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Department of community medicine

Suicidal behaviour in adolescence and later mental healthcare use: a population-based registry study of Norwegian youth.

Exploring potential gender differences and ethnic differences between indigenous Sami and non-Sami.

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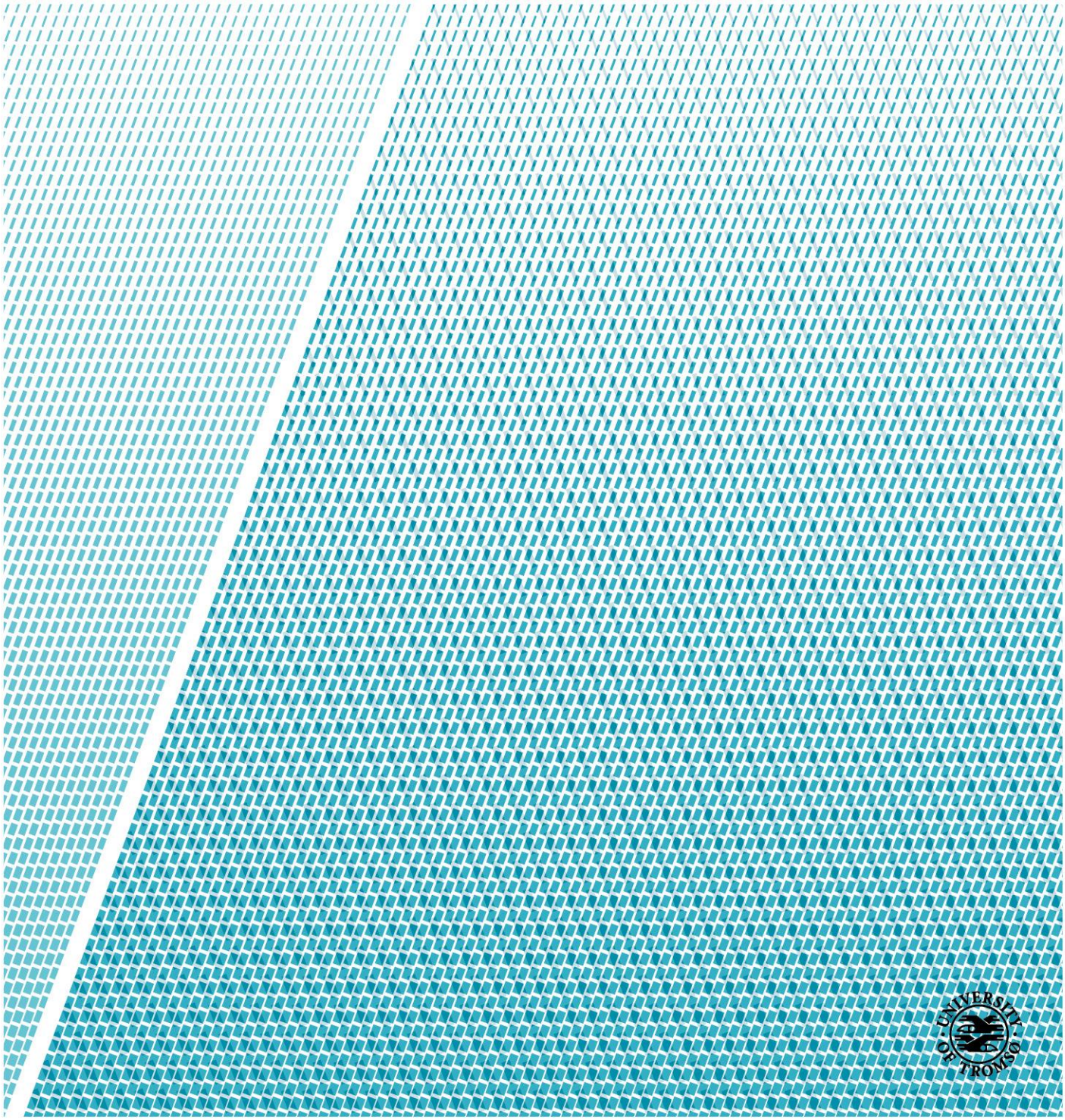
Master's thesis in Public Health July 2017



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Mental health has been a topic of interest for a long time, which lead me to work with persons with mental health problems when I graduated nursing school. When I started the master in Public Health, I did it with the intention to wright a thesis about mental health. It was not easy to find a supervisor in this topic at the department of community medicine, and I am so grateful that my co-supervisor Siv Kvernmo gave me this project after a long while of searching. I would like to thank my main supervisor Christian Eckhoff for his time and engagement, all the constructive feedbacks, and for always replying quickly on mail when I had questions.

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Tromsø, July 2017

Maria Therene Sørvold

ABSTRACT

Background: The prevalence of suicidal behaviour among adolescents are high, and act as a risk factor of suicide. Suicide is considered a public health problem worldwide. Indigenous people are in general at higher risk of suicide than the majority population, and there are gender differences in the pathways of suicidal behaviour and suicides.

Objectives: To investigate the association and importance of suicidal behaviour in northern Norwegian adolescents and the use of mental healthcare in young adulthood, and to explore potential gender differences and differences between the indigenous Sami and non-Sami.

Material and method: 3987 (68%) of all 10th grade students in northern Norway participated in the Norwegian Arctic Adolescents Health Study (NAAHS) in 2003-2005. Suicidal thoughts, suicidal attempts and self-harm was measured in the NAAHS at the age of 15-16 years. NAAHS and was linked to the Norwegian Patient Registry in the years of 2008-2012. Pearson Chi-Square test and one-way ANOVA was used for the univariate analyses, and hierarchical binary logistic regression was used for the multivariable analyses. Separate logistic regression analyses were made for the three suicidal behaviours.

Results: Suicidal thoughts, suicide attempts and self-harm in adolescence significantly increased the use of mental healthcare in young adulthood. Females had more suicidal behaviour and a higher mental healthcare use than males, however gender was not a significant predictor of the use of mental healthcare. The indigenous Sami reported more suicidal thoughts, but ethnicity was not a significant predictor for the use of mental healthcare.

Conclusion: Many adolescents have suicidal behaviour, however, most of them are not in need of mental healthcare in young adulthood. The indigenous Sami were not worse off than the non-Sami, and have less suicidal behaviour than other indigenous populations. This is important in a global health perspective, for other indigenous populations.

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ABBREVIATIONS

NAAHS	The Norwegian Arctic Adolescents Health Study
NPR	Norwegian Patient Registry
Non-Sami	All adolescents which did not meet the criteria of being Sami, independent of other ethnicities.
Suicidal behaviour	Suicidal thoughts, suicide attempts and self-harm
CI	Confidence interval
OR	Odds ratio

1 Introduction

1.1 Background

Suicide and suicidal behaviour such as suicidal thoughts, suicide attempts and self-harm is a significant public health problem worldwide, and the prevalence of suicidal behaviour among young people is high (Cash & Bridge, 2009; World Health Organization (WHO), 2017). Research indicates that suicidal thoughts, suicide attempts and self-harm debut during adolescence, and the high-risk age of initial suicidal behaviour have a peek around 15-17 years (Kessler et.al, 1999). From a public health perspective, it will be important to investigate the association between suicidal behaviour in adolescence and the later need of mental healthcare in adulthood, to give a picture of how suicidal behaviour in adolescents can influence mental health in adult life.

According to the World Health Organization (2017), suicide is the second most common cause of death among 15-29-year-olds globally. WHO (2017) states that globally, around 800.000 people dies from suicide every year, and the number can be higher because of poor availability and quality of data of suicide and suicide attempts. In Norway, between 500-600 persons commit suicide each year, with a suicide rate of approximately 11 per 100.000 (Norwegian Institute of Public Health (NIPH), 2017). Suicidal behaviour is important in the context of suicide, because suicidal behaviour act as one of many risk factors for suicide (Bridge et.al, 2006). Known risk factors of suicidal behaviour is poor childhood environment, such as exposure to sexual abuse, socio-economic problems and poor relation to parents, as well as mental health problems and exposure to adverse life events (Fergusson et.al, 2000). The severity and duration of the suicidal behaviour gives an indication of how increased the risk of suicide is when suicidal behaviour is present. The more severe the suicidal thoughts

are, and a specially with a high intent or a plan on how to commit suicide, the higher is the risk of a suicide attempt, that in worst case could end in a suicide. Further on, a prior suicide attempt increases the risk of suicide (Bridge et.al, 2006). Shain (2016) estimates the number of suicide attempts to be 50-100 times higher than committed suicides, and suicidal thoughts are even more common than suicide attempts (Cash & Bridge, 2009). Bridge et.al (2006) states that around 15-25% of adolescents struggles with suicidal thoughts. This show that suicidal behaviour is a major public health concern. It might be an especially concern towards adolescents, since so many adolescents struggles with suicidal behaviour, and suicidal behaviour often initiates in this age (Kessler et.al, 1999). Suicidal behaviour is not only a concern in relation to suicides, but in also relation to mental health struggles in the adolescent population, and the connection to mental health struggles in the adult life.

In Norway, approximately two thirds of all suicides among adolescents are completed by males (NIPH, 2016). While young males in general are more likely to die by suicide than their female peers (Hawton et.al, 2012), females have a higher risk of suicidal behavior such as suicidal thoughts, self-harm and suicide attempts (Wichstrøm, 2000: Wichstrøm, 2009: Cash & Bridge, 2009).

Indigenous people around the world are known to have the highest risk of suicide (Leenaars, 2006). Over the last decades, the suicide rates in the Arctic region have increased for the indigenous people, and we see high suicide rates among the Greenlandic Inuits (Bjerregaard & Lynge, 2006) and Russian Nenets (Sumarokov, Brenn, et.al, 2014). Evidence show that the prevalence of suicidal behaviour among indigenous populations compared to non-indigenous populations can be different from one indigenous population to another. However, indigenous population with high suicide rates often have high suicidal behaviour rates as well. Wexler et.al (2008) found in their study that the Alaskan Natives had higher rates of suicidal behaviour, while Qiao & Bell (2016) found that indigenous populations in America were not

more likely to have suicidal thoughts than the majority population. They did however have more suicide attempts (Qiao & Bell, 2016).

Few studies have examined the prevalence of suicidal behaviour in the indigenous Sami population. The Norwegian government does not have public records of ethnicity, and knowledge about suicidal behaviour among the indigenous Sami depends on research (Berntsen et.al, 2011). There are no recent studies of the prevalence of suicidal behaviour among the indigenous Sami in the Arctic Norway since the late nineties. From the years of 1994-1998, Silviken & Kvernmo (2007) could not find any difference in the prevalence of suicide attempts between indigenous Sami and the majority peers in northern Norway. This result indicates that suicide attempts among the indigenous Sami is relatively low compared to other indigenous groups around the world, which can be an important societal difference of global health interest and importance.

Knowledge about suicidal behaviour and the association to later mental health problems and use of mental healthcare are limited, and more knowledge will be of interest in the work of creating adjusted and cultural sensitive intervention and prevention programs. Both in relation to possible gender differences and potential differences between the indigenous Sami and the non-Sami population.

1.2 Definitions

There are many different terms used in the literature to describe the aspects around suicide and suicidal behaviour (Silverman, 2006). In this thesis, these terms will be used: suicide, suicidal behaviour, self-harm, suicidal thoughts and suicide attempt.

Suicidal behaviour is often described as suicidal thoughts, suicide attempts and self-harm in literature (Silverman, 2006; Wichstrøm, 2009). Suicidal thoughts are defined by The Centres for Disease Control and Prevention (CDC) (2016) as “thinking about, considering, or

planning suicide". The NHS Centre for Reviews and Dissemination (1998) defined in 1998 self-harm as: "Deliberate self-harm involves intentional self-poisoning or injury, irrespective of the apparent purpose of the act." In later years, self-harm has also been divided in to "suicidal" and "non-suicidal", which describes the intention behind the self-harm (Crosby et.al, 2011). Crosby et.al (2011) defines suicide attempts as "a non-fatal self-directed potentially injurious behaviour with any intent to die as a result of the behaviour. A suicide attempt may or may not result in injury."

CDC (2016) defines suicide as: "Death caused by self-directed injurious behavior with an intent to die as a result of the behavior". Several different definitions of suicide are used by researchers and organizations. Silverman (2006) gathers some of the definitions and finds that there are four key components that are shared by most definitions of suicide. The four key components are: Death is the outcome of the behaviour. The behaviour needs to be self-inflicted – done to oneself and by oneself. The intention to die is to achieve a different status, and the person are in awareness of the outcome (Silverman, 2006).

1.3 Objective

In this master thesis, I wanted to:

1. explore the association between self-reported suicidal thoughts, suicidal attempts and self-harm in northern Norwegian adolescents and later mental healthcare use in young adulthood.
2. determine the importance these suicidal behaviours in relation to later mental healthcare use, when adjusting for sociodemographic and adolescent psychosocial factors.
3. explore potential gender differences and ethnic differences between indigenous Sami and non-Sami regarding adolescent suicidal behaviour and later mental healthcare use.

2 Material and methods

2.1 Study design

This master thesis used data from the cross-sectional study "The Norwegian Arctic Adolescent Health Study" (NAAHS), which was linked to the Norwegian Patient Registry (NPR) in 2013.

2.1.1 The Norwegian Arctic Adolescent Health Study (NAAHS)

NAAHS was conducted among 10th grade students (15-16-year-olds) in Nordland, Troms and Finnmark in the years 2003-2005. Nearly all invited junior high schools responded (292 out of 293) to the study. The response rates were 88% for Nordland, 82% for Troms and 71% for Finnmark. Questionnaires were managed by project staff and handed out to the students in classroom settings. The questionnaires were completed during two school hours, and were available in both the Norwegian and Sami language. Students who were not present during the first delivery had the chance to respond to the questionnaire in a later date. There were no predetermined exclusion criteria in this study.

2.1.2 The Norwegian Patient Registry (NPR)

The Norwegian Patient Registry is a detailed registry that includes personal identification of diagnosis and specialized healthcare utilization. NAAHS was linked to available specialized mental health care data from the NPR from year 2008 to 2012 (a 5-year period) when the participants of the NAAHS were 18-20 to 23-25 years of age.

2.1.3 Sample

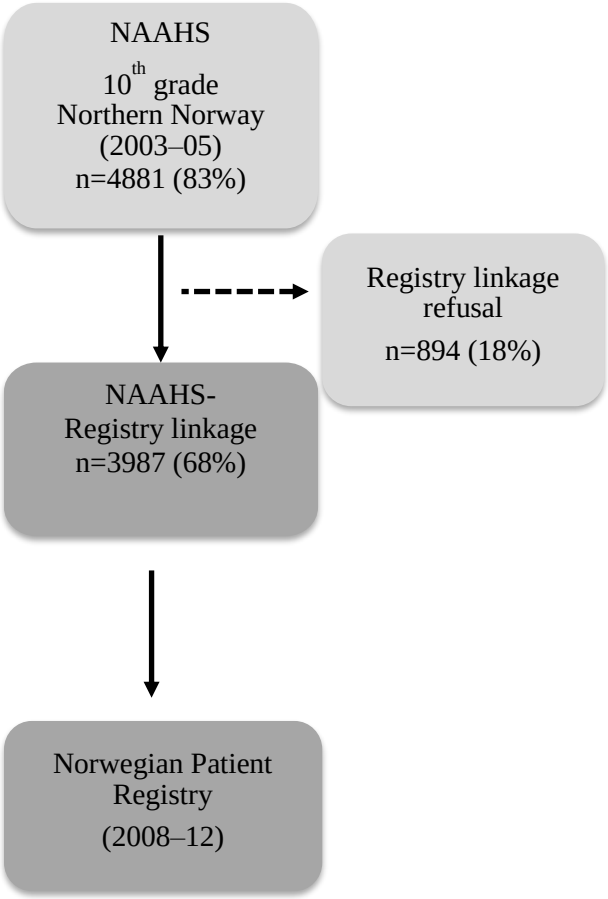

Figure 1 Flowchart of participants

Of all invited students, 4881 out of 5877 (83%) responded to the NAAHS. Out of these participants, 3987 (82%) consented to a future registry linkage, which resulted in a 68% sample of all 10th grade students in Northern Norway. The sample consisted of 1996 (50.1%) males and 1991 (49.9%) females. 365 (9.2%) reported to be indigenous Sami, while 3280 (82.3%) reported to be non-Sami.

Nordland county represented 52.8% of the sample, Troms 32.9% and Finnmark 14.4%. The distribution of the sample is expected to be unequally distributed because of the difference in population size between the counties.

2.1.4 Measures

Main predictors – The NAAHS

Suicidal behaviour factors:

Suicidal behaviour was measured by the participants answering "yes" or "no" to the questions: "have you ever thought about taking your life?", defined as *suicidal thoughts*, "have you ever attempted to take your life?", defined as *suicide attempts* and "have you ever harmed yourself on purpose?", defined as *self-harm*. The measure of self-reported suicidal behaviour were done when the participants were 15-16 years old.

Adjusting/confounding factors – The NAAHS

Sociodemographic factors:

Gender: male or female.

Sami ethnicity was measured by the participants answering "yes" to one or more of the following factors: Sami ethnic self-labelling, Sami parents, Sami language competence in parents, grandparents and the participants (Kvernmo & Heyerdahl, 1996).

Parental education was collected from Statistics Norway`s education registry. The parent's highest education was registered when the adolescents were 15-16 years old. It was categorized as "lower secondary" (≤10th grade), "upper secondary" (≤13th grade), "lower university degree" (4 years or less) and "higher university degree" (more than 4 years) (Statistics Norway, 2003; Eckhoff et.al, 2017).

Family income: The participants reported their beliefs about their family economic situation compared to others families on a four-point scale from “not well off” to “very well off” (Eckhoff et.al, 2017)

Psychosocial supportive factors:

Self-efficacy (α=0.77) was measured by the “General perceived self-efficacy scale”, where the participants answered five of the ten questions, on a four-point Likert scale from “completely wrong” to “completely right”. The five-item version consisted of the questions: “I always manage to solve difficult problems if I try hard enough”, “If someone counteracts me, I can find a way to get what I want”, “I feel confident that I would be able to cope with unexpected events in an efficient way”, “I keep calm when I face difficulties, because I trust my coping skills” and “If I’m in trouble, I usually find a way out of it” (Røysamb et.al, 1998; Eckhoff & Kvernmo, 2014).

Parental support (α=0.88) was measured by the participants answering five statements on a four point Likert scale from “completely agree” to “completely disagree”. The statements were “I feel attached to my family”, “my family takes me seriously”, “my family values my opinions”, “I mean a lot to my family” and “I can count on my family when I need help” (Eckhoff & Kvernmo, 2014).

Parental involvement (α=0.78) was measured by the participants answering a 4-item version of the Parental Involvement Scale (Alsaker et.al, 1991). The four statements were measured by a four point Likert scale from “completely agree” to “completely disagree”. The questions were: “My parents know where I am and what I do in the weekend”, “my parents know where I am and what I do on weekdays”, “my parents know who I spend my leisure time with” and “my parents like the friends I spend time with” (Echhoff & Kvernmo, 2014).

Peer support (α=0.84) was measured by four statements; "I feel closely attached to my friends", "my friends value my opinions", "I can help/support my friends" and "I can count on my friends when I need help" (Eckhoff & Kvernmo, 2014).

Psychosocial stress and mental health:

School-related stress (α=0.66) was measured by questions about experiences based on heavy work pressure at school, pressure from others to succeed at school, difficulties concentrating in class, and difficulties understanding the teacher. The participants answered the questions on a three-point Likert scale from "no" to "yes, often" (Echhoff & Kvernmo, 2014).

Adverse life events were measured by 12 questions regarding; conflicts with parents, parental mental health problems, parental drug abuse, parental financial problems and/or unemployment, peer problems, experience of being bullied and/or being exposed to violence, serious illness and disease, death in close relations and experience of sexual assault. The variables were dichotomized into any degree of exposure (1) and zero degree of exposure (0), which resulted in a range of adverse life events from 0-12 (Echhoff & Kvernmo, 2014).

Anxiety/depression (α=0.87) symptoms was measured by the Hopkins Symptom Checklist 10-item version (HSCL-10) (Derogatis et. al, 1974), that measure symptoms of anxiety and depression during the last week (Echhoff & Kvernmo, 2014).

Outcome factors – data from the Norwegian Patient Registry

Mental health factors in young adulthood:

Mental healthcare users were participants registered as users of specialized psychiatric healthcare in the Norwegian patient registry. Both the use of public psychiatric healthcare and private specialists were included.

The number of *inpatient admissions*, *total outpatient hours*, *total inpatient days* and *total acute referrals* were calculated into the respective variables.

2.2 Data analysis

Pearson Chi-square test for independence and one-way analysis of variance (ANOVA) was used for the univariate analyses. Pearson Chi-square test for independence was used to explore the relationship between the dependent variable "*mental healthcare users"* and independent variables *"have you ever thought about taking your life?", "have you ever attempted to take your life?"* and *"have you ever harmed yourself on purpose?"*. These tests were stratified by gender and Sami ethnicity.

One-way ANOVA was performed to compare means between the independent variables "*have you ever thought about taking your life*", "*have you ever attempted to take your life*" and "*have you ever harmed yourself on purpose*" and mental healthcare use in young adulthood with variables "*total number of inpatient admissions"*, *"total outpatient hours"*, *"total inpatient days"* and *"total acute referrals"*. One-way ANOVA was used to investigate which adjusting factors to include in the multivariable analyses, since the psychosocial supportive factors, psychosocial stress and mental health factors were scales. "*Have you ever thought about taking your life"*, *"have you ever attempted to end your life"* and *"have you ever harmed yourself on purpose"* was used as the factor variables in three steps. Table 7 in the appendix show a significant difference in all the psychosocial supportive factors, psychosocial stress – and mental health factors and if the adolescence answered "yes" or "no" to the suicidal behaviours. Therefore, all the adjusting variables will be a part of the binary logistic regression analysis.

Hierarchical binary logistic regression was used for the multivariable analyses between the three adolescent suicidal behaviours and later mental healthcare use. This analysis was appropriate since the outcome variable was a dichotomous variable. I conducted three

hierarchical models with the respective suicidal behaviours as main predictors of interest. All the three analyses started out with the main predictor in model 0. Adolescent sociodemographic predictors were added as adjusting factors in model 1, psychosocial supportive factors in model 2, and psychosocial stress factors and mental health in model 3 (final model).

All statistical analyses were performed with IBM SPSS Statistics 24. The significance level was set to 0.05.

3 Ethical considerations and consents

The Norwegian Data Inspectorate and the school authorities first approved the NAAHS. The participants and their parents were given written information about the study, and the participants and parents gave a written consent. The Regional Medical Ethical Committee approved the NAAHS and the registry linkage to the Patient Registry, and this master thesis. The linkage was carried out by the Norwegian Institute of Public Health and Statistics Norway.

Suicidal behaviour and the use of mental healthcare is a sensitive topic to explore since it is such a personal part of the lives of the people with these struggles. When exploring this complex topic, it is important to have in mind that possible associations found is only a piece of a large picture. Researching on ethnic groups, such as the indigenous Sami in this thesis, can also be a sensitive matter. When researching on ethnic groups, there is a danger that the research results can contribute to causing stigma of the groups, and this is important to be aware of this when exploring ethnic differences.

4 Results

4.1 Baseline characteristics

Tabel 1-1 Suicidal behaviour in adolescence and mental healthcare use in young adulthood in males and females, and Sami and non-Sami

	Gender				Ethnicity			
	Female N=1991	**Male N=1996**	**Total N=3987**	**Gender diff.**	**Sami N=365**	**Non Sami N=3280**	**Total N=3645**	**Ethnic diff.**
	%	%	%	$\chi 2$	%	%	%	$\chi 2$
Suicidal thoughts	46.3	21.8	34.2	$255.00^{p=.000}$	40.2	33.7	34.3	$5.70^{p=.017}$
Suicide attempt	14.0	3.7	8.9	$125.56^{p=0.000}$	11.8	8.6	8.9	$3.74^{p=.053}$
Self-harm	36.6	23.1	30.0	$82.43^{p=.000}$	32.2	29.8	30.0	$0.79^{p=.373}$
Mental healthcare use	16.2	11.0	13.6	$22.48^{p=.000}$	12.1	13.5	13.3	$0.46^{p=.499}$

$\chi 2$= Chi-square test for independence with Yates Continuity Correction

Table 1-1 shows that 13.6% of the adolescents in the NAAHS had used mental healthcare in young adulthood. Suicidal thoughts were reported by 34.2% adolescents, and suicide attempts and self-harm was reported by respectively 8.9% and 30 %. Females reported significantly more suicidal behaviour in adolescence and had received significantly more mental healthcare in young adulthood than males. The indigenous Sami reported significantly more suicidal thoughts than the non-Sami. There was no significant difference between self-harm and the use of mental healthcare between Sami and non-Sami adolescents, while suicide attempts reached a p-value=.053, which is on the border of significance.

Table 1-2 Type of mental healthcare use in young adulthood in males and females, Sami and non-Sami.

	Gender				Ethnicity			
	Female N=1991	**Male N=1996**	**Total N=3987**	**Gender diff.**	**Sami N=365**	**Non-Sami N=3280**	**Total N=3645**	**Ethnic diff.**
	Mean	Mean	Mean	F-test	Mean	Mean	Mean	F-test
Inpatient admissions	0.10	0.08	0.09	$0.50^{p=.481}$	0.11	0.08	0.08	$0.66^{p=.416}$
Total outpatient hours	5.11	2.35	3.73	$8.67^{p=.003}$	2.31	3.94	3.78	$0.93^{p=.335}$
Total inpatient days	2.76	3.62	3.19	$0.71^{p=.399}$	4.60	2.82	2.30	$1.04^{p=.402}$
Total acute referrals	0.07	0.07	0.07	$0.14^{p=.710}$	0.08	0.06	0.08	$0.56^{p=.454}$

Note: Statistical analysis: one-way ANOVA

Table 1-2 shows that females have a significantly higher use of outpatient hours than males. There is no significantly difference in the use of the other different types of mental healthcare use between males and females, and Sami and non-Sami.

4.2 The association between suicidal behaviour in adolescence and later mental health problems

Table 2 The association between suicidal behaviour in adolescence and use of later mental healthcare

	Users of mental healthcare in young adulthood[§]				
	Total sample n=3987	**Male n=1996**	**Female n=1991**	**Sami n=365**	**Non-Sami n=3280**
	%	%	%	%	%
Suicidal thoughts	n=3841				
Yes	21.1	17.5	22.7	16.8	21.7
No	9.5	8.9	10.4	9.4	9.3
$\chi 2$	$98.6^{p=0.000}$	$24.2^{p=0.000}$	$53.6^{p=0.000}$	$4.3^{p=0.038}$	$95.2^{p=0.000}$
Suicide attempts	n=3833				
Yes	31.9	21.7	34.4	21.4	33.2
No	11.6	10.2	13.0	11.2	11.5
$\chi 2$	$109^{p=0.000}$	$8.1^{p=0.004}$	$78.3^{p=0.000}$	$3.6^{p=0.058}$	$102.5^{p=0.000}$
Self-harm	n=3836				
Yes	21.1	16.2	24.1	21.1	21
No	10.1	9.0	11.3	7.9	10.2
$\chi 2$	$83.6^{p=0.000}$	$17.6^{p=0.000}$	$53.9^{p=0.000}$	$12.5^{p=0.000}$	$67.6^{p=0.000}$

$\chi 2$= Chi-square test for independence with Yates Continuity Correction.
[§]=Patient data from the Norwegian Patient Registry

Table 2 shows that suicidal behaviour in adolescence gives a significantly higher use of mental healthcare as young adults. 21.1% of the participants with suicidal thoughts had used mental healthcare in young adulthood, compared to 9.5% without suicidal thoughts. For

suicide attempts the numbers are respectively 31.9% compared to 11.6%. Within adolescents reporting self-harm, 21.1% used the healthcare system in young adulthood compared to 10.1% not reporting self-harm. Females had a higher consume of mental healthcare in young adulthood when experiencing suicidal thoughts, suicide attempts and self-harm in adolescents, than males. The non-Sami`s had a higher use of mental healthcare as adults when they reported suicidal thoughts and suicide attempts in adolescence, compared to the Sami`s. Self-harm in adolescence and the need of mental healthcare in young adulthood is the same between Sami and non-Sami.

4.3 Suicidal behaviour in adolescence and the type of mental healthcare use in young adulthood

Table 3 show that adolescents with suicidal behaviour had significantly more inpatient admissions, inpatient days, outpatient treatment hours and acute referrals in young adulthood than the adolescents that did not report suicidal behaviour. The two exceptions that lack a significant relationship is between suicidal thoughts and the amount of inpatient days and acute referrals.

Females with suicidal behaviour in adolescence had more inpatient admissions, inpatient days, outpatient treatment hours and acute referrals in young adulthood than those without suicidal behaviour in adolescence (table 3). The only exception for females was the lack of an association between suicidal thoughts in adolescence and the amount of inpatient admissions in adulthood. Males only had a significantly higher use of inpatient admissions in young adulthood when they reported self-harm in adolescence. There is a clear gender difference in the amount of use in the different types of mental healthcare treatments, where females overall have a higher use of outpatient, inpatient and acute referrals. While females with

suicidal thoughts, suicide attempts and self-harm have a mean of respectively 8.19, 14.3 and 8.42, males with suicidal behaviour have means of respectively 2.56, 4.21 and 2.31.

Table 3 show a difference between the indigenous Sami and non-Sami. The indigenous Sami only had a significantly higher use of outpatient treatment hours in young adulthood when they reported self-harm in adolescence. The non-Sami`s had a significantly higher use of outpatient hours when reporting suicidal thoughts, suicide attempts and self-harm in adolescence. When reporting suicidal attempts and self-harm in adolescence, non-Sami`s also had a significantly higher use of total inpatient admissions and acute referrals.

Table 3 The difference in adult mental healthcare use‡ and suicidal thoughts, suicide attempts and self-harm in adolescence. Stratified by gender and Sami ethnicity

	Users of mental healthcare‡														
Adult mental health‡	**Total n=3836**			**Females n=1991**			**Males n=1996**			**Sami n=365**			**Non-Sami n=3280**		
(means)	Yes	No	F-test	Yes	No	F-test	Yes	No	F-test	Yes	No	F-test	Yes	No	F-test
Suicidal thoughts															
Total outpatient hours	6.43	2.02	$20.24^{p=0.000}$	8.19	2.21	$13.69^{p=0.000}$	2.56	1.89	$0.39^{p=0.535}$	3.54	1.58	$2.54^{p=0.112}$	7.01	2.14	$17.70^{p=0.000}$
Inpatient admissions	0.11	0.06	$5.45^{p=0.020}$	0.11	0.05	$2.65^{p=0.104}$	0.10	0.06	$2.62^{p=0.105}$	0.15	0.08	$0.58^{p=0.449}$	0.10	0.05	$4.14^{p=0.416}$
Total inpatient days	3.8	2.5	$1.46^{p=0.228}$	3.83	1.29	$3.98^{p=0.046}$	3.72	3.37	$0.03^{p=0.856}$	8.44	2.21	$2.11^{p=0.147}$	3.21	2.42	$0.5^{p=0.481}$
Total acute referrals	0.08	0.05	$3.39^{p=0.066}$	0.09	0.03	$5.81^{p=0.016}$	0.06	0.06	$0.00^{p=0.059}$	0.13	0.06	$0.9^{p=0.344}$	0.07	0.04	$2.56^{p=0.110}$
Suicide attempts															
Total outpatient hours	12.2	2.67	$34.45^{p=0.000}$	14.3	3.46	$21.67^{p=0.000}$	4.21	1.95	$0.91^{p=0.340}$	8.59	1.54	$14.64^{p=0.109}$	13.1	2.90	$27.24^{p=0.000}$
Inpatient admissions	0.21	0.06	$14.86^{p=0.000}$	0.23	0.06	$10.73^{p=0.001}$	0.12	0.07	$0.72^{p=0.397}$	0.36	0.08	$4.01^{p=0.381}$	0.17	0.06	$7.58^{p=0.022}$
Totalt inpatient days	7.5	2.5	$7.9^{p=0.005}$	9.0	1.4	$17.4^{p=0.000}$	1.5	3.52	$0.23^{p=0.633}$	15.0	3.34	$3.22^{p=0.074}$	6.45	2.34	$4.81^{p=0.118}$
Total acute referrals	0.16	0.05	$14.78^{p=0.000}$	0.18	0.04	$17.95^{p=0.000}$	0.09	0.06	$0.22^{p=0.638}$	0.38	0.04	$9.28^{p=0.229}$	0.13	0.05	$6.81^{p=0.009}$
Self-harm															
Total outpatient hours	6.1	2.42	$13.1^{p=0.000}$	8.42	2.98	$10.52^{p=0.001}$	2.31	1.95	$0.12^{p=0.732}$	4.92	1.15	$8.54^{p=0.004}$	6.41	2.66	$9.85^{p=0.002}$
Inpatient admissions	0.15	0.05	$18.98^{p=0.000}$	0.15	0.04	$8.60^{p=0.003}$	0.14	0.05	$12.22^{p=0.000}$	0.18	0.08	$1.19^{p=0.276}$	0.14	0.04	$14.14^{p=0.000}$
Total inpatient days	4.71	2.2	$5.16^{p=0.023}$	5.04	0.98	$9.51^{p=0.002}$	4.16	3.23	$0.24^{p=0.622}$	7.74	3.32	$0.95^{p=0.330}$	4.3	2.0	$3.99^{p=0.057}$
Total acute referrals	0.12	0.03	$19.47^{p=0.000}$	0.12	0.03	$12.51^{p=0.000}$	0.12	0.04	$7.38^{p=0.092}$	0.17	0.05	$2.45^{p=0.119}$	0.11	0.03	$15.15^{p=0.000}$

Note: Statistical analysis: one-way ANOVA

‡Patient data from the Norwegian Patient Registry

4.4 Suicidal behaviour in adolescence as a predictor of later mental health problems in young adulthood.

Table 4 The association between suicidal thoughts in adolescent and mental healthcare use‡ in young adulthood, adjusted for adolescent sociodemographic, psychosocial support, psychosocial stress and mental health (Final model: n=3232)

		Mental healthcare use in young adulthood
Adolescent factors	**n**	**Odds ratio (95% CI) / R^2**
Model 0	3841	R^2 = .045
Suicidal thoughts		2.55 (2.11 - 3.07)$^{p<.001}$
Model 1 – Model 0 + Sociodemographic:	3527	R^2 = .062
Suicidal thoughts		2.38 (1.94 - 2.93)$^{p<.001}$
Female gender		1.20 (0.97 - 1.48)$^{p=.090}$
Sami		0.84 (0.60 - 1.18)$^{p=.322}$
Higher parental education		0.87 (0.77 - 0.99)$^{p=.030}$
Family income		0.73 (0.63 - 0.84)$^{p<.001}$
Model 2 – Model 1 + Psychosocial supportive factors:	3404	R^2 = .076
Suicidal thoughts		2.17 (1.74 - 2.71)$^{p<.001}$
Female gender		1.25 (1.00 - 1.56)$^{p=.051}$
Sami		0.86 (0.61 - 1.22)$^{p=.394}$
Higher parental education		0.87 (0.77 - 0.99)$^{p=.034}$
Family income		0.78 (0.67 - 0.91)$^{p=.002}$
Self-efficacy		0.96 (0.92 - 0.99)$^{p=.026}$
Parental support		1.03 (0.99 - 1.07)$^{p=.193}$
Parental involvement		1.01 (0.96 - 1.06)$^{p=.631}$
Peer support		1.07 (1.02 – 1.12)$^{p=.010}$
Final model - Model 2 + psychosocial stress and mental health):	3219	R^2 = .091
Suicidal thoughts		1.76 (1.38 - 2.26)$^{p<.001}$
Female gender		1.01 (0.85 - 1.39)$^{p=.496}$
Sami		0.88 (0.61 - 1.26)$^{p=.484}$
Higher parental education		0.86 (0.75 - 0.98)$^{p=.022}$
Family income		0.81 (0.69 - 0.95)$^{p=.009}$
Self-efficacy		0.98 (0.94 - 1.03)$^{p=.451}$
Parental support		1.00 (0.96 - 1.04)$^{p=.970}$
Parental involvement		1.01 (0.96 - 1.06)$^{p=.728}$
Peer support		1.06 (1.00 – 1.12)$^{p=.035}$
School-related stress		1.10 (1.03 - 1.17)$^{p=.003}$
Adverse life events		1.03 (0.97 - 1.10)$^{p=.326}$
Anxiety/depression		1.39 (1.09 - 1.78)$^{p=.008}$

Note: Statistical analyses: Hierarchical binary logistic regression.
‡Patient data from the Norwegian Patient Registry.

Table 4 shows the prediction of mental healthcare use in young adulthood with suicidal thoughts in adolescence as the main predictor. The odds ratio (OR)=2.55 (CI=2.11-3.07) for

suicidal thoughts in the unadjusted model 0, and when adjusting for the sociodemographic and psychosocial factors, the OR=1.76 (CI=1.38-2.26) in the final model. The strongest predictor was the main predictor suicidal thoughts, followed by school-related stress, anxiety/depression, family income, higher parental education and peer support. Gender and Sami ethnicity was not significant in the final model.

Table 5 The association between suicide attempts in adolescent and mental healthcare use[‡] in young adulthood, adjusted for adolescent sociodemographic, psychosocial support, psychosocial stress and mental health (Final model: n=3229)

		Mental healthcare use in young adulthood
Adolescent factors	**n**	**Odds ratio (95% CI) / R^2**
Model 0	3833	R^2 = .041
Suicide attempts		3.58 (2.78 - 4.60)$^{p<.001}$
Model 1 – Model 0 + Sociodemographic:	3520	R^2 = .060
Suicide attempts		3.18 (2.43 - 4.17)$^{p<.001}$
Female gender		1.30 (1.05 - 1.59)$^{p=.014}$
Sami		0.86 (0.61 - 1.21)$^{p=.377}$
Higher parental education		0.87 (0.77 - 0.98)$^{p=.026}$
Family income		0.72 (0.62 - 0.83)$^{p<.001}$
Model 2 – Model 1 + Psychosocial supportive factors:	3400	R^2 = .074
Suicide attempts		2.75 (2.06 - 3.67)$^{p<.001}$
Female gender		1.34 (1.08 - 1.67)$^{p=.008}$
Sami		0.86 (0.61 - 1.22)$^{p=.410}$
Higher parental education		0.87 (0.77 - 0.99)$^{p=.032}$
Family income		0.77 (0.66 - 0.90)$^{p=.001}$
Self-efficacy		0.95 (0.91 - 0.99)$^{p=.015}$
Parental support		1.02 (0.98 - 1.07)$^{p=.239}$
Parental involvement		1.02 (0.97 - 1.07)$^{p=.479}$
Peer support		1.07 (1.02 – 1.13)$^{p=.005}$
Final model - Model 2 + psychosocial stress and mental health):	3216	R^2 = .088
Suicide attempts		1.98 (1.44 - 2.73)$^{p<.001}$
Female gender		1.13 (0.89 - 1.44)$^{p=.325}$
Sami		0.89 (0.62 - 1.28)$^{p=.543}$
Higher parental education		0.86 (0.75 - 0.98)$^{p=.027}$
Family income		0.81 (0.69 - 0.95)$^{p=.008}$
Self-efficacy		0.98 (0.94 - 1.03)$^{p=.406}$
Parental support		1.00 (0.96 – 1.04)$^{p=.892}$
Parental involvement		1.01 (0.96 – 1.07)$^{p=.617}$
Peer support		1.06 (1.01 – 1.12)$^{p=.028}$
School-related stress		1.10 (1.04 – 1.17)$^{p=.002}$
Adverse life events		1.03 (0.97 – 1.10)$^{p=.329}$
Anxiety/depression		1.46 (1.15 – 1.87)$^{p=.002}$

Note: Statistical analyses: Hierarchical binary logistic regression.
‡Patient data from the Norwegian Patient Registry.

Table 5 shows the prediction of mental healthcare use in young adulthood with suicide attempts in adolescence as the main predictor. The OR=3.58 (CI=2.78-4.60) for suicide attempts in the unadjusted model 0. When adjusting for the sociodemographic and psychosocial factors, the OR=1.98 (CI=1.44-2.73) for suicide attempts in the final model. The strongest predictors were suicide attempts, followed by school-related stress, anxiety/depression, family income, higher parental education and peer support. Sami ethnicity and gender were not significant in the final model.

Table 6 The association between self-harm in adolescent and mental healthcare use‡ in young adulthood, adjusted for adolescent sociodemographic, psychosocial support, psychosocial stress and mental health (Final model: n=3232)

		Mental healthcare use in young adulthood
Adolescent factors	**n**	**Odds ratio (95% CI) / R^2**
Model 0	3836	R^2 = .037
Self-harm		2.39 (1.98 – 2.89)$^{p<.001}$
Model 1 – Model 0 + Sociodemographic:	3526	R^2 = .057
Self-harm		2.23 (1.83 – 2.73)$^{p=<.001}$
Female gender		1.33 (1.09 – 1.63)$^{p=.006}$
Sami		0.85 (0.60 – 1.20)$^{p=.346}$
Higher parental education		0.87 (0.77 – 0.98)$^{p=.027}$
Family income		0.71 (0.62 – 0.83)$^{p<-001}$
Model 2 – Model 1 + Psychosocial supportive factors:	3404	R^2 = .070
Self-harm		2.01 (1.62 – 2.50)$^{p<.001}$
Female gender		1.38 (1.11 – 1.72)$^{p=.003}$
Sami		0.86 (0.61 – 1.23)$^{p=.410}$
Higher parental education		0.87 (0.77 – 0.99)$^{p=.031}$
Family income		0.77 (0.66 – 0.90)$^{p=.001}$
Self-efficacy		0.95 (0.92 – 0.99)$^{p=.020}$
Parental support		1.03 (0.99 – 1.07$^{p=.189}$
Parental involvement		1.01 (0.96 – 1.06)$^{p=.820}$
Peer support		1.08 (1.02 – 1.13)$^{p=.004}$
Final model - Model 2 + psychosocial stress and mental health):	3219	R^2 = .086
Self-harm		1.55 (1.22 – 1.98)$^{p<.001}$
Female gender		1.15 (0.90 – 1.46)$^{p=.263}$

Sami	0.88 (0.61 – 1.26)$^{p=.490}$
Higher parental education	0.86 (0.75 – 0.98)$^{p=.025}$
Family income	0.80 (0.69 – 0.94)$^{p=.008}$
Self-efficacy	0.98 (0.94 – 1.03)$^{p=.448}$
Parental support	1.00 (0.96 – 1.04)$^{p=.891}$
Parental involvement	1.01 (0.96 – 1.06)$^{p=.814}$
Peer support	1.06 (1.01 – 1.12)$^{p=.025}$
School-related stress	1.10 (1.04 – 1.17)$^{p=.002}$
Adverse life events	1.04 (0.97 – 1.11)$^{p=.253}$
Anxiety/depression	1.48 (1.16 – 1.88)$^{p=.001}$

Note: Statistical analyses: Hierarchical binary logistic regression.
‡Patient data from the Norwegian Patient Registry.

Table 6 shows the prediction of mental healthcare use in young adulthood with self-harm in adolescence as the main predictor. The OR=2.39 of self-harm in the unadjusted model 0. When adjusting for sociodemographic and psychosocial factors, the OR=1.55 for self-harm in the final model. The strongest predictor in the final model was self-harm, followed by anxiety/depression, school-related stress, family income, higher parental education and peer support. Gender and Sami ethnicity were not significant in the final model.

5 Discussion

5.1 Main results

The results show that suicidal behaviour in adolescence significantly increases the use of mental healthcare in young adulthood. Suicidal thoughts, suicide attempts and self-harm act as the strongest predictors of mental healthcare use in young adulthood.

Females reported more suicidal behaviour in adolescence than males, and they had a higher use of mental healthcare in young adulthood. However, gender was not a significant predictor of the use of mental healthcare. The indigenous Sami reported more suicidal thoughts, while suicide attempts, self-harm and the use of mental healthcare were not significantly different from the non-Sami. Sami ethnicity was not a significant predictor of the use of mental healthcare in young adulthood.

5.2 Methodological strengths and limitations

The main strength in this thesis is the high response rate in the NAAHS study, resulting in a 68% sample of all the adolescents in Northern Norway, including the indigenous Sami in the same study. Another strength is the linkage to the NPR, which is a high quality national patient registry. This strengthens the collection of mental healthcare data. The sample was equally distributed between genders (Eckhoff et.al, 2017). These factors strengthen the generalizability and validity of the study. Altogether, this gives a representative sample of adolescents, followed into young adulthood in Norway.

In this thesis, only one cross-sectional study was linked to the NPR. This can act as a limitation because of the complexity of suicidal behaviour, and there is a possibility that other

factors at a later point in time may have influenced the associations found in this study (Eckhoff et.al, 2017).

This study had several limitations. The NAAHS was based on a self-reporting questionnaire. This could be a source of recall bias, and result in over- or under reporting by the adolescence. Another issue that can influence the validity of the study is the fact that not all scales were time-limited. This limits the validity about which factors mediates for each other, and it is unknown which factors that appeared first. Some of the scales are not frequently used in other researches, which could make it difficult to replicate the findings of this study (Eckhoff et.al, 2017). The HSCL-10 scale to measure symptoms of anxiety/depression was limited to the past week, which could have affected the number of adolescents reporting anxiety/depression symptoms.

The sample consisted of a relatively low number of indigenous Sami (9.2%). If the sample of indigenous Sami is representative for the population in Northern Norway are difficult to predict, since there are no public records of the number of Sami`s living in Norway (Berntsen et.al, 2011).

Not all variables in this study are normally distributed. Independent of this fact, this thesis can be able to give reliable statistical analysis on the background of the central limit theorem (Katz et.al, 2014) with a high number of participants and a relatively high response rate. Pallant (2013) also support this, and describes that in a lot of research, the dependent variable will not be normally distributed. Most of the statistical techniques to compare groups are reasonably tolerant of this assumption, and with a large enough sample (30+) it should not cause a problem (Pallant, 2013).

The participants had the opportunity to answer yes or no to all the questions about suicidal behaviour, so one participant could have reported more than one suicidal behaviour. This

means that in the suicidal thoughts analysis for example, there will be a mix of participants with only suicidal thoughts, together with those who also reported self-harm and/or suicide attempts. Because of this, the results from suicidal thoughts, suicide attempts and self-harm does not independently represent the respective suicidal behaviour, since some of the adolescents with suicidal thoughts will also be in the more extreme group of suicide attempters. However, in the real life these factors are connected, and it would not be representative to make three groups independent of each other.

5.3 Suicidal behaviour and mental healthcare use

As much as 34 percent of the adolescents in the study reported suicidal thoughts, and 30 percent reported self-harm. Out of these participants, 1 of 5 (21.1%) had been in contact with mental healthcare in young adulthood. This means that the majority (4 of 5) of the adolescents with suicidal thoughts and self-harm did not have any contact with mental healthcare in young adulthood. For suicide attempts, almost 1 of 3 of the 9 percent reporting suicide attempts in adolescents had contact with mental healthcare in young adulthood. This indicates that even though the results show that suicidal behaviour in adolescence increases the odds of using mental healthcare, the majority of the adolescents with suicidal behaviour do not have contact with mental healthcare in young adulthood. One theory behind this could be that many adolescents struggle with suicidal behaviour in adolescence due to age-related factors and other factors, and not necessarily severe mental health problems or mental disorders. Age-related factors could for example be puberty, which involves mental- and bodily changes, the paradox of both detachment and dependency of their parents, group pressure and "finding themselves". The transition between being a child and an adolescent/young adult can be demanding, and it would not be unlikely that this could contribute to suicidal behaviour for some adolescents. Those remaining in need of mental healthcare in young adulthood may be

those with more severe mental health problems and/or mental health disorders. This is, however, only a theory, since it could not be further explored in this thesis due to limitations in the thesis.

If we consider the suicide rate in Northern Norway of 12 per 100.00 population (Norgeshelsa, 2017), not many of the adolescents in the study will have committed suicide, seen from a statistically perspective. However, we see that the adolescents with suicidal behaviour have a significant increased use of both inpatient treatment, outpatient treatment and acute referrals in young adulthood compared to adolescents without suicidal behaviour. This strengthens the importance to address the issue of suicidal behaviour in in adolescence, both because of the fact that many adolescents struggle with their mental health, and to prevent suicidal behaviour and poor mental health in adolescence to follow in to the adult life and cause a need of specialized mental healthcare.

Suicidal thoughts and suicide attempts gave a nearly 2 times higher odds of using mental healthcare in young adulthood, and self-harm gave a 1.5 times higher odds, when adjusting for sociodemographic and psychosocial factors. This is consistent with several other similar studies, with significant associations between suicidal behaviour in adolescence and increased odds of adverse mental health and suicidal behaviour in adulthood (Reinherz et.al, 2006: Herba et.al, 2007: Fergusson et.al, 2005). Herba et.al (2007) found that suicidal thoughts in childhood (11 years or younger) was highly predictive of suicidal thoughts, mood disorders and anxiety disorders in young adulthood. Reinherz et.al (2006) found that adolescents with suicidal thoughts were 12times more likely to have tried to commit suicide before the age of 30. According to Fergusson et.al (2005) suicidal thoughts and suicide attempts in adolescence also increases the risk of suicidal behaviour and major depression in adulthood. None of the

latter studies explored the same outcome as this thesis of mental healthcare use in young adulthood, but we can assume that participants using mental healthcare in young adulthood, do so because of a mental health problem of some kind. However, it is not a matter of course that all participants struggling with suicidal behaviour receive mental healthcare treatment, since not all persons with suicidal behaviour seek help (Bruffaerts, Demyttenaere et.al, 2011).

5.3.1 Gender differences

Females reported 2 times more suicidal thoughts, 3.8 times more suicide attempts and 1.5 times more self-harm in adolescence than their male peers. Females also had a 1.5 times higher use of mental healthcare than males. Non-lethal suicidal behaviour is known to be more frequent in females (O`Connor & Nock, 2014), and the NIPH (2017) states that approximately 3 times more females have attempted suicide than males. This is in agreement with the results in this master thesis, although results from the northern Norway adolescents in this study show a slightly higher difference between genders, with adolescent females reporting even more suicide attempts than their male peers. Females also had a strong association between suicidal behaviour in adolescence and inpatient, outpatient and acute treatment, while males did not have this strong association. Why we see these differences could not be explored any further in this thesis due to limitations of the study. A theory may be that we do not see a significant association in males because we have a to low number of males with suicidal behaviour in the study, that they have less suicidal behaviour and use of mental healthcare in general than females, or that mental health problems with the need of treatment comes later in life for males. However, gender is not a significant predictor of the use of mental healthcare in young adulthood, when sociodemographic and psychosocial factors are adjusted for. This is also an interesting fact, because of the gender paradox within suicidal behaviour and suicides, where females have more suicidal behaviour than males, and

males commit more suicides in general (Bridge et.al, 2006). On the background of the gender paradox, one could think that females would have a higher use of mental healthcare, but the baseline characteristics show that females only had a significantly higher use of outpatient treatment hours than males. Males had a slightly higher, but not significant, mean than females in the amount of total inpatient days. This shows that females seek outpatient treatment more often than males, and it could give an indication of males seeking help at a more critical point where more inpatient treatment days is necessary. The latter is however a theory, but the results show that the difference between gender is compensated for somewhere in the adjusting process.

5.3.2 Ethnic differences

Indigenous Sami living in northern Norway were not worse off than the non-Sami`s in terms of adolescent suicidal behaviour and use of mental healthcare in young adulthood in this study. The only exception is that Sami adolescents reported more suicidal thoughts than the non-Sami`s, however, Sami`s did not have a higher use of mental healthcare than the non-Sami in the same group. This is in agreement with Silviken & Kvernmo (2007), which did not find a significant difference in suicide attempts between Sami adolescents and the majority adolescents. This contrasts with other indigenous populations around the world, and in the arctic north. Greenlandic Inuits are known to have higher suicide rates than other industrialized Western countries (Bjerregaard & Lynge, 2006), and studies have shown that the Russian Nenets and Alaskan Natives have substantially higher suicide rates than the non-indigenous population (Sumarokov et.al, 2014; Wexler et.al, 2008). Suicide rates is a different measurement of mental health than suicidal behaviour, but with increased suicide rates we can also assume that suicidal behaviour, especially suicidal thoughts and suicide attempts among the respective population also will be increased. Several studies states that the direct causes of

the high rates of suicidal behaviour and suicides among indigenous populations are hard to directly point out, but a mix of colonisation and the indigenous populations being forced to adjust and integrate into the modern society seems to be an important factor (Leenaars, 2006; Bjerregaard & Lynge, 2006). Studies that compare indigenous populations to non-indigenous populations show that there are some similar risk factors between the ethnicities, and some risk factors that work very different, and nearly opposite between the ethnicities. One example of this is that the Russian Nenets living in urban areas had a lot higher suicide rate than the Nenets living in rural areas. This contradicts with the rest of Russia, where the suicide rates are lower in urban areas (Sumarokov et.al, 2014). For the Greenlandic Inuit's living in Denmark, language competence was shown to be a factor when it comes to suicidal thoughts. Inuit's speaking both the Greenlandic and Danish language had less suicidal thoughts compared to Inuit's only speaking Danish or the Greenlandic language (Bjerregaard & Lynge, 2006). Among the indigenous Sami in northern Norway, risk factors of suicide attempts such as suicidal thoughts, anxiety/depression and eating behaviour problems were common with the non-Sami. In addition to this, the indigenous Sami had increased risk factors of suicide attempts when diverging from the traditional and cultural Sami norms, like living in a single parent home, alcohol intoxication and paternal overprotection (Silviken & Kvernmo, 2007). It seems, however, like the situation of suicidal behaviour for the Sami population is far better than other indigenous populations, despite the fact that the indigenous Sami in Norway, like other indigenous populations, also have a past of forced modernization and suppression. After world war 2, Norway decided to work against the ongoing assimilation politic, and instead work towards the indigenous Sami being able to live as Sami in the Norwegian society (Gaski, 2016). Silviken & Kvernmo (2007) states that the Norwegian society has moved forward the past three decades, and that Sami`s are not as socially disadvantaged as other indigenous populations may be. Sami`s living in Norway are also

more culturally equal to the majority, which might explain why we do not see major differences in suicidal behaviour between the indigenous Sami and the majority (Silviken & Kvernmo, 2007). This is a very important point in terms of global indigenous health.

5.3.3 Other considerations

Several of the adjusting factors were also significant predictors of later mental healthcare use, and the OR of the main predictors of suicidal behaviour decreased when the adjusting factors was entered. This indicates that the risk of using mental healthcare later in life is a complex phenomenon put together by several risk and protective factors, and that even though suicidal behaviour is presence, the contribution of sociodemographic, psychosocial and mental health factors is important.

We see from this study that suicidal behaviour in adolescence increases the odds of using mental healthcare in young adult life. This knowledge can be important in the work of designing and implementing good intervention and prevention programs to reduce both suicidal behaviour in adolescence and later need of mental healthcare.

6 Conclusion

We see that many adolescents struggle with suicidal thoughts, suicide attempts and self-harm, which acts as indicators for future mental healthcare use. Nevertheless, the majority of the adolescents in the study do not use mental healthcare as young adults. Suicidal behaviour among adolescents is, however, an issue that needs to be taken seriously to be able to avoid mental healthcare use in adulthood, that could have been prevented at an earlier stage. Early detection of suicidal behaviour and early intervention are keywords in this work. An important finding in this study was that indigenous Sami were overall not worse off than the non-Sami, and the Sami seem to have less suicidal behaviour than other arctic indigenous populations. This is important in a global health perspective, and with more knowledge around why the Sami population have less suicidal behaviour than other indigenous populations, other nations could extract what they believe is relevant knowledge in the work of reducing suicidal behaviour in their indigenous populations.

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Appendix

Table 7 Choosing the adjusting and confounding factors for the binary logistic regression analysis

	Suicidal thoughts			Suicide attempts			Self-harm		
Variables (means)	Yes	No	F-test	Yes	No	F-test	Yes	No	F-test
School related stress	8.09	6.78	$414.09^{p=0.000}$	8.67	7.09	$203.69^{p=0.000}$	8.12	6.84	$362.32^{p=0.000}$
Adverse life events	3.62	2.33	$474.15^{p=0.000}$	4.42	2.61	$325.57^{p=0.000}$	3.66	2.39	$420.41^{p=0.000}$
Parental involvement	7.08	6.10	$169.05^{p=0.000}$	7.70	6.31	$122.47^{p=0.000}$	7.34	6.05	$280.75^{p=0.000}$
Parental support	8.30	6.61	$332.64^{p=0.000}$	9.57	6.95	$283.73^{p=0.000}$	8.50	6.64	$378.29^{p=0.000}$
Self-efficacy	14.06	15.14	$152.76^{p=0.000}$	13.54	14.89	$84.94^{p=0.000}$	14.16	15.03	$89.85^{p=0.000}$
Peer support	5.79	5.50	$18.78^{p=0.000}$	5.84	5.58	$5.66^{p=0.042}$	5.75	5.54	$9.32^{p=0.003}$
Anxiety/depression	1.82	1.30	$1174.34^{p=0.000}$	2.10	1.41	$648.69^{p=0.000}$	1.78	1.34	$678.45^{p=0.000}$

Statistical analysis: one-way ANOVA with p-values from the Welch and Brown-Forsythe tests.