14)	23 (11)	101 (15)	
Previous psychological morbidity	922	205	667	0.003
Yes	211 (23)	32 (16)	173 (26)	
No	711 (77)	173 (84)	494 (74)	
History of depression	896	205	664	< 0.0001
Yes	362 (40)	56 (27)	297 (45)	
No	495 (55)	140 (68)	339 (51)	
Don't know/not answered	39 (4)	9 (4)	28 (4)	
History of loss of interest	890	201	662	0.0002
Yes	310 (35)	52 (26)	248 (37)	
No	534 (60)	145 (72)	374 (56)	
Don't know/not answered	46 (4)	4 (2)	40 (6)	

Data are shown as n (%).

Characteristics of the total study population are listed in Table 1. Characteristics are also listed by whether or not participants had experienced trauma. A vast majority (667/872, 76%) had experienced a traumatic event in their lifetime. Participants with no history of trauma (205/872, 23%) had a lower prevalence of psychological morbidity than the group with trauma history (16% vs 26%, $p < 0.05$), as well as a lower prevalence of having experienced a 2 week depressive period in their lifetime (27% vs 45%, $p < 0.05$) or a period of loss of interest (26% vs 37%, $p < 0.05$) (Table 1).

3.1. Mental disorders and gender

Sixteen per cent of participants reported having had a depressive disorder during their lifetime. Women were more likely to report having had a depressive disorder compared to men (18% vs 13%, $p = 0.02$), and more likely to have experienced 2 week periods of depressive symptoms (women 46% vs men 33%, $p = 0.0002$) and a period of loss of interest (women 39% vs men 30%, $p = 0.001$). Among those who had a history of trauma, the difference between the genders was similar; men had a lower prevalence of previous depression compared to women (15% vs 22%, $p = 0.03$), as well as a lower prevalence of experiencing a 2 week depressive period (38% vs women 53%, $p = 0.009$) and a period of loss of interest (35% vs 44%, $p = 0.01$).

3.2. Suicidality and gender

Out of 893 individuals answering the question on present suicidal thoughts, 44 (5%) reported having current thoughts. As shown in Figure 1, the prevalence of current suicidal thoughts was not higher among men than women (6% vs 4%, $p = 0.47$), while a lifetime history of having had serious thoughts of dying by suicide was higher among men than women (15% vs 8%, $p = 0.001$), as was having planned a suicide (8% vs 5%, $p = 0.02$), but not lifetime deliberate self-harming (1% vs 1%) or having attempted suicide (3% vs 2%, $p = 0.42$). Table 2 presents the demographics of individuals who reported any suicidality, including current suicidal thoughts, lifetime suicidal thoughts (thought and planning) and suicidal actions (suicidal self-harming or attempting suicide). The overall prevalence for lifetime suicidality was 13% (men 16% and women 11%, $p = 0.017$). Among those reporting lifetime suicidality, 42% reported a previous mood affective disorder and 36% reported having had PTSD (all women; no men reporting suicidality reported previous PTSD).

3.3. Traumatic life events and suicidality

In total, 76% of participants had experienced an event in their lifetime classified as traumatic, 64% had experienced events classified as non-interpersonal trauma (men 68% and women 61%), 40% interpersonal trauma (men 38% and women 43%), 23% trauma during their childhood (men 17% and women 28%) and 19% sexual trauma (men 11% and women 25%). Table 3 presents the association between having experienced traumatic life events and lifetime suicidality. After adjusting for sociodemographic factors, we found that any traumatic life event increased the overall risk of lifetime suicidality [relative risk (RR) 2.05, 95% confidence interval (95% CI) 1.21–3.75], as did non-interpersonal trauma (RR 2.03, 95% CI 1.15–3.59). After stratifying by gender, the risk was found to be increased for men (RR 3.14, 95% CI 1.25–7.89 and RR 3.27, 95% CI 1.30–8.25), but not for women (RR 1.45, 95% CI 0.70–2.99 and RR 1.27, 95% CI 0.59–2.70). We furthermore found that the experience of an interpersonal traumatic life event increased the risk of lifetime suicidality for both

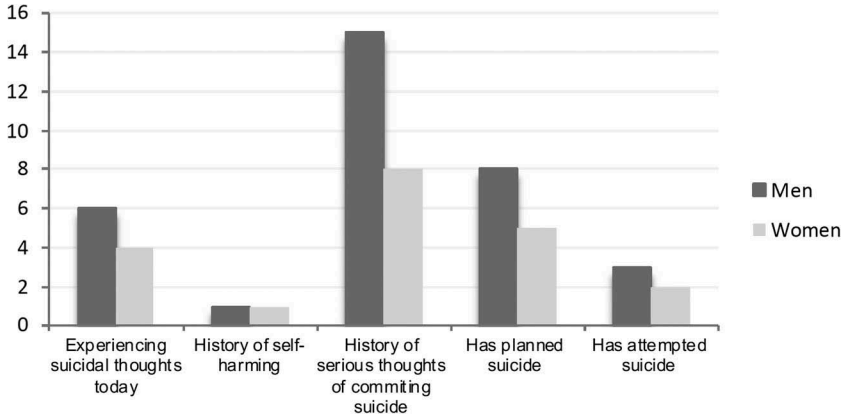

Figure 1. Overall prevalence (percentage) of current suicidal thoughts and history of suicidal thoughts, suicidal self-harm, suicide planning and suicide attempts of the Stress And Gene Analysis (SAGA) cohort study population, presented by gender.

Table 2. Suicidal outcomes by background characteristics among the Stress And Gene Analysis (SAGA) cohort study population.

	Current suicidal thoughts (*n* = 892)	Lifetime suicidal thoughts/ planning (*n* = 900)	Lifetime self-harm/ attempt (*n* = 899)	Lifetime overall suicidality (*n* = 922)
Total	44/892 (5)	120/900 (13)	24/899 (3)	120 (13)
Men	22/389 (6)	65/390 (17)	13/390 (3)	65/403 (16)
Women	22/503 (4)	55/509 (11)	11/509 (2)	55/519 (11)
Age group	*n* = 888	*n* = 899	*n* = 899	*n* = 923
18–35 years	10/145 (7)	27/145 (19)	3/145 (2)	27/149 (18)
36–45 years	8/164 (5)	29/169 (17)	8/169 (5)	29/179 (16)
46–55 years	9/253 (4)	28/256 (11)	7/256 (3)	28/265 (11)
≥56 years	17/326 (5)	36/329 (11)	6/329 (2)	36/329 (11)
Education	*n* = 846	*n* = 897	*n* = 889	*n* = 897
Basic	9/157 (6)	24/159 (15)	8/159 (5)	24/163 (15)
Middle	17/255 (7)	41/255 (16)	8/255 (3)	41/264 (16)
University (completed)	14/366 (4)	41/370 (11)	3/370 (1)	41/377 (11)
Other	4/112 (4)	14/113 (12)	5/113 (4)	14/116 (12)
Residence	*n* = 885	*n* = 892	*n* = 892	*n* = 902
Reykjavik centre	12/265 (5)	42/267 (16)	9/267 (3)	42/272 (15)
Reykjavik suburbs	12/226 (5)	26/230 (11)	7/230 (3)	26/232 (11)
Surrounding municipalities	19/394 (5)	50/395 (13)	7/395 (2)	50/398 (13)
Marital status	*n* = 865	*n* = 884	*n* = 884	*n* = 915
Married/cohabiting	24/651 (4)	65/654 (10)	11/654 (2)	65/668 (10)
In a relationship	3/48 (6)	6/48 (13)	0/48 (0)	6/50 (12)
Single	17/167 (10)	47/170 (28)	12/170 (7)	47/175 (27)
Widow/widower	0/12 (0)	1/12 (8)	0/12 (0)	1/12 (8)
Employment	*n* = 848	*n* = 894	*n* = 894	*n* = 892
Employed/studying/leave	27/726 (4)	88/758 (12)	12/758 (2)	88/775 (11)
Unemployed	3/27 (11)	8/27 (30)	4/27 (15)	8/28 (29)
Disabled/sick leave	12/48 (25)	20/61 (33)	8/61 (13)	20/61 (33)
Pension	2/47 (4)	4/48 (8)	0/48 (0)	4/48 (8)
Psychological disorders*	*n* = 961	*n* = 973	*n* = 973	*n* = 973
Mood affective disorders	24/145 (17)	60/147 (41)	16/147 (11)	62/147 (42)
Anxiety disorders	18/124 (15)	42/126 (33)	11/126 (9)	42/126 (33)
PTSD	5/21 (24)	8/22 (36)	1/22 (5)	8/22 (36)
Other	7/34 (21)	17/36 (47)	4/36 (14)	17/36 (47)
None	12/637 (2)	41/642 (6)	6/641 (1)	41/641 (6)

*Have you had any of the following diseases? Mood disorders = Depression and Bipolar. Anxiety disorders = General anxiety disorder, Panic attacks, Agoraphobia and Social phobia. PTSD = Post-traumatic stress disorder. Other = Burnout, Obsessive–compulsive disorder, Schizoaffective disorder, Schizophrenia, Asperger, Tourette, Autism, Personality disorder. Individuals can answer for more than one psychological disorder; hence the *n*is higher.

Table 3. Experience of traumatic life events and relative risk of lifetime suicidality among the Stress And Gene Analysis (SAGA) cohort study population.

	No./total (%)*	Crude RR of lifetime suicidality (CI)	RR (CI) adjusted†	RR (CI) adjusted‡
Traumatic life event	105/667 (16)	2.31 (1.37–4.21)	2.38 (1.41–4.34)	2.05 (1.21–3.75)
Men	59/293 (20)	3.50 (1.55–10.03)	3.54 (1.57–10.14)	3.14 (1.25–7.89)
Women	46/374 (12)	1.61(083–3.52)	1.71 (0.88–3.74)	1.45 (0.70–2.99)
A. Non-interpersonal trauma	86/568 (15)	2.22 (1.30–4.07)	2.33 (1.37–4.29)	2.03 (1.15–3.59)
Men	53/262 (20)	3.52 (1.55–10.11)	3.59 (1.58–5.10.34)	3.27 (1.30–8.25)
Women	33/306 (11)	1.41 (0.71–3.14)	1.54 (0.77–3.46)	1.27 (0.59–2.70)
B. Interpersonal trauma	82/348 (24)	3.45 (2.02–6.35)	3.45 (2.03–6.36)	2.97 (1.67–5.67)
Men	42/141 (30)	5.18 (2.26–14.99)	5.23 (2.27–15.14)	4.30 (1.68–10.98)
Women	40/207 (19)	2.53 (1.29–5.57)	2.61 (1.32–5.75)	2.25 (1.08–4.70)
B1. Childhood trauma	65/200 (34)	4.76 (2.76–8.83)	4.81 (2.79–8.94)	4.09 (2.27–7.36)
Men	32/66 (48)	8.44 (3.60–24.68)	8.46 (3.60–24.77)	7.32 (2.77–19.31)
Women	33/134 (25)	3.23 (1.61–7.18)	3.31 (1.44–7.40)	2.82 (1.33–5.99)
B2. Sexual trauma	44/162 (27)	4.16 (2.34–7.84)	4.21 (2.38–7.95)	3.44 (1.85–6.37)
Men	18/40 (45)	7.83 (3.12–23.71)	8.36 (3.31–25.48)	7.66 (2.51–23.51)
Women	26/122 (21)	3.01 (1.48–6.76)	3.03 (1.48–6.81)	2.48 (1.15–5.36)

*The number of individuals experiencing suicidality among those experiencing given traumatic events.
† Adjusted for age.
‡ Adjusted for sociodemographic factors; age, residence, education, marital status and employment.
A: Experienced major disaster, witnessed serious accident, experienced a serious accident, lost a loved one suddenly (heart attack, murder, suicide). B: Been robbed or physically assaulted, been physically assaulted by someone you know before age 18, been physically assaulted by someone you know after age 18, been touched against own will in a sexual way before age 18, been touched against own will in a sexual way after age 18, raped before age 18, raped after age 18. B1: Been physically assaulted by someone you know before age 18, been touched against own will in a sexual way before age 18, raped before age 18. B2: Been touched against own will in a sexual way before age 18, been touched against own will in a sexual way after age 18, raped before age 18, raped after age 18.
RR, relative risk; CI, confidence interval.

genders, with higher risk for men (RR 4.30, 95% CI 1.68–10.98) than for women (RR 2.25, 95% CI 1.08–4.70). This further applied to childhood trauma (men RR 7.32, 95% CI 2.77–19.31, and women RR 2.82, 95% CI 1.33–5.99) and sexual trauma (men RR 7.66, 95% CI 2.51–23.51, and women RR 2.48, 95% CI 1.15–5.36).

4. Discussion

In this study, we found an increased risk of lifetime suicidality among individuals reporting lifetime interpersonal, childhood and sexual trauma, with stronger associations observed for men than for women. We furthermore found an association between experience of non-interpersonal trauma and suicidality among men. In addition, we found that while women more frequently reported lifetime depressive periods, men had a higher prevalence of suicidal outcomes.

4.1. Traumatic life events and suicidality

Among those who had experienced interpersonal traumatic life events, we found increased risk of suicidality for both genders. Similarly, studies have found strong associations between interpersonal trauma and suicidality, especially sexual trauma (Stein et al., 2010) and childhood trauma (Afifi et al., 2016; Dube et al., 2001). Among those who had experienced sexual trauma or childhood trauma in our study, we found an association with suicidality in both genders, which was stronger for men.

For non-interpersonal traumatic events, such as the sudden loss of a loved one and experiencing a natural disaster, we found increased risk for suicidality for men only. Similarly, some studies have indicated elevated risk of suicide for both genders following the loss of a loved one, although this was significantly higher for men (Li, 1995; Luoma & Pearson, 2002). Other studies have furthermore indicated that men may be at more risk of suicidal behaviour associated with natural disasters (Chou et al., 2003; Vehid, Alyanak, & Eksi, 2006). To minimize the risk of suicidality, preventive measures aiming at psychological health after traumatic societal events as well as personal trauma may be beneficial, especially for men.

4.2. Gender and suicidality

The total prevalence of any lifetime suicidality was 13% in our study, which largely matches previous research, indicating a lifetime suicidality prevalence of 13–20% in a general population (De Leo, Cerin, Spathonis, & Burgis, 2005; Kessler, Borges, & Walters, 1999; Nock et al., 2008). The observed higher prevalence of suicidality among men than women (men 16% vs women 11%, $p = 0.02$) is, however, unusual. Despite this difference in suicidality, women in our study had a higher prevalence of reported lifetime depressive symptoms and PTSD. The underlying mechanisms for these unexpected findings of higher risk of suicidality but not depressive symptoms in association with exposure to trauma among men are probably multifactorial. First, it has been suggested that traditional diagnostic criteria for depressive symptoms may not detect men's depression (Martin, Neighbors, & Griffith, 2013), leaving untreated and/or unreported symptoms more likely to develop to suicidality. Secondly, men may find it more difficult, and find different ways, to regulate their emotional feelings than women (Beautrais, 2002; Nolen-Hoeksema, 2012). Furthermore, they seem less likely to seek help for mental health problems after trauma (Möller-Leimkühler, 2002), which may leave untreated symptoms more likely to develop to suicidality. Thirdly, following trauma, women are more likely than men to meet criteria for PTSD (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Tolin & Foa, 2006). PTSD has frequently been reported to be associated with suicidality and may be an important mediator in further development of suicidality after trauma (Ford & Gomez, 2015; Panagioti et al., 2015; Wilcox, Storr, & Breslau, 2009). In our study, among individuals reporting suicidality, only women reported having been diagnosed with PTSD in their lifetime. The reasons for gender differences in PTSD development are unclear. If men are more reluctant to express their emotional feelings following trauma, they may possibly be less likely to be diagnosed with PTSD and, in turn, less likely to receive help. Our results of suicidality risk associated with non-interpersonal trauma (such as natural disaster), only for men, may be due to higher risk of PTSD among men after such trauma. A study by Arnberg et al. (2015), for example, found increased risk of PTSD in individuals exposed to the 2004 South-East Asian tsunami compared to unexposed individuals, and that the risk was higher for male survivors [hazard ratio (HR) 11.5, 95% CI 6.77–19.47] than for female survivors (HR 6.30, 95% CI 4.25–9.34). In addition, a study on stressful and traumatic life events found that men had higher levels of PTSD after stressful life events than traumatic events, while women had similar levels of PTSD for both type of events (van den Berg, Tollenaar, Spinhoven, Penninx, & Elzinga, 2017).

If men are more reluctant to acknowledge psychiatric morbidity and seek help, it may result in unrecognized PTSD and psychological morbidities, possibly affecting more serious psychological outcomes for men, such as suicidality. If so, this emphasizes the clinical importance of focusing on adequate psychological follow-up after traumatic events and even screening for trauma history among individuals with psychological morbidities, with a special awareness of the importance of reaching both men and women.

4.3. Strengths and limitations

A strength of our study is that it is based on a sample with a relatively high participation rate (66%). In the questionnaire, we used a validated checklist on exposure measurement (LSC-R), using the newest DSM-5 diagnostic codes as a guideline to evaluate the type of traumatic event. Having questions on psychological morbidity after receiving questions on lifetime trauma may lead to differential misclassification when comparing participants with a history of traumatic events to participants with no such history (Hauksdóttir, Steineck, Fürst, & Valdimarsdóttir, 2006). To avoid this potential bias, we placed questions on psychological morbidity and suicidal behaviour earlier in the questionnaire.

Some limitations should be noted; for example, owing to the cross-sectional design of the study, we cannot conclude whether the exposure (specific life event) occurred before suicidality. However, when evaluating the association for traumatic events and restricting the outcome measures for current suicidality only, we found similar significant results. We have no information on those who did not participate in the study or did not complete the questionnaire, and it is possible that such selection affects our observed point estimates. Furthermore, even though the question on current suicidal thoughts is a part of the validated questionnaire PHQ-9, we do not have validated or standardized measurements on self-harm and suicide attempts, which limits our generalization and comparison to other studies. Regarding gender differences, all female participants in the study were women who were already attending a cancer screening clinic, while men were a random population sample. On the one hand, women who have experienced serious trauma, especially sexual trauma, may be more reluctant to attend such a screening programme, and therefore not participate in our study, but on the other hand, women who have experienced trauma in their lifetime may be more likely to seek medical care, especially those with psychiatric disorders. We may therefore possibly have an oversampling of women with traumatic life exposure except for sexual trauma. This may limit the generalizability of findings for women. In addition, the findings may underestimate the prevalence of self-harm with suicidal intent since only individuals answering 'yes' on lifetime depressive symptoms received questions on self-harm (see Appendix). This may be true especially for men, who may be more reluctant than women to report depressive symptoms. The use of retrospective self-reported measures of lifetime trauma and suicidal behaviour is one of the study's limitations raising the risk of recall bias, especially with older age and longer time passed since the traumatic event. The main results did, however, not change significantly after we restricted the outcome measurement to current suicidality. This source of error would be non-differential with respect to suicidality status. In this regard, the mean age was higher for women in our study, which may further explain our gender-specific result. Yet, adjustment for age, education and other sociodemographic factors did not considerably affect the main results on the relationship between trauma and suicidality, for either gender.

5. Conclusion

This study emphasizes the importance of interpersonal trauma as a major risk factor of suicidality and further indicates that trauma, especially non-interpersonal trauma, may be likely to be associated with suicidality among men. To reduce the risk of suicidal thoughts or behaviours, it may thus be beneficial for clinicians to routinely assess trauma history among patients seeking care for psychological problems but also to implicate preventive measures in society in relation to traumatic events.

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Appendix

Details of measurement methods

Outcome measurements were further evaluated.

Current suicidal and self-harm thoughts

For the evaluation of current suicidal thoughts, we used an item from the Patient Health Questionnaire (PHQ-9) (Cannon et al., 2007; Kroenke, Spitzer, Williams, & Lowe, 2010): 'Over the last two weeks, how often have you had thoughts that you would be better off being dead, or of hurting yourself in some way?', with the response alternatives: (1) Not at all, categorized as 'No', and (2) Several days, (3) More than half the days, as well as (4) All the time, categorized as 'Yes'.

History of depressive symptoms

In the SAGA questionnaire, we included two questions on lifetime depressive symptoms based on the Composite International Diagnostic Interview (CIDI) instrument:

(1) 'In your lifetime, have you ever had two weeks or longer when nearly every day you felt sad, empty, or depressed for most of the day?' (called depressive period in the manuscript)
(2) 'In your lifetime, have you ever had 2 weeks or longer when you lost interest in most things like work, hobbies, and other things you usually enjoyed?' (called loss of interest in the manuscript).

The response alternatives were: Yes/No/Don't know.

History of suicidality

(3) **Previous self-harm**: 'Have you ever harmed yourself deliberately because of your feelings? (for example cut into your arm)', with response alternatives: Yes/No/Don't know. This question was a

follow-up question for individuals answering 'yes' to either question 1 or 2 on lifetime depressive symptoms. If the participant answered 'yes' to self-harming, follow-up questions were asked on frequency, age of onset and age of last self-harm act, along with the question: 'Why did you harm yourself?', with response alternatives: (1) 'I had the urge to', (2) 'I felt relief doing so', (3) 'It was a cry for help', (4) 'It was a suicide attempt', and (5) 'I wanted to die'. Even though self-harm may increase risk of suicidality, individuals who self-harm may have no suicidal intent (Edmondson, Brennan, & House, 2016), and distinguishing non-suicidal self-harm from suicidality is therefore important. We divided answers 1–3 as self-harm without suicidal intent and 4–5 as self-harm with suicidal intent, and used only answer alternatives 4–5 as an outcome measure of suicidality.

(4) **Previous suicidal thoughts**: (Received by all participants) 'Have you ever seriously thought about committing suicide?' (categorized as 'No' for: No/Don't know/Not answering; and categorized as 'Yes' for Yes, once/Yes, a few times/Yes, often).

(5) **Previous suicide planning**: Those answering 'yes' to having had serious suicidal thoughts received a follow-up question: 'Have you ever planned in what way you would commit suicide?', with response alternatives: Yes/No/Don't know.

(6) **Previous suicide attempt**: Finally, those who answered yes to having planned their suicide received the question: 'Have you ever tried to commit suicide?', with response alternatives: Yes/No/Don't know.

(7) We categorized all questions on self-harm with suicidal intent and suicidal behaviour into suicidal behaviour with and without active measures to evaluate the difference between individuals who had experienced suicidal thoughts (including current thoughts) and those who had acted on their depressive thoughts (attempted suicide and self-harm with suicidal intent). We identified a positive answer on any of the suicidal behaviour questions as lifetime suicidality.

Assessment of other mental health outcomes

(8) To evaluate a history of psychiatric disorders, we included a question: 'Have you had any of these psychiatric diseases?', with response possibilities that we categorized according to definition by DSM-IV (American Psychiatric Association, 2000) into: (1) Mood affective disorders (depression and bipolar), (2) Anxiety-related disorders (including positive responses on general anxiety disorder, panic attacks, agoraphobia and social phobia), (3) PTSD (positive response on post-traumatic stress disorder), and (4) Other (positive response on burnout, obsessive–compulsive disorder, schizoaffective disorder, schizophrenia, Asperger, Tourette, autism, or personality disorder).

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