Suicidal behaviour among women with history of childhood sexual abuse

The SAGA cohort study

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Thesis for the degree of Master of Public Health Science (30 ECTS)

Center of Public Health
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HÁSKÓLI ÍSLANDS

Sjálfsvígshegðun meðal kvenna með sögu um kynferðisofbeldi í æsku

Gögn úr rannsókninni Áfallasaga kvenna

Rebekka Aldís Kristinsdóttir Valberg

Ritgerð til meistaragráðu í lýðheilsuvísindum

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Ágrip

Inngangur og markmið: Sjálfsvígshegðun (sjálfsvígshugsanir, sjálfsskaði og sjálfsvígstilraunir) og sjálfsvíga þekkt eru alvarleg lýðheilsuvandamál á heimsvísu. Fyrri rannsóknir hafa gefið til kynna að ýmsir þættir geti haft áhrif á þessar útkomur, eins og áfallasaga, þ.m.t. að hafa orðið fyrir kynferðisofbeldi í æsku. Markmið þessarar rannsóknar var að kanna tengsl kynferðisofbeldis í æsku og sjálfsvígshegðunar meðal kvenna á Íslandi. Sértæk markmið voru að kanna algengi og bakgrunn einstaklinga með sögu um kynferðisofbeldi í æsku og sjálfsvígshegðun á lífsleiðinni, kanna tengsl á milli kynferðisofbeldis í æsku og sjálfsvígshegðunar og tengsl á milli fjölda tilvika kynferðisofbeldis í æsku og sjálfsvígstilrauna.

Efniviður og aðferð: Áfallasaga kvenna er rannsókn á konum á Íslandi, 18 ára og eldri. Markmiðið er að auka þekkingu á tíðni áfalla og áhrifum þeirra á heilsufar kvenna. Fyrstu gagnasöfnun lauk 1. júlí 2019 og tóku alls 31.811 konur þátt. Til að meta sögu um kynferðisofbeldi í æsku var Adverse Childhood Experience International Questionnaire (ACE-IQ) listinn notaður og spurningar úr The World Health Organization World Mental Health Composite International Diagnostic Interview (WHO WMH-CIDI) voru notaðar til að meta sögu sjálfsvígshegðun á lífsleiðinni.

Niðurstöður:. Samtals greindu 11,4% kvenna frá nauðgun í æsku og 3,8% frá tilraun til nauðgunar í æsku. Í heild greindu 28,3% kvenna frá því að hafa upplifað sjálfsvígshugsanir um ævina, 17,4% höfðu sögu um sjálfsskaða, 16,1% höfðu skipulagt sjálfsvígstilraun um ævina og 6,7% greindu frá því að hafa gert tilraun til sjálfsvígs. Tengsl fundust milli þess að hafa upplifað tilraun til nauðgunar eða nauðgun í æsku og sjálfsvígshegðunar á lífsleiðinni. Tengslin voru greinileg fyrir sjálfsvígshugsun, sjálfsskaða, gerð áætlunar um sjálfsvíg og tilraun til sjálfsvígs, og voru sterkust fyrir sjálfsvígstilraun; bæði meðal kvenna með sögu um nauðgunartilraun í æsku (OR = 3,25, 95% CI 2,90-3,64) og meðal kvenna með sögu um nauðgun í æsku (OR = 3,62, 95% CI 3,22-4,08). Áhættan á sjálfsvígstilraunum jókst eftir því sem tilvikum nauðgunar í æsku fjölgaði.

Ályktanir: Niðurstöður gefa til kynna að kynferðisofbeldi í æsku tengist sjálfsvígshegðun á lífsleiðinni og að sterkustu tengslin séu við tilraun til sjálfsvígs. Þá gefa niðurstöður einnig til kynna að áhætta á sjálfsvígstilraun geti aukist með fjölda tilvika kynferðisofbeldis í æsku.

Lykilorð: Kynferðisofbeldi í æsku, sjálfsvígshugsanir, sjálfsvígshegðun, sjálfsvígstilraun, áfall, heilsa kvenna.

Abstract

Background and aims: Suicide and suicidal behaviour (suicidal ideation, self-harm, and suicide attempts) are a major global public health concern. Previous studies have found an association between childhood sexual abuse (CSA) and risk of suicidal behaviour. The aim of this study was to investigate the role of CSA on suicidal behaviour among women in Iceland. More specifically, we aimed to study the lifetime prevalence and background characteristics of CSA and suicidal behaviour, the association between childhood sexual abuse and suicidal behaviour and the association between number of rapes and suicide attempts.

Methods and materials: The SAGA cohort is a unique nationwide study on the impact of trauma on women ‘s health. The target population are all women, 18 years or older. First wave of data collection was completed July 2019 (N=31,811). CSA was measured with the Adverse Childhood Experience International Questionnaire (ACE-IQ), and suicidal behaviour with single item questions from The World Health Organization World Mental Health Composite International Diagnostic Interview (WHO WMH-CIDI).

Results: 11.4% of participants reported a history rape during childhood and 3.8% reported attempted rape during childhood. The total prevalence for lifetime suicidal thoughts was 28.3%, 17.4% for lifetime self-harm, 16.1% for lifetime suicidal planning, and 6.7% for lifetime suicide attempts. An association was found between history of attempted rape and rape during childhood and all suicidal behaviour (suicidal thoughts, self-harm, planning and attempt), with strongest association for suicide attempt (attempted rape: OR 3.25 (95%, CI 2.90-3.64), and rape: OR 3.62 (95% CI 3.22-4.08)). A dose-response relationship was found between history of rape in childhood and lifetime suicide attempts.

Conclusion: Findings indicate that CSA is associated with all suicidal behaviour, with strongest association for suicide attempts. Moreover, increased number of childhood rape increased the risk of suicide attempts.

Key words: Childhood Sexual abuse, Suicidal Thoughts, Suicidal Behaviour, Suicide attempts, Traumatic life-events, Women´s health.

Þakkir

Ég vil þakka bæði leiðbeinandanum mínum Hildi Ásgeirsdóttur og umsjónarkennara Örnu Hauksdóttur fyrir dýrmæta og faglega leiðsögn, yfirlestur og að beina mér á rétta fræðilega braut. Einnig vil ég þakka þeim báðum fyrir að efla áhuga minn á rannsóknarefninu. Ég tel mig vera mjög heppna að hafa fengið leiðsögn frá þessum tveimur konum sem ég lít á sem fyrirmyndir. Ég vil einnig þakka teyminu hjá Tölfræðiráðgjöf heillbrigðisvísindasviðs við Háskóla Íslands fyrir góðar ábendingar og aðstoð við tölfræðilega úrvinnslu. Að lokum vil ég þakka öllum þeim konum sem tóku þátt í rannsókninni „Áfallasaga kvenna“ því án þeirra hefði þessi rannsókn ekki orðið að veruleika.

Sérstakar þakkir fær kærasti minn Daníel Óli Ólafsson fyrir ómetanlegan stuðning og hvatningu sem hann veitti mér á meðan á ritgerðarsmíðum stóð. Ég vil þakka foreldrum mínum Jenný Kristínu Valberg og Kristni Lofti Karlssyni fyrir kærleikinn og skilninginn á því að dóttir þeirra var alltaf að læra. Ég vil þakka stjúpforeldrum, tengdarforeldrum, systkinum og vinum fyrir alla gleðina sem þau hafa veitt mér á meðan á þessum tíma stóð. Ég vil einnig þakka ömmu minni Ernu Sigurjónsdóttur og afa mínum Karli Bergssyni fyrir stuðninginn og heilræðin. Án ykkar allra hefði þetta ekki tekist.

Þetta ritgerðarefni er mér afar mikilvægt og sérstaklega fyrir þær sakir að á síðasta ári missti ég skyndilega vinkonu mína Þorbjörgu Rósu Ómarsdóttur. Ritgerðarsmíðin á þessu viðfangsefni hefur því verið ein sú erfiðasta þraut sem ég hef tekist á við en á sama tíma hefur það verið mér ótrúlega dýrmætt. Ég vil tileinka ritgerðina öllum þeim sem berjast áfram og öllum þeim sem hafa tapað baráttunni. Þá vil ég sérstaklega tileinka ritgerðinni Þobbu vinkonu minni, við sjáumst aftur síðar í sumarlandinu.

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List of abbreviations

CSA	Childhood sexual abuse
CI	Confidence interval
OR	Odds Ratio
ACE-IQ	Adverse Childhood Experience International Questionnaire
WHO	World Health Organization
WHO WMH-CIDI	World Health Organization World Mental Health Composite International Diagnostic Interview
SES	Socioeconomic Status

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1 Introduction

Traumatic life events may affect individuals throughout their whole lifetime. One of the most serious and detrimental traumatic life events that individuals may experience is childhood sexual abuse (CSA). The definition of CSA has varied throughout the years. While CSA was once only defined by contact abuse (i.e. fondling and touching) and not by non-contact abuse (i.e. exhibitionism), today the term is considered to be much wider and includes any sexual conduct against a minor by threat, force, intimidation, or manipulation. This includes fondling, touching or being sexually touched, attempted intercourse, intercourse, rape, incest, sodomy, exhibitionism, child's prostitution or pornography (Collin-Vézina, Daigneault, & Hébert, 2013; Olafson, 2011; Putnam, 2003). The World Health Organization (WHO) defines CSA as involving a child in a sexual situation that the child does not fully understand or is not developmentally prepared for or unable to give informed consent for, and violates society's rule or social taboos (World Health Organization, 2003). CSA does not only refer to adult on child conduct, and increasing knowledge on children's sexual interaction (e.g. siblings) has come to light and it's severe consequences for individual's well-being (Collin-Vézina et al., 2013). CSA experiences can vary in length, frequency, nature of abuse, and by relations with perpetrator (Collin-Vézina et al., 2013). The age of consent differs from one country to another, and ranges from as young as 12 (e.g. Spain) to 17 or 18 (e.g. in some states in US). In Iceland, the age of consent is 15 years (Althingi Parliament House, 2020; Collin-Vézina et al., 2013).

1.1 Scope of the problem

Numerous studies have investigated the prevalence of CSA worldwide (Barth, Bermetz, Heim, Trelle, & Tonia, 2012; Finkelhor, 1994; Pereda, Guilera, Forns, & Gómez-Benito, 2009; Stoltenborgh, van IJzendoorn, Euser, & Bakermans-Kranenburg, 2011) and findings suggest that incidence reports of CSA do inevitably underestimate the scale of the problem due to a variety of factors, for example due to the secrecy of the abuse, the shame the victims experience, the young age of the victims, and the reliance of the children on adults. It may lead to fewer victims actively reporting their abuse (Finkelhor, 1994; Goldman & Padayachi, 2000; Pereda et al., 2009) and CSA may therefore be a more widespread problem than previously expected (Pereda et al., 2009).

A recent meta-analysis of 217 publications for CSA revealed a global prevalence of 12% (Hailes, Yu, Danese, & Fazel, 2019). Other studies have found prevalence for CSA to be 15-19.7% for females and 7.4-7.6% for males (Barth et al., 2012; Pereda et al., 2009; Stoltenborgh et al., 2011). A national survey in the United States of America (USA) from 2014 revealed that the lifetime experience among 17 year olds with sexual abuse/assault was 26.6% for females and 5.1% for males. That counts for approximately 1 in 4 girls, and 1 in 20 boys (Finkelhor, Shattuck, Turner, & Hamby, 2014). However, the prevalence of lifetime sexual abuse by adult perpetrators only was 11.2% for females and 1.9% for males. Other studies have found the prevalence of CSA to be 1.5 to 3 times higher for females compared to males (Finkelhor, 1994; Pereda et al., 2009). Collin-Vézina et al. (2013) estimated the prevalence of CSA to be more than 1 out of 5 women and 1 out of 10 men worldwide. CSA prevalence

varies by continents and countries. For example, Pereda and colleagues (2009) reported a highest prevalence in Africa (34.4%, 95% CI 21.1–50.7,), and lowest in Europe (9.2%, 95% CI 6.8–12.3).

1.2 Risk factors for victimization

Risk factors for CSA victimization have been studied for many years. As mentioned above, females are more likely than males to be victims of CSA (Afifi et al., 2008; Barth et al., 2012; Briggs, Simon, & Simonsen, 2010; Collin-Vézina et al., 2013; Finkelhor et al., 2014; Hailes et al., 2019; McLafferty, O'Neill, Murphy, Armour, & Bunting, 2018; Pereda et al., 2009; Seto, 2009; Stoltenborgh et al., 2011). In a national follow-up survey conducted in 2003, 2008 and 2011, Finkelhor et al. (2014) found that the risk of CSA increases considerably for females between their 15th and 17th birthday, with a reported prevalence of 17% among 15 years old and a 27% among 17 years old. This included increase in most forms of abuse or assault by adults (11.2%), peers (17.8%), family (5.5%), acquaintances (19.6%), and strangers (3.0%). In a large meta-analysis including 72 studies, the main risk factors for CSA victimization were investigated, indicating domestic abuse, parent's substance use and/or psychiatric or physical illness, a disrupted family structure, low socioeconomic status (SES), physical and/or mental condition, being female, substance abuse and delinquent behaviour to be significant risk factors for CSA (Assink et al., 2019). CSA is often associated with other childhood adversities, including physical abuse, neglect, and parental psychopathology (Sugaya et al., 2012).

1.3 Child sexual abuse perpetrators

Paedophilia is defined as the diagnosis of being sexually attracted to prepubescent children. This includes sexual behaviour towards children, having greater sexual desire towards children than towards adults, recurring sexual thoughts, fantasies, or the urge to have sex with children. Some are interested exclusively in children, while others are interested in both children and adults (Seto, 2009). Research suggest that antisocial paedophiles are more likely to repeat a sexual offence, thus indicating an interaction between paedophilia and criminal propensity (Harris et al., 2003). Sex offenders who have a history of sexual abuse before age of 16 are more likely to commit sex offenses against substantially younger victims relative to non-abused sex offenders. Perpetrators who have been sexually abused by male perpetrator had more paedophilic tendencies than those who were victimized by a female perpetrator (Nunes, Hermann, Renee Malcom, & Lavoie, 2013).

Victim seduction or coercion by incorporating sexual content into communication is a common technique used by sexual offenders, especially when the victim knows the perpetrator personally. This form of technique is also referred to as "grooming" (Craven, Brown, & Gilchrist, 2006). Grooming may take from seconds to years and serve various purposes (Briggs et al., 2010; Whittle, Hamilton-Giachritsis, Beech, & Collings, 2013). Online predators or cyber predators are becoming an increasingly larger threat to young adolescents, and such individuals use the Internet to find young victims in an online setting (e.g. social networking site, gaming site, and chat rooms) and deceive or manipulate them into situations controlled by the perpetrator (Davidson & Gottschalk, 2011; Whittle et al., 2013; J. Wolak & Finkelhor, 2013; Janis Wolak, Ybarra, Mitchell, & Finkelhor, 2007). Cyber predators trick victims into sharing personal information and use it to divulge victims' online profiles

and social media sites (Janis Wolak et al., 2007). Sexual offenders use the Internet against children and adolescents in two ways; to target and “groom” children for sexual exploitation purposes, or create, distribute or access child pornography (Davidson & Gottschalk, 2011). Results from the National Juvenile Online Victimization (N-JOV) Study from 2005, studying adolescents victimization through the internet by interviewing law enforcement investigators, found that most Internet predators are male offenders and children’s activity, like talking to strangers, sending personal information, and talking about sex, can be a significant risk factors for victimization by online predators (Janis Wolak et al., 2007).

1.4 Consequences of CSA

Psychological and physical consequences of CSA have been studied extensively for over three decades (Alix, Cossette, Hebert, Cyr, & Frappier, 2017). This type of childhood adversity increases the risk of developing negative outcomes later in life (Aglan, Kerfoot, & Pickles, 2008) and survivors of CSA are at a significant risk of developing health problems later in life (Afifi et al., 2008; Hillberg, Hamilton-Giachritsis, & Dixon, 2011).

1.4.1 Psychological consequences

Individuals with history of CSA are at increased risk of multiple psychological adversities. A recent review including 19 meta-analysis found that the odds ratio (OR) ranged from 2.2 (95% CI 1.8–2.8) to 3.3 (95% CI 2.2–4.8) for psychiatric outcomes such as post-traumatic stress disorder (PTSD), and from 1.2 (95% CI 1.1–1.4) to 3.4 (95% CI 2.3–4.8) for psychosocial outcomes such as non-suicidal self-injury (Hailes et al., 2019). A study investigating female adult health found that CSA (non-genital, genital, and intercourse) was positively associated with major depression, generalized anxiety disorder, panic disorder, bulimia nervosa, and having two or more concurrent disorders (Kendler et al., 2000). Females who were sexually assaulted in childhood have also been found to differ from non-abused women in the way that they may be more likely to have depression, PTSD, and dissociative symptoms later in life (Trickett, Noll, & Putnam, 2011).

CSA has been linked to major depressive disorder by multiple studies (Afifi et al., 2008; Chang, Kaczkurkin, McLean, & Foa, 2018; Fergusson, McLeod, & Horwood, 2013; Hailes et al., 2019; Hillberg et al., 2011; Maniglio, 2009; O'Brien & Sher, 2013; Paolucci, Genuis, & Violato, 2001; Trickett et al., 2011). For example, a study from 2019 found strong association between CSA and depression later in life (OR = 2.7) (Hailes et al., 2019), and studies have found an increase in depression in both adolescents (Alix et al., 2017) and adults (Aglan et al., 2008) among individuals with history of CSA (Hailes et al., 2019). Some findings suggest mediating factors between CSA and various mental and physical outcome, such as the mediating effects of depression between CSA and obesity (Luppino et al., 2010). Many studies have found strong association between CSA and anxiety (Afifi et al., 2008; Fergusson et al., 2013; Maalouf, Daigneault, Dargan, McDuff, & Frappier, 2020), with results from one study suggesting the risk being roughly twofold (OR = 2.7) (Hailes et al., 2019). Studies have furthermore found strong association between CSA and PTSD (Fergusson et al., 2013; Hillberg et al., 2011; Maalouf et al., 2020; Maniglio, 2009; O'Brien & Sher, 2013; Paolucci et al., 2001), with one

study sample of sexually abused adolescents reporting total of a 66% of girls with diagnosed PTSD (Alix et al., 2017). Trauma survivors (including CSA) may be more likely to have depression symptoms, and emotion regulation difficulties with greater severity PTSD symptoms (Chang et al., 2018). Borderline personality disorder (BPD) has been associated among individuals with history of CSA Maniglio, 2009). Fossit and colleagues found only moderate association between CSA and later development of BPD (*r* = .279) (Fossati, Madeddu, & Maffei, 1999). However, other findings have shown that CSA was strongly associated with BPD (OR = 2.9) (Hailes et al., 2019), and found to be a valid predictor (16.1–85.7% of cases) of development of BPD (de Aquino Ferreira, Queiroz Pereira, Neri Benevides, & Aguiar Melo, 2018; O'Brien & Sher, 2013). Other adverse outcomes of CSA are dissociation, somatization (Maniglio, 2009), conversion disorder (OR = 3.3) (Hailes et al., 2019), eating disorder (Maniglio, 2009; O'Brien & Sher, 2013), and obsessive compulsive disorder (OCD) (Maniglio, 2009).

A large number of studies have identified the association between CSA and alcohol and/or substance abuse (Afifi et al., 2008; Felitti et al., 1998; Fergusson et al., 2013; Irish, Kobayashi, & Delahanty, 2009; Kendler et al., 2000; Maniglio, 2009; O'Brien & Sher, 2013; Trickett et al., 2011).Victims with history of CSA are involved in more risk-taking behaviour (e.g. unprotected sex, multiple sexual partners, early sexual experience, and prostitution) (Felitti et al., 1998; Irish et al., 2009; Maniglio, 2009; Paolucci et al., 2001; Trickett et al., 2011), as well as higher rates of seeking medical assistance (Fergusson et al., 2013; Trickett et al., 2011). Other known adverse behavioural factors are revictimization (Maniglio, 2009; Trickett et al., 2011), lack of regular exercise (Irish et al., 2009), lower self-esteem, lower life-satisfaction (Fergusson et al., 2013), and impulsiveness (O'Brien & Sher, 2013). As parents, victims of CSA are more likely than non-abused parents to place their children at risk for abuse, neglect and maldevelopment (Trickett et al., 2011).

The Traumagenic Dynamic of Stigmatization Model was developed by Finkelhor and Browne in 1985 and the model suggest that the experience of sexual abuse can be divided into four trauma-causing factors, or traumagenic dynamics (traumatic sexualization, betrayal, powerlessness, and stigmatization). These factors change a child's emotional and cognitive perception of the world and causes trauma by distorting self-concept and affective ability. Traumatic sexualization refers to the sexuality of the victims which is shaped inappropriately and distorted by the abuse. Betrayal means the loss of trust in the perpetrator who destroyed the relationship, and the victims may feel that all adults have failed to help or protect the child against the abuse. Powerlessness (or disempowerment) refers to the victim's experience, despite feeling the danger of harm and violation of their personal space, were powerless to stop the perpetrator's behaviour. Finally, stigmatization is the feeling of badness, shame, and guilt after the abuse and is incorporated into the child's self-image (Finkelhor & Browne, 1985). This model emphasises the subject of trust and intimacy issues which are common among CSA survivors (Collin-Vézina et al., 2013). Shame has been found to partially mediate the relationship between self-blame and PTSD, and between self-blame and suicidal ideation (Alix et al., 2017).

1.4.2 Physical consequences

Number of studies have investigated the associations between CSA and physical outcomes (Coelho, Viola, Walss-Bass, Brietzke, & Grassi-Oliveira, 2014; Felitti et al., 1998; Irish et al., 2009; Renna, O'Toole, Spaeth, Lekander, & Mennin, 2018). Results from a review found an increased risk for obesity, HIV, pain, and fibromyalgia ranging from 1.4 (95% CI 1.3–1.6) to 1.9 (95% CI 1.4–2.8) (Hailes et al., 2019). Also, increased risk has been found with developing certain diseases and health risks, for example, diabetes (OR = 1.6), chronic bronchitis or emphysema (OR = 3.9), skeletal fractures (OR = 1.6), hepatitis or jaundice (OR = 2.3), poor self-rated health (OR = 2.2) following childhood adversities (Felitti et al., 1998). Other physical consequences include higher somatization symptoms and more negative physical health experiences, chronic pelvic pain, musculoskeletal pain symptoms, cardiopulmonary symptoms, non-epileptic seizures, sexual dysfunction, obesity (Hailes et al., 2019; Irish et al., 2009; Maniglio, 2009; Trickett et al., 2011), intelligence or learning impairment (Maniglio, 2009; Paolucci et al., 2001), lower resting levels of cortisol, asymmetrical stress responses, and higher levels of somatic symptoms (Trickett et al., 2011). Childhood maltreatment may alter the immune system and cause depression, and depressed individuals are more likely to have higher dysregulation of inflammatory response, compared to nondepressed individuals (Coelho et al., 2014; Pedrotti Moreira et al., 2018). Chronic stress resulting from anxiety and PTSD symptoms may lead to adverse impact on the immune system and inflammatory regulation (Renna et al., 2018), and lead to infectious diseases (Maalouf et al., 2020).

1.4.3 Severity of CSA and health outcomes

Evidence from previous studies have found evidence for the association between a more severe history of CSA (e.g. attempted intercourse versus intercourse) and the likelihood of more adverse outcomes (e.g. mental disorders) (Fergusson et al., 2013; Kendler et al., 2000; Molnar, Berkman, & Buka, 2001). Multiple studies have also shown association between the number of adverse childhood experiences and adverse behavioural and health outcomes (Afifi et al., 2008; Brockie, Dana-Sacco, Wallen, Wilcox, & Campbell, 2015; Chang, Jiang, Mkandarwire, & Shen, 2019; Felitti et al., 1998). A population-based study conducted in 1987-1997 on 1411 female adult twins found the association between CSA and mental disorders to be profoundly higher when the abuse included intercourse, compared to CSA without intercourse (Kendler et al., 2000). Results from Felitti and colleagues (1998) indicated if individuals with four or more categories of exposure was compared to those with none, the risk for alcoholism (OR = 7.4), use and injection of illicit drugs (OR = 10.3), having 50 or more sexual partners (OR = 3.2), and history of STI‘s (OR = 2.5) increased as the number of childhood experiences increased (Afifi et al., 2008). A recent Chinese study examined the effects of adverse childhood experiences (childhood abuse, family dysfunction, violence, and neglect) on health outcomes in adults. The study revealed that participants who had higher adverse childhood events (ACE) scores were more likely to drink, smoke, have chronic disease, depression, and PTSD than individuals with lower scores. Similarly, a dose-response association was found with risk behaviours, depression, and PTSD as ACE scores increased (Chang et al., 2019). Furthermore, findings from a population-based sample of adolescents (N=33,747) in USA between the ages of 12-17 found

association between higher ACE scores and worse physical and emotional well-being (Balistreri & Alvira-Hammond, 2016). Findings from a study with a sample of adolescents in USA found that the risk of suicide ideation and suicide attempts increased substantially among individuals with higher number of childhood adversities (OR = 5.73 and OR = 5.43, respectively) compared with those with lower number of childhood adversities (OR = 2.31 and OR = 1.21, respectively) (Clements-Nolle et al., 2018). A dose-response relationship has been found between ACE scores and adult adverse outcomes (such as drug and alcohol use and suicide attempts). When compared to individuals with no ACEs, the risk among individuals reporting six or more ACEs increased by 3.73 times for reporting drug use, 2.84 times for alcohol use, and 24.36 times for attempting suicide (Merrick et al., 2017). In addition, an increased number of ACEs was associated with increased odds of suicidal ideation and attempts among women, presenting a dose-response group relationship. The risk of suicide ideation was lower among individuals reporting history of one ACE (OR = 1.38) compared to individuals reporting history of three ACEs (OR = 3.49). The risk of suicide attempts roughly quadrupled among those reporting three ACEs (OR = 13.07), compared to those only reporting one ACE (OR = 3.05) (Afifi et al., 2008).

The adverse effect of psychological, behavioural, and physical consequences of CSA victims pose a serious risk to the wellbeing of those individuals. In other adverse outcomes, the victim develops a suicidal behaviour following the CSA.

1.5 Suicide and other suicidal behaviour

Suicidal behaviour (sometimes known as suicidality) consists of suicidal ideation, attempted suicide, and suicide. Suicidal ideation is defined as thinking, considering, or planning suicide, while attempted suicide is the event of trying to kill one's self. Suicide is defined as death caused by self-directed injurious behaviour with the intent to die (Castle & Kreipe, 2007; Klonsky, May, & Saffer, 2016).

1.5.1 Suicide

Suicide has a major impact on global public health, with 800,000 individuals dying each year from suicide worldwide (Naghavi, 2019). For each suicide, approximately 20 suicide attempts occur (World Health Organization, 2019). In a large study across 17 countries on suicidal behaviour (N=84,850) and estimation of lifetime prevalence of suicidal behaviour among adolescents from USA, the reported lifetime prevalence was 9.2-12.1% for suicidal ideation, 3.1-4.0% for suicidal planning, and 2.7-4.1% for suicide attempts (Nock et al., 2008; Nock et al., 2013). The suicide rate worldwide is approximately 10.5 per 100.000 inhabitants (World Health Organization, 2016) and 79% of all suicides happen in low- and middle-income countries (World Health Organization, 2019). However, high-income countries have generally higher suicide rates than low-and middle-income countries (Klonsky et al., 2016). In Iceland, the rate has been 11.7 per 100,000 inhabitants during the last decade, with a mean of a total 39 suicides per year as reported the Directorate of Health. Between 2005-2015, Iceland had the second-highest suicide rates among the Nordic countries after Finland, whilst Denmark had the lowest rate (The Directorate of Health, 2020).

1.5.2 Suicidal behaviour – from ideation to suicide

Suicidal ideation, self-harm and attempts are risk factors for suicide. Studies have shown that suicidal ideation may predict suicide planning, and individuals who have a history of suicidal planning are more likely to attempt suicide than others (Arsenault-Lapierre, Kim, & Turecki, 2004; Borges et al., 2010; Castle & Kreipe, 2007; Hoertel et al., 2015; Klonsky et al., 2016; Nock et al., 2008; Nock et al., 2009). Roughly 60% individuals transition from ideation to planning, and from ideation to attempt during the first year after the onset ideation (Nock et al., 2008). Individuals with a history of suicidal behaviour are likely to struggle to discontinue that behaviour, and studies have found that about one of every 25 patients who come to the hospital due to suicidal behaviour will die by suicide in the next five years (Carroll, Metcalfe, & Gunnell, 2014).

Klonsky and May developed the "ideation-to-action framework" to guide all suicide research and theory in the future, such as categorize predictors and explanation for suicide as whether they concern risk of suicidal ideation, risk of suicide attempts among ideators, or both (Klonsky & May, 2014). The ideation-to-action framework considers that while most ideators do not go on to make an attempt, majority of attempters experience ideation. The ideation-to-action framework distinguishes risk factor for suicidal ideation (e.g. depression) from risk factors for suicide attempts (e.g. access to lethal means) (Klonsky et al., 2016). The framework uses the interpersonal theory of suicide, which suggests that perceived burdensomeness and low belongingness or social alienation promotes desires for suicide. The desire alone is not a sufficient risk to die by suicide, however the acquired capability to act on suicidal longing is an important factor to pursue suicidal desires and overcoming the fear of death and pain that are a natural part of attempting suicide (Ribeiro & Joiner, 2009). Another theory belonging in the ideation-to-action framework is the integrated motivational – volitional model of suicidal behaviour (IMV). The IMV proposes that defeat and entrapment are fundamental causes of suicidal ideation. Group of factors (volitional moderators (VMs)) oversee the transition from suicidal ideation to attempt. VMs includes access and capability to the means of suicide (e.g. fearlessness about death, access to lethal means, planning, or impulsivity) (O'Connor & Kirtley, 2018).

1.5.3 Risk factors

Risk factors for suicidal behaviour include physical, environmental, social, and psychological factors (Castle & Kreipe, 2007). O'Connor and Nock (2014) identified over 30 psychological risk and protective factors for suicidal behaviour. The risk factors were defined as personality and individual differences (e.g. hopelessness, impulsivity, and perfectionism), cognitive factors (e.g. rumination, belongingness, and burdensomeness), social factors (e.g. family history), and negative life events (e.g. childhood adversities, traumatic life event during adulthood, and physical illness).

The prevalence of suicidal ideation under the age of 10 is very low (<1%), then rises steadily until the age of 12, and increases rapidly between 12-17 years (Nock et al., 2013). For example, a study by Waldrop et al. (2007) on suicide attempts among adolescents in the USA found a prevalence of 24.3% for suicidal ideation. An Icelandic questionnaire study from 2016 on suicidal behaviour among college students (16-20 years old), found that 33% of female adolescents and 23% of male adolescents had a

lifetime history of serious suicidal thoughts, and 12% of females and 7% of males reported having attempted suicide (Ingibjörg Eva Þórisdóttir, Sigrún Daníelsdóttir, & Salbjörg Bjarnadóttir, 2018). Even though suicide rate increases with age, the suicide rates among young people are of significant concern. Suicide is the second leading cause of death among those aged 15-29, and the leading cause of death among 15-19 year old females (Castle & Kreipe, 2007; Klonsky et al., 2016). Female sex has been identified as a risk factor for suicidal behaviour by multiple studies (Borges et al., 2010; Fergusson et al., 2000; Nock et al., 2008; Waldrop et al., 2007), but other studies suggest that male sex must be considered an important risk factor as well (Ásgeirsdóttir et al., 2018; Castle & Kreipe, 2007; Klonsky et al., 2016).

Some studies have suggested a hereditary and genetic influence on suicide and suicidal behaviour (Brent & Mann, 2005), as well as factors of shared environment (Tidemalm et al., 2011). A broad population study (N=83,953) investigating individuals who had died by suicide, revealed a genetic influence on the risk of suicide. Despite comparable environmental exposure, the risk for full siblings (OR = 3.1) was higher than for half-siblings (OR = 1.7). In addition, the risk of dying by suicide among monozygotic twins was greater than for dizygotic twins. Similarly, there was a double risk of suicide in children, and triple the risk in siblings of individuals who had died by suicide (Tidemalm et al., 2011).

A number of environmental and social factors have been associated with suicide risk, such as living alone (Turecki & Brent, 2016), a recent loss of a significant relationship (Castle & Kreipe, 2007), early motherhood, divorce (Fergusson, Woodward, & Horwood, 2000), being part of the LGBTQIA community (Castle & Kreipe, 2007), and low income and unemployment (Borges et al., 2010; Nock et al., 2008; O'Connor & Nock, 2014). Socio-economic environment (e.g. economic crisis) may indirectly increase suicide rate (Fergusson et al., 2000; Fountoulakis et al., 2014), as well as financial or legal difficulties (Turecki & Brent, 2016). A significant relationship has been found between suicidal ideation and living with no (OR = 4.1) or one parent (OR = 2.0) compared to living with both biological parents (OR = 1.8-2.8). However, being the youngest child and having two or more siblings may be a protective factor (OR = 0.1) for unplanned suicide attempts (Nock et al., 2013). Protective factors may decrease risk of suicide through broad network of social support, strong motivations for living (e.g. responsibility for other people), religiosity, extrovertism, optimism, and effective coping and problem solving (Turecki & Brent, 2016).

1.5.3.1 Psychological risk factors

Mental disorders are among the strongest predictors of suicidal behaviour, and majority of individuals with suicidal behaviour have a pre-existing mental disorder (Arsenault-Lapierre et al., 2004; Borges et al., 2010; Hoertel et al., 2015; Nock et al., 2008; Nock et al., 2013; Nock et al., 2009; Nock, Hwang, Sampson, & Kessler, 2010; O'Connor & Nock, 2014). An association has been found between the time of first suicide attempt and number of disorder (e.g. one disorder OR =3.7, and six or more disorders OR = 29.0) (Nock et al., 2010). Findings from Nock et al. (2009) demonstrated a dose-response relationship between the number of mental disorders and risk of later suicide attempts, and autopsy results showed that 90% of people who died by suicide had a previous mental condition (Cavanagh, Carson, Sharpe, & Lawrie, 2003).

Self-destructive behaviour and self-harm are common among individuals with intense feelings of hopelessness and depression (Castle & Kreipe, 2007; Klonsky et al., 2016). Some of the most prevalent disorders among suicidal individuals are depression (Arsenault-Lapierre et al., 2004; Castle & Kreipe, 2007; Nock et al., 2013; Nock et al., 2009; Nock et al., 2010), anxiety disorder (Nock et al., 2010), PTSD, conduct disorder, bipolar disorder (Nock et al., 2013; Nock et al., 2009; Waldrop et al., 2007), substance disorder, specific phobia, oppositional defiant disorder, intermittent explosive disorder (Arsenault-Lapierre et al., 2004; Castle & Kreipe, 2007; Nock et al., 2013; Waldrop et al., 2007), and psychotic disorders (such as schizophrenia) (Sharifi et al., 2015). Also, fear and anger, distress and disruptive behaviour (Nock et al., 2013), impulsivity, aggression, neuroticism, worthlessness and hopelessness are traits that have been associated with suicidal behaviour (Castle & Kreipe, 2007; Fergusson, Woodward, & Horwood, 2000; Turecki & Brent, 2016).

1.5.3.2 Traumatic life events

Traumatic and stressful life events in adulthood, such as experiencing loss or being exposed to violence, may significantly increase suicidal behaviour (Nock, Hwang, Sampson, & Kessler, 2010; Turecki & Brent, 2016). A recent Icelandic study found that traumatic life events raised the risk of lifetime suicidal behaviour (RR = 2.05, 95% CI 1.21-3.75). Additionally, 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) had higher association with lifetime suicidal behaviour relative to non-interpersonal trauma (RR = 2.03, 95% CI 1.15–3.59) (Ásgeirsdóttir et al., 2018).

Similarly, numerous studies have found strong association between CSA and suicidal behaviour (Afifi et al., 2008; Borges et al., 2010; Devries et al., 2014; Fergusson et al., 2013; Fergusson et al., 2000; Hillberg et al., 2011; Molnar et al., 2001; Nock et al., 2008; O'Brien & Sher, 2013; Plener, Singer, & Goldbeck, 2011; Turecki, 2014), estimating that the overall 20-22% of suicidal behaviour may be attributed to consequences of CSA (Devries et al., 2014). A review on studies published between 1990-2012 reported that CSA was a major risk factor for suicidal behaviour in adults (O'Brien & Sher, 2013), suicidal ideation (OR = 1.51) and suicide attempts (OR = 3.24) (Afifi et al., 2008; Waldrop et al., 2007). Furthermore, a German study on adolescents reported that 78% of suicide ideators and 62% of suicide attempters had history of at least one traumatic event within 6 months prior to their suicidal behaviour, and repeated exposure to traumatic events increased the risk of suicide attempts. Sexual abuse in childhood was more prevalent in suicide attempters (Plener et al., 2011). Among girls, high distress from CSA increases risk of suicidal thoughts and plans by threefold, compared to non-abused girls (Martin, Bergen, Richardson, Roeger, & Allison, 2004). CSA has been shown to increase the risk of suicide attempts in both males and females (OR = 2.43), even in twin studies (OR = 2.65) (Devries et al., 2014). The relationship may be partly mediated by mental disorders (Hoertel et al., 2015), family dysfunction, hopelessness and mental disorders (such as depression) (Martin et al., 2004). For example, a study by Molnar et al. (2001), found that following CSA, roughly 80% of those attempted suicide had an underlying psychiatric condition. During a 10-year period, The Early Developmental Stages of Psychopathology (EDSP) study investigated 3021 individuals aged 14-24, and the association between traumatic events and later suicide attempts. The

traumatic events were physical attack, rape/sexual abuse, serious accidents, and witnessing others experiencing a traumatic event. All four traumatic events increased the risk of a suicide attempt. The lowest risk was found for witnessing traumatic event (HR = 2.3) and the highest risk was found for rape/sexual abuse (HR = 9.6). Additionally, higher number of past traumatic events increased the risk of a suicide attempts, and 56-90% of suicide attempts was attributed to a past traumatic event (Miché et al., 2020). A recent study from Northern Ireland found a strong association between childhood adversities (parental mental health and substance problems, family (domestic) violence, physical and sexual abuse, and economic), and psychopathology, and suicidal behaviour. Adversities in childhood, such as parental mental illness was significantly associated to the development of mood, anxiety, substance disorders, and suicidal behaviour. The strongest risk factor for suicidal ideation and behaviour was sexual and physical abuse. However, a significant association was also found between parental mental illness and family violence, and suicidal ideation and behaviour (McLafferty et al., 2018).

Taken together, the evidence for the role of CSA on suicidal behaviour appears strong and significant. However, there is a need for further research on this subject. More precisely, previous researches on different effects of attempted rape in childhood and rape in childhood is ambiguous, as well as the effect of number of CSA on suicidal behaviour. The special circumstances of the Icelandic population allow researchers to execute an Icelandic population-based study, thus creating an opportunity to investigate the different effects of CSA on suicidal behaviour.

2 Aims

In a large cohort including Icelandic women, the overall aim of this study is to investigate the association between childhood sexual abuse and lifetime prevalence of suicidal behaviour (suicidal thoughts, self-harm, suicide planning, and suicide attempts). The specific aims are to investigate:

1. The lifetime prevalence and background characteristic of childhood sexual abuse.
2. The lifetime prevalence and background characteristics of suicidal behaviour.
3. The association between childhood sexual abuse and suicidal behaviour among Icelandic women.
4. The association between number of rapes and suicide attempts.

3 Methods

3.1 Design and study population

The population-based study includes data from The Icelandic SAGA (Stress-And-Gene-Analysis) cohort study. The target population of the SAGA cohort were all Icelandic speaking women 18-69 years of age, living in Iceland (approximate 110,000 women in total). All women were invited to

participate in the study from March 1st 2018 until July 1st 2019 by text message, letter and/or phone call, by answering extensive online questionnaire on trauma history and health. The SAGA Cohort questionnaire included questions on history of stressful life events and trauma (including childhood abuse), and suicidal behaviour. At the end of the study period (July 1st, 2019), a total of 31,811 women had participated.

3.2 Measures

3.2.1 Childhood sexual abuse

The Adverse Childhood Experiences International Questionnaire (ACE-IQ) is a retrospective self-report measurement and is used to measure ACEs in culturally and geographically diverse samples, worldwide. The ACE-IQ is designed for people aged 18 years and older, and includes questions on childhood experiences, such as family dysfunction, abuse (physical, sexual, and emotional) and neglect (by parents or caregivers), peer violence, witnessing community violence, and exposure to collective violence (World Health Organization, 2012). The questionnaire originates from the adverse childhood experiences (ACE) questionnaire from the adverse childhood experience (ACE) study, which was conducted 1995-1997 in the USA. The aim of the ACE study was to examine the association between childhood abuse and adult medical and public health problems (Felitti et al., 1998). The questionnaire has been used worldwide, such as in China (Chang et al., 2019), USA (Brockie et al., 2015), and in Korea (Kim, 2017). Edda Björk Þórðardóttir, Jóhann Pálmar Harðarson, Arna Hauksdóttir and Unnur Valdimarsdóttir translated the ACE-IQ to Icelandic. Items from this instrument were used as a measurement of childhood sexual abuse: (1) (“Did someone attempt oral, anal, or vaginal intercourse with you when you did not want them to?“), and (2) (“Did someone have actual oral, anal, or vaginal intercourse with you when you did not want them to?”).

3.2.2 Suicidal behaviours

The questions measuring suicidal behaviours originated from The World Health Organization World Mental Health Composite International Diagnostic Interview (WHO WMH-CIDI). These questions were developed from the Diagnostic Interview Schedule (DIS) by Lee Robins and colleagues to use in the Epidemiologic Catchment Area (ECA). The WHO CIDI was an expansion extracted from the DIS by Lee Robins for WHO, and later WHO established WHO WMH Survey Initiative. The WHO WMH-CIDI assess mainly the prevalence and correlates of mental disorders in the general population (Kessler & Ustün, 2004). Questions associated with suicidal behaviour measure lifetime occurrence, age of onset, and time since last episode of suicidal behaviour. The questionnaire has been used in multiple studies worldwide (Borges et al., 2010), such as in Arabia (Jaju, Al-Adawi, Al-Kharusi, Morsi, & Al-Riyami, 2009), in Canada (Patten et al., 2015), Iceland (Ásgeirsdóttir et al., 2018), and in Argentina (Cia et al., 2019). Hildur Guðný Ásgeirsdóttir, Edda Björk Þórðardóttir, Arna Hauksdóttir and Unnur Valdimarsdóttir translated the WHO WMH-CIDI to Icelandic. Questions to measure suicidal behaviour included: (1) (“Have you ever seriously thought about dying by suicide?”), (2) (“Have you ever

intentionally hurt yourself, for example, cut, scratch, bite, or hit your head against a wall?"), (3) ("Have you ever planned your suicide?"), and (4) ("Have you ever attempted suicide?").

3.2.3 Sociodemographic factors

Information on the participants' background used in this study were: age, education, employment status and monthly income, measured with single item questions. The measurement for age was answered with a slider in which participants selected their age. The measurement for education ("What is your highest level of education?") was answered with either primary, secondary, tertiary A (such as bachelor's degree), tertiary B (such as master's degree), or don't know/ won't answer". The measurement for employment status ("What is your employment status?") was answered with either "working, studying, working from home, on parental leave, on disability, retired, on sick leave, job searching, or don't know/won't answer". Lastly, the measurement for monthly income was measured in Icelandic krona in thousands ("In what range do you estimate your total monthly income was in the past 12 months?") and answered with "less than 150 thousand, 151-300 thousand, 301-500 thousand, 501-700 thousand, 701-1000 thousand, more than a million, or don't know/won't answer".

3.3 Procedure

The participants in the SAGA cohort study answered an online questionnaire, either via phone or a computer. They were informed that they would get an invitation to participate in a follow-up study and/or potentially other studies. Also, they were asked to give informed consent to connect information from deCODE genetics, data from the health care system and biological specimen to their answers. Participants were given the option to not answer any questions and discontinue the survey at any time.

3.4 Statistical analysis

We used descriptive statistics to evaluate the sociodemographic background of the participants and performed tests to evaluate the statistical significance of each variable. We calculated the prevalence for lifetime suicidal thoughts, lifetime self-harm, lifetime suicidal planning, and lifetime suicide attempts. We performed statistical logistic regression test and used odds ratio (OR) to evaluate difference between groups with and without history of CSA. The data was analysed with the R statistical program (R Core Team, 2020).

3.5 Ethical consideration

This study was approved by the National Bioethics Committee in Iceland (17-238) and announced to the Data Protection Authority in Iceland. Some participants, especially survivors of CSA, might have experienced negative emotion while answering some of these deeply personal questions in the survey. All participants were offered a free therapy session if participation caused emotional distress. All participants gave informed consent and participated voluntarily. Anonymity and confidentiality of the participants was assured.

4 Results

A total of 31,811 women participated in the first wave of the SAGA cohort study. The mean age of the participants was 44 years (SD = 14.2), and the distribution of education levels, employment and monthly income of participants were similar to the general population of Icelandic women (Áfallasaga kvenna, 2020).

Table 1. Demographics of the Stress and Gene Analysis (SAGA) cohort study population by history of having experienced childhood sexual abuse.

		Total*	No history of childhood sexual abuse (%)	History of attempted rape (%) **	History of rape (%) ***	*p*
Total		29,606	25,114 (84.8%)	1129 (3.8)	3363 (11.4)	
Mean age (SD)		44 (14.2)	44 (14.3)	46 (13.6)	43 (13.8)	<0.001
Age groups						<0.001
	18-29	5587	4750 (85.0)	176 (3.2)	661 (11.8)	
	30-39	5956	5059 (84.9)	190 (3.2)	707 (11.9)	
	40-49	6403	5356 (83.6)	275 (4.3)	772 (12.1)	
	50-59	6566	5531 (84.2)	280 (4.3)	755 (11.5)	
	60-69	4366	3770 (86.3)	183 (4.2)	413 (9.5)	
	≥ 70	728	648 (89.0)	25 (3.4)	55 (7.6)	
Education						<0.001
	Primary	4400	3387 (77.0)	207 (4.7)	806 (18.3)	
	Secondary	7354	6209 (84.4)	288 (3.9)	857 (11.7)	
	Tertiary A	9303	8146 (87.6)	323 (3.5)	834 (8.9)	
	Tertiary B	6551	5781 (88.2)	207 (3.2)	563 (8.6)	
	Don't know/ not answered	1998	1591 (79.6)	104 (5.2)	303 (15.2)	
Employment						<0.001
	Employed****	24535	21161 (86.2)	873 (3.6)	2501 (10.2)	
	Unemployed*****	4872	3792 (77.8)	247 (5.1)	833 (17.1)	
	Don't know/ not answered	199	161 (80.9)	9 (4.5)	29 (14.6)	
Monthly income in thousands (ISK)						<0.001
	<150	2022	1701 (84.2)	64 (3.1)	257 (12.7)	
	151-300	6911	5530 (80.1)	300 (4.3)	1081 (15.6)	
	301-500	8926	7588 (85.0)	356 (4.0)	982 (11.0)	
	501-700	6706	5846 (87.2)	229 (3.4)	631 (9.4)	
	701-1000	2858	2525 (88.4)	102 (3.5)	231 (8.1)	
	>Million	1013	916 (90.4)	28 (2.8)	69 (6.8)	
	Don't know/ not answered	1170	1008 (86.1)	50 (4.3)	112 (9.6)	

* Individuals who did not answer question concerning CSA were excluded.

** Defined with the question "Did someone attempt oral, anal, or vaginal intercourse with you when you did not want them to?" Individuals with history of rape or did not answer the question were excluded in this column.

*** Defined with the question "Did someone actually have oral, anal, or vaginal intercourse with you when you did not want them to?" Individuals who did not answer the question were excluded.

**** Including participants answering "working, studying, working from home, or on parental leave".

*****Including participants answering "on disability, retired, on sick leave, or job searching".

4.1 Childhood sexual abuse

Table 1 presents characteristics of the whole study population and by history of CSA. We excluded women who did not answer the questions on CSA, leaving 29,606 participants (93.1%). A majority of participant had no history of childhood sexual abuse (85%) in their lifetime. In total, 3.8% reported having a history of attempted rape in childhood without a history of rape, while 11.4% reported a history of rape in childhood.

A history of attempted rape without a history of rape in childhood was highest among the age groups 40-49 years and 50-59 years (4.3%), while the prevalence was lowest for the two youngest age groups (18-29 years and 30-39 years) (3.2%). The prevalence of attempted rape in childhood was most common among women with primary education (4.7%) and among those who didn't answer the question (5.2%), relative to women with tertiary B education (3.2%). The prevalence was higher among the group of women reporting being on disability /retired /on sick leave/ job searching (5.1%), compared to women who reported being working /staying at home /being on parental leave (3.6%). Women with history of attempted rape in childhood were more likely to have income of 151-300 thousand per month and not answering the question (4.3%).

The prevalence of having a history of childhood rape was highest in the age group 40-49 years (12%), while the age group ≥70 years had the lowest prevalence (7.6%). The prevalence of childhood rape was most common with women with primary education (18%) relative to women with tertiary B education (8.6%). Additionally, they were more likely to be on disability /retired /on sick leave/ job searching (17%) compared to be working, staying at home, or being on parental leave (10%). The most common answers of income for women with history of childhood rape were answers indicating the two lowest categories of income; 151-300 thousand per month (16%) and less than 150 thousand per month (13%), while these answer possibilities were the least common answers among women with no history of childhood sexual abuse (see Table 1).

4.2 Suicidal behaviour

A total of 30,250 women answered questions on suicidal behaviour (95%), after we excluded women who did not answer the questions on suicidal behaviour. Table 2 present background by history of suicidal behaviour. Most of the participants did not report any history of suicidal behaviour (67%). In total, 28% reported having a lifetime history of suicidal thoughts, 17% reported history of self-harm, 16% reported having planned their suicide, and 7% reported history of suicide attempts.

A history of suicidal behaviour was most common among the youngest age group (age 18-29 years), while the prevalence was lowest among the oldest age group (>70 years old). For example, the prevalence for a history of suicide attempts was 11.1% for the youngest age group versus 3.3% for the oldest age group. Similar results were found for suicidal planning, self-harm, and suicidal thoughts for the two age groups (24% versus 9.4%, 34% versus 3.9%, and 36% versus 17% respectively). The prevalence of suicide attempts was furthermore higher among women with primary education than among women with tertiary B education (13% vs. 3.4%) and higher among women with low income (11.1%) compared to women with higher income (2.3%). Out of women who reported being on sick

leave/ job searching/ retired/ on disability, 38% reported a history of suicidal thoughts, and 24% reported a history of planning their suicide.

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

		Total*	No history of suicidal behaviour	Lifetime suicidal thoughts	Lifetime self-harm	Lifetime suicidal planning	Lifetime suicide attempts
Total		30,250	20,238 (66.9)	8555 (28.3)	5271 (17.4)	4854 (16.1)	2017 (6.7)
Mean age (SD)		44 (14.3)	46 (14.1)	41.44 (13.9)	35.66 (12.3)	40.13 (13.9)	38.91 (13.8)
Age groups							
	18-29	5817	3171 (54.5)	2152 (36.9)	1995 (34.3)	1401 (24.1)	646 (11.1)
	30-39	6164	3851 (62.5)	1864 (30.2)	1487 (24.1)	1073 (17.4)	445 (7.2)
	40-49	6538	4383 (67.0)	1864 (28.5)	1005 (15.4)	1025 (15.7)	424 (6.5)
	50-59	6603	4784 (72.5)	1680 (25.4)	531 (8.0)	871 (13.2)	329 (4.9)
	60-69	4379	3439 (78.5)	866 (19.8)	224 (5.1)	414 (9.5)	148 (3.4)
	≥ 70	749	610 (81.4)	129 (17.2)	29 (3.9)	70 (9.4)	25 (3.3)
Education							
	Primary	4551	2683 (58.9)	1694 (37.2)	1108 (24.4)	1081 (23.8)	616 (13.5)
	Secondary	7546	4755 (63.0)	2359 (31.3)	1617 (21.4)	1382 (18.3)	556 (7.4)
	Tertiary A	9491	6646 (70.0)	2358 (24.9)	1355 (14.3)	1272 (13.4)	433 (4.6)
	Tertiary B	6614	4818 (72.9)	1498 (22.7)	846 (12.8)	734 (11.1)	222 (3.4)
	Don't know/ not answered	2048	1336 (65.2)	646 (31.5)	345 (16.9)	385 (18.8)	190 (9.3)
Employment							
	Employed**	25048	17165 (68.5)	6595 (26.3)	4265 (17.0)	3610 (14.4)	1354 (5.4)
	Unemployed***	4994	295 (5.9)	1875 (37.6)	953 (19.1)	1190 (23.8)	633 (12.7)
	Don't know/ not answered	208	115 (55.3)	85 (40.9)	53 (25.5)	54 (25.9)	30 (14.4)
Monthly income in thousands (ISK)	<150	2073	1112 (53.6)	787 (37.9)	660 (31.8)	462 (22.3)	217 (10.5)
	151-300	7132	4099 (57.6)	2662 (37.3)	1714 (24.0)	1669 (23.4)	790 (11.1)
	301-500	9097	6080 (66.8)	2553 (28.1)	1539 (16.9)	1430 (15.7)	572 (6.3)
	501-700	6793	5029 (74.0)	1501 (22.1)	773 (11.4)	737 (10.9)	247 (3.6)
	701-1000	2913	2229 (76.5)	568 (19.5)	312 (10.7)	283 (9.7)	80 (2.8)
	> Million	1042	831 (79.8)	174 (16.7)	95 (9.1)	89 (8.5)	24 (2.3)
	Don't know/ not answered	1200	858 (71.5)	310 (25.8)	178 (14.8)	184 (15.3)	87 (7.3)

* Individuals answering did not answer question concerning suicidal behaviour were excluded.

** Including participants answering "working, studying, working from home, or on parental leave".

*** Including participants answering "on disability, retired, on sick leave, or job searching".

4.3 Childhood sexual abuse and suicidal behaviour

Table 3 presents the associations between having a history of attempted and/or rape in childhood and lifetime suicidal behaviour. In the table 3, we present the crude OR, age adjusted OR, and age, education, income, and employment status adjusted OR. Out of 8555 women experiencing suicidal thoughts, 1752 (21%) women also reported having history of attempted rape in childhood, and 1488 women (17%) reported history of rape in childhood. After adjusting for sociodemographic factors (age, education, income, and employment status), we found increased the risk of suicidal thoughts among

those having history of CSA. This was true both for history of childhood attempted rape (OR = 2.72, 95% CI 2.52-2.93) and childhood rape (OR = 2.92, 95% CI 2.69-3.17). We found similar results for the association between CSA and self-harm. A total of 1186 (22%) participants reported history of attempted rape in childhood and self-harm, and 1026 (19%) reported childhood rape and self-harm. Adjusted risk between attempted childhood rape and self-harm was significant (OR = 2.82, 95% CI 2.59-3.08), as well as for rape in childhood (OR = 3.01, 95% CI 2.74-3.30). Out of those reporting suicidal planning, 1171 (24%) women reported attempted rape in childhood, and 1012 (21%) reported rape in childhood. Adjusted risk of suicidal planning among those with history of attempted rape in childhood was 2.96 (95% CI 2.72-3.22) and among those with history of rape in childhood was the risk 3.15 (95% CI 2.88-3.45). An association between suicide attempts and childhood sexual abuse was found. 588 (29%) women reported history of both attempted childhood rape and suicide attempts, and 534 (26%) reported both childhood rape and suicide attempts. The adjusted risk of suicide attempts increased when participants had history of attempted childhood rape (OR = 3.25, 95% CI 2.90-3.64) and childhood rape (OR = 3.62, 95% CI 3.22-4.08).

Table 3. Childhood sexual abuse and odds ratio of lifetime suicidal behaviour among the study population.

	Lifetime suicidal thoughts	**Lifetime self-harm**	**Lifetime suicidal planning**	**Lifetime suicide attempts**
History of attempted rape				
No/total *	1752/8555	1186/5271	1171/4854	588/2017
Crude OR [95% CI]	2.95 [2.74-3.17]	2.84 [2.62-3.07]	3.27 [3.02-3.54]	4.00 [3.59-4.45]
Adjusted OR [95% CI] **	2.97 [2.76-3.20]	3.13 [2.87-3.40]	3.33 [3.07-3.61]	4.02 [3.61-4.48]
Adjusted OR [95% CI] ***	2.72 [2.52-2.93]	2.82 [2.59-3.08]	2.96 [2.72-3.22]	3.25 [2.90-3.64]
History of rape				
No/total *	1488/8555	1026/5271	1012/4854	534/2017
Crude OR [95% CI]	3.22 [2.98-3.49]	3.11 [2.86-3.38]	3.57 [3.27-3.89]	4.53 [4.05-5.07]
Adjusted OR [95% CI] **	3.22 [2.97-3.48]	3.35 [3.06-3.67]	3.57 [3.27-3.89]	4.50 [4.02-5.04]
Adjusted OR [95% CI] ***	2.92 [2.69-3.17]	3.01 [2.74-3.30]	3.15 [2.88-3.45]	3.62 [3.22-4.08]

*Number of individuals experiencing given suicidal behaviour, out of those who experienced given sexual abuse.

**Adjusted for age.

***Adjusted for age, education, income, and employment status.

In figure 1, we present the association between frequency of rape in childhood and suicide attempts. The likelihood of suicide attempts is elevated when participants report greater frequency cases of rape, presenting a dose-response relationship between the two variables. The risk of suicide attempt following no history of rape during childhood was approximately 5%, however the risk of suicide attempt after participants reported multiple rape in childhood was roughly 30%.

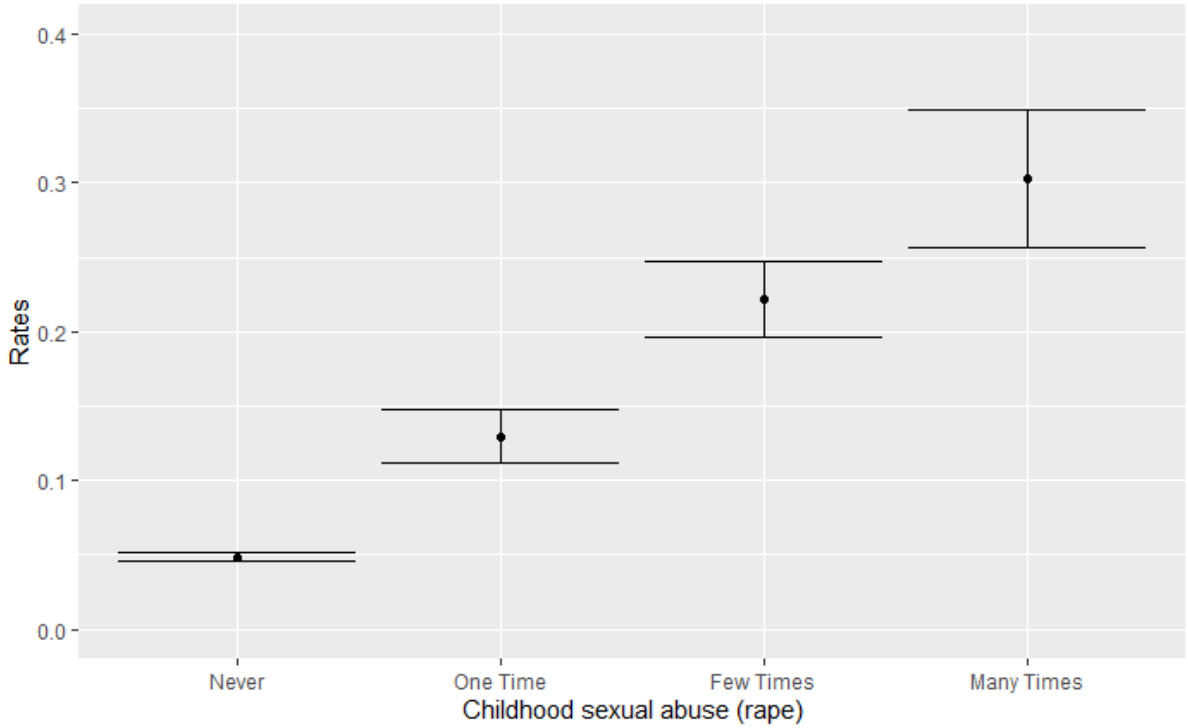

Figure 1. The overall prevalence of frequency of rape in childhood by suicidal attempts.

5 Discussion

The aim of the study was to investigate the prevalence and background characteristics of both CSA and suicidal behaviour, the association between CSA and suicidal behaviour, and the association between number of rapes and suicide attempts. We found an increased risk of lifetime suicidal behaviours (suicidal thoughts, self-harm, suicidal planning, and suicide attempts) among women reporting CSA. The risk of adverse outcomes increased when both CSA and suicidal behaviour intensified. We furthermore found a strong association between frequency of rape in childhood and suicide attempts in a dose-response relationship.

5.1 CSA and suicidal behaviour

Among those who had experienced CSA (attempted rape and rape in childhood), we found increased risk of suicidal behaviour. Similarly, previous studies have found strong association between CSA and suicidal behaviour (Afifi et al., 2008; Fergusson et al., 2013; Turecki, 2014), especially suicide attempts (Devries et al., 2014; Molnar et al., 2001). Our findings showed that those who had history of childhood attempted rape or childhood rape were particularly at risk of attempting suicide. According to our findings, a staggering 11.4% of all women participating in our study have history of childhood rape, higher prevalence than the 3.8% participants who reported history of attempted childhood rape without rape. A possible reason for this difference in prevalence of these two CSA, is

that majority of attempted rape is followed by childhood rape and fewer individuals experience solely childhood attempted rape. Most participants who reported CSA had primary education, were unemployed, and reported monthly income of 151-300 thousand. Participants with history of attempted rape but no rape in childhood were mostly over 40 years old (40-69 years old), and participants with history of rape were mostly in the age group 40-49 years old. However, a small variance was between number of participants in each age group. Approximately, one third of all participants reported having had lifetime suicidal thoughts, and roughly one-fifth reported having self-harmed at any time in their lives. Participants reporting suicidal behaviour were most likely to be 18-29 years old, having primary education, being unemployed, and having monthly income of less than 150 thousand and 151-300 thousand.

Studies investigating traumatic events in childhood have found that sexual abuse in childhood often has a more serious impact than other adversities, such as childhood physical abuse, witnessing a violence, or parental mental illness (Afifi et al., 2008; Fergusson et al., 2000; McLafferty et al., 2018; Miché et al., 2020; Plener et al., 2011; Waldrop et al., 2007). We found that the risk of suicidal behaviour increased more for the women reporting history of childhood rape, compared to those who reported attempted rape in childhood. This is similar to findings from a study by Molnar et al. (2001), where those who reported child rape were at more risk at developing suicidal behaviour than those reporting child molestation or no CSA history. The risk among women reporting CSA increased twofold for every suicidal behaviour outcome, and for history of childhood rape the risk increased significantly for each outcome, resulting with a nearly fourfold highest risk of suicide attempts.

We found an association between those who had a history of frequent exposure to CSA in our study and stronger outcome of suicidal behaviour. This is similar to other studies that found association between number of traumatic events and more adverse outcomes (Afifi et al., 2008; Brockie et al., 2015; Felitti et al., 1998; Fergusson et al., 2013; Kendler et al., 2000). In our study, women who reported greater number of rapes during childhood were more likely to have history of suicide attempts, compared to those reporting fewer incidence of rape in childhood. This suggests that women who have a longer and frequented history of CSA may have a higher likelihood of more adverse outcomes (such as suicidal behaviour), compared to women with history of single incidence of CSA.

5.2 Strengths and limitations

One of the strengths of our study is that it's a large nationwide population-based study, increasing statistical power and generalizability. The measurements used in our study have been validated in other studies, both the ACE-IQ (Brockie et al., 2015; Chang et al., 2019; Kim, 2017) and WHO WMH-CIDI (Ásgeirsdóttir et al., 2018; Cia et al., 2019; Jaju et al., 2009; Patten et al., 2015).

Some limitations should be noted. Sexual abuse usually refers to sexual activity carried out by older caregivers and adults. However in other cases it refers to offenses committed by peers of the same age and findings show that over half of the total estimates of CSA offenses was at the hands of juvenile perpetrator (Finkelhor et al., 2014). By using vague or inconsistent terms and definition, the progress in suicide research gets hindered. A lack of standardization and wide range of definitions of

CSA can influence prevalence rate and effects sizes. This concerns mainly in which abuse is defined, for example broad definitions of CSA (e.g. inappropriate touching or exposure to genitals) tend to have higher prevalence than narrow definitions of CSA (e.g. penetration vaginally or anally) (Fergusson et al., 2000). Suicidal behaviour encompasses some terminological and definitional ambiguity as well. The use of term suicidal behaviour is often vague, for example actions with and without the intent to die (e.g. self-harm and suicidal self-harm), and may therefore have inconsistent prevalence rate (Klonsky et al., 2016). An advantage to our study is that the questions used are direct and narrow, thus minimizing terminological ambiguity.

Retrospective self-report is the most common measurement of CSA history for the reason that it minimizes embarrassment or discomfort whilst upholding anonymity (Irish et al., 2009). Nonetheless, another limitation is that this and other assessments of CSA based on self-report in adulthood will be incomplete. Participants might not remember the CSA or didn't understand it as assault due young age, and this might increase the risk of recall bias (Finkelhor et al., 2014; Hardt & Rutter, 2004). Furthermore, due to the cross-section design of the study, it's impossible to conclude if CSA occurred before suicidal behaviour, although it's likely.

The harmful consequences of CSA on the lives of the victims are reflected in our study. Stigma and taboo have followed the subject of CSA and suicidal behaviour and child abuse often goes unreported (Irish et al., 2009). For that reason, many individuals get hindered from seeking help and therefore won't get the help that they so sorely need. By conducting this study, we hope to open the discussion and raise awareness about CSA and suicidal behaviour. Our findings are comparable to past studies, but we provide a new contribution to the knowledge of devastating effects of number of CSA on suicidal behaviour. Additionally, women who have a history of attempted rape during childhood versus rape during childhood differ in severity of the risk of developing suicidal behaviour. The need for accurate CSA prevalence estimates is critical for health studies worldwide, disease burden estimation, and in the development of effective prevention programs. Past findings and our results underscore the need for an effective intervention for victims of CSA.

6 Conclusion

This study emphasizes the importance of childhood sexual abuse as a significant risk factor for suicidal behaviour, and further indicates that the risk of suicidal behaviour may increase by severity of sexual abuse. Moreover, the findings indicate that the risk for lifetime suicide attempt may increase with a higher number of childhood rape. The findings highlight the extreme importance of preventive measures regarding childhood sexual abuse. Given the strong association with suicidal behaviour, it may be beneficial for clinicians to routinely screen for childhood trauma history among children and adults who seek psychological treatment, as part of suicide risk assessment and effective suicide prevention.

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