

Religion and Health in Arctic Norway—The association of religious and spiritual factors with non-suicidal self-injury in the Sami and non-Sami adult population—The SAMINOR 2 Questionnaire Survey

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ABSTRACT

Research has found psychological dimensions of religiosity/spirituality (R/S) beneficial against non-suicidal self-injury (NSSI), whereas the effect of R/S social aspects is less studied. Using data from the SAMINOR 2 Questionnaire Survey (2012, n=10,717 ages 18–69; response rate: 27%; non-Sami: 66%; females: 55%), we examined the association of R/S—religious attendance, congregational affiliation, Laestadian family background, religious importance/view of life—with NSSI in the adult Sami and non-Sami population of Arctic Norway. We also applied multivariable-adjusted regression models and mediation analyses to explore how religious participation transmits its effect on NSSI through violence exposure and symptoms of anxiety and depression. Across ethnicities, 3.3 percent (n=355) reported lifetime NSSI—ranging from 1.2 percent among Laestadians to 7.7 percent in unaffiliated. Regular religious attendance had a significant negative total effect on NSSI (OR=0.59).

Keywords: NSSI; religion; religious attendance; Sami; indigenous; Laestadianism; SAMINOR 2

Introduction

While the effect of religiosity/spirituality (R/S) on *suicide behavior* has received considerable attention since the days of Durkheim (Gearing & Alonzo, 2018), its association with *non-suicidal self-injury* (NSSI) has seldom been studied (Haney, 2019). NSSI is an independent condition defined as the direct, deliberate and socially

deviant destruction of one's body tissue in the absence of lethal intent (American Psychiatric Association, 2013). One of the strongest predictors of suicide behavior (Ribeiro et al., 2016), recurring NSSI (>6 times) causes a nine-fold increase in the risk of suicide attempts in adults (Whitlock et al., 2013). A recent review found NSSI prevalences ranging from four to 47 percent—peaking among adolescents, young adults, and females—and its typical debut between the ages of 12 and 14 (Cipriano et al., 2017). Leading causes of NSSI are physical, sexual, and emotional child maltreatment and neglect (Brown et al., 2018; Cipriano et al., 2017), partly mediated by anxiety disorders and depression (Brown et al., 2018).

There are few studies on NSSI among indigenous peoples (Gholamrezaei et al., 2017). Among the US ethnic groups, Native Americans have the highest NSSI frequencies across ages (Kuentzel et al., 2012; Monto et al., 2018; Vaughn et al., 2015), possibly explained by lower socioeconomic status and the prior suppression and genocide of indigenous peoples (Gholamrezaei et al., 2017). In the Norwegian Arctic Adolescent Health Study among 10th graders in North Norway (2003–05, n=4,881), the NSSI lifetime prevalence in the Sami population was not significantly different from that in non-Sami peers (30%) (Eckhoff et al., 2019). The study confirmed findings from 1990 on self-harm irrespective of suicidal intent among 487 Sami and non-Sami 13–16-year-old adolescents in Finnmark County—a Sami core area in Arctic Norway (Kvernmo & Rosenvinge, 2009). On the contrary, a register study (1970–98) showed the adult Sami of Arctic Norway had a higher suicide mortality rate (peaking among males aged 15 to 24) compared to non-Sami; however, the rate was not significantly higher in the nomadic reindeer-herding Sami (Silviken et al., 2006). Furthermore, recent data from the SAMINOR 2 Study (2012) revealed a higher prevalence of NSSI risk factors like anxiety, depression, post-traumatic stress symptoms, and childhood

exposure to emotional, physical, and sexual violence among Sami compared to non-Sami (Eriksen et al., 2018). Culturally based and religious self-mutilation rituals are well-known in other regions (Favazza, 2011); however, to our knowledge, they are not recorded in a Sami context. In a clinical setting, religiously motivated self-mutilation may occur in psychotic individuals (Favazza, 2011).

The association of R/S factors with NSSI

Contemporary scholars apply a multilevel-multidimensional definition of R/S encompassing aspects of culture, identity, relationship, and practice (Oman, 2013). A recent meta-analysis (15 samples; 24,767 participants aged 13–92) found a negligible negative correlation between NSSI and R/S ($r=0.1$, $p<0.01$) (Haney, 2019). There was a weak positive relationship between NSSI and doubt about divine care and the conviction of divine abandonment or punishment (Buser et al., 2017). However, only psychological dimensions of R/S, such as belief and coping, were presented in the included studies (Haney, 2019), which failed to consider any possible effects of its sociological or interpersonal aspects.

Although studied among only adolescents, social support is associated with lower odds of both NSSI and suicidal behavior (Forster et al., 2020). Accordingly, attending religious, social events protects against both future major depression (Balbuena et al., 2013) and completed suicides (Kleiman & Liu, 2018), whereas R/S importance and view of life do not influence such developments (Balbuena et al., 2013; Kleiman & Liu, 2018). To our knowledge, the association of religious participation with NSSI is unexplored.

The association between R/S and mental health in indigenous Sami areas

The teetotal Laestadian revival movement is a vital religious and social factor in large sections of the Sami people (Kristiansen, 2005; Langås-Larsen et al., 2018), presumably causing the higher religious attendance rate and less alcohol consumption in Sami municipalities in Finnmark County (Larsen & Saglie, 1996; Spein et al., 2011). In the 1994–95 North Norwegian Youth Study, Laestadian affiliation and religious importance were associated with both less drinking and more abstinence among both Sami and non-Sami 15–19-year-old high school students (Spein et al., 2011). However, there was more experimental smoking among the Laestadian-affiliated Sami in the study (Spein et al., 2004). Furthermore, an epidemiological study conducted in Finnmark in 1990 found poorer self-rated health among adult Laestadians compared to non-Laestadian Established Church-affiliated (Årnes et al., 1996); however, the study did not control for ethnicity. In the SAMINOR 2 Study from 2012, Laestadian adherence or family background (pooled measure) was associated with higher lifetime exposure to violence among women when adjusted for sociodemographics, including Sami self-ascription. The findings were only border-significant among males (Eriksen et al., 2015).

Aims

We wished to examine the lifetime NSSI frequencies and the association between R/S and NSSI in the adult Sami and non-Sami population of Arctic Norway. We also wanted to test whether religious attendance transfers its effect to NSSI through anxiety, depression, and lifetime violence exposure, which are among the most potent NSSI risk factors (Brown et al., 2018; Cipriano et al., 2017).

Methods

Procedure and sample

Religion and Health in Arctic Norway used data from the second survey of the Population-based Study on Health and Living Conditions in Regions with Sami and Norwegian Populations—The SAMINOR 2 Questionnaire Survey. The survey (following the SAMINOR 1 Survey, conducted in 2003–2004) was conducted in 2012 by the Centre for Sami Health Research, UiT—The Arctic University of Norway—aiming to explore the health and living conditions in the Sami and non-Sami populations (Brustad et al., 2014). All inhabitants between 18 and 69 years old in 25 municipalities or districts with Sami settlements in Central and Northern Norway were invited (response rate 27%—below 11% in those 30 and younger). After excluding respondents without information regarding ethnicity, religiosity, self-injury, or suicide attempts, the study sample included 10,717 participants—66.2 percent being non-Sami and 55.5 percent females (Figure 1 and Table 1).

Figure 1.

Table 1.

Instruments and variables

NSSI—outcome variable

NSSI was tapped by the question "Have you injured yourself deliberately?"—with the possible answers being "Yes, during the past year," "Yes, earlier," and "No, never"—and the results were pooled into a dichotomous lifetime NSSI variable. A corresponding

question tapped suicide attempts. We excluded those respondents who reported attempts or who failed to answer.

Indicators of R/S—independent variables

We applied four measures of general R/S (see points 1–4 below) suitable for a religiously homogenous Norwegian study population dominated by traditional Lutheranism—particularly the Established Church (Sørensen, Lien, et al., 2012). Three variables focus on sociological aspects, including Laestadian adherence and family background (Spein et al., 2004), and one variable combines the view of life (atheist, agnostic, or belief in a god) and religious importance (religious or not-so-devoted believer, point 4).

(1) The attendance rate during the past six months at a (a) church, (b) congregation house, or (c) other religious building: Reported separately as "more than three times a month," "1–3 times a month", "1–6 times", or "never." We categorized the total participation rate as "regularly" (once per month or more often—rural church services usually being held once or twice a month (Norwegian Centre for Research Data, 2017)), "irregularly" (1–6 times), or "never or rarely."

(2) Personal affiliation with one or more religious groups or fellowships of belief—five variables: "Established Church," "Laestadian congregation," "other religious congregation," "non-religious denomination," and "not a member of any denomination"—the reference groups being all other categories.

(3) Point 2 was repeated for grandparents and both parents, yielding a variable of Laestadian family background by at least one parent or grandparent vs. other family backgrounds.

(4) The view of life and importance of religious belief was divided into four categories (i–iv) (Spein et al., 2011): (i) "I am a believer/confessing or personally Christian" ("religious"); (ii) "I believe there is a god, but religion is not so important in my everyday life" ("less devoted believer"); (iii) "Unsure" (iv); "I do not believe there is any god" ("non-believer").

Sociodemographic control variables

The sociodemographics included sex, age, education level (1–9 years; 10–12 years; 13–15 years; and >15 years, Table 1), total household gross income (<301,000 NOK; 301,000–750,000 NOK; and >750,000 NOK), living arrangement (living with somebody or alone), municipality, and ethnicity. The ethnicity report included home language (respondent, parents, and all grandparents), ethnic background (respondent and both parents), and self-ascription with multiple options (Norwegian, Sami, Kven, and "other"). The final ethnic categories were "non-Sami" (mainly ethnic Norwegians), "Sami self-ascription," and "Sami background without Sami self-ascription," considering the effect of assimilation (Minde, 2005).

Health-related risk factors

We employed two variables accounting for the leading causes of NSSI (Brown et al., 2018; Cipriano et al., 2017):

(1) Lifetime exposure to emotional, physical, or sexual violence: Reported separately and respectively for the past year, earlier in adulthood, and during childhood, and finally merged into a dichotomous variable of lifetime violence exposure (Eriksen et al., 2015).

(2) Anxiety and depression symptoms: Defined as a Hopkins Symptom

Checklist-10 score above the clinical cut-off level (1.85) during the past four weeks (Strand et al., 2003). The instrument and its cut-off level are validated for Norwegian and Sami populations, as well as subgroups having Sami family background without Sami self-ascription (Sørliet et al., 2018).

Statistical analyses

Using Stata version 16 and a significance level of five percent, we applied χ^2 tests and pairwise comparisons with ANOVA to compute differences across categorical and continuous variables. Mixed-effect logistic regression models—including sociodemographic and health-related risk factors—estimated the association of religious participation with NSSI. We added municipality as a random effect in the analyses, taking local clusters of NSSI and assumed but unmeasured differences into account. To adjust for age-dependent NSSI recall bias, we used a logistic regression model of reporting lifetime NSSI as a function of age, then computed the inverse-probability weights (IPW) (Seaman & White, 2013). In the IPW method, for participants reporting NSSI, the weight is equal to the reciprocal of the predicted probability of recounting NSSI. For participants not recounting NSSI, the weight is equal to the reciprocal of the predicted probability of not reporting NSSI. Thus, the oldest responders reporting NSSI and the youngest responders not recounting NSSI received more weight in the analysis. We tested our regression models with and without the IPW term, the unweighted model being the main model presented in this paper.

Through mediation analyses, we could study the mechanisms by which religious attendance affects NSSI. Mediation analysis examines the potential pathways through which a predictor influences an outcome. These pathways are intervening variables or mediators, at least partially transmitting the effect to the response variable (Lachowicz

et al., 2018). It is important to note that mediation analysis cannot prove causality and requires some necessary fundamental conditions, such as association, temporal precedence of the cause before the effect, isolation of confounders, and no interaction effects of predictors and mediators (Lachowicz et al., 2018). Thus, our mediation model presupposed that the religious participation rate during the past six months corresponded to a lifelong pattern, a premise having some evidence (Hayward & Krause, 2013). We likewise presumed that clinical levels of anxiety and depression symptoms through the past four weeks represented anxiety and depression earlier in life (Brown et al., 2018). The first step of the mediation analysis was to establish a conceptual model showing how violence exposure (M_1) and symptoms of anxiety and depression (M_2) potentially mediate the effect of religious attendance (X_n) on NSSI (Y) (Hayes, 2017). Sociodemographic factors (C_{1-6}), being potential confounders, were included in the model, comprising one direct (c') and two mediated indirect effect paths of interest (a_1b_1 and a_2b_2). The total effect of religious participation on NSSI—adjusted for sociodemographic factors—is the sum of the impact of the direct and indirect paths ($a_1b_1 + a_2b_2 + c'$, Figure 2). For the mediation analyses, regression models estimated the adjusted effect of religious attendance on anxiety and depression symptoms and violence exposure, respectively. We reported the effect size of the mediated indirect effect of religious participation on NSSI as a ratio of the total sociodemographics-adjusted effect (Alwin & Hauser, 1975).

Figure 2.

Ethical considerations

The Norwegian Regional Committees for Medical and Health Research Ethics approved the study (reference code 2006/1766/REK nord).

Results

Sample description

The total sample had a mean 3.3 percent lifetime prevalence of NSSI—albeit significantly higher among females (4.7%) than males (1.6%, Table 1)—but the corresponding female and male figures among 18–29-year-olds were 20.2 percent (n=851) and 4.6 percent (n=461), respectively (not tabulated). Post hoc pairwise comparisons showed significant differences between all age groups, except for the two oldest. The gender and age patterns were cross-ethnic findings (not tabulated).

There was an extremely strong correlation between being a regular attendee (vs. non- or rare attendee) and religious self-ascription (vs. non-believer, $\Phi=0.77$, $p<0.001$ —these and the following numbers not tabulated). Laestadian family background was moderately correlated with Sami self-ascription or origin (vs. non-Sami, $\Phi=0.34$, $p<0.001$), religious self-ascription (vs. non-believer, $\Phi=0.30$, $p<0.001$), and adherence to a Laestadian congregation ($\Phi=0.35$, $p<0.001$). There was a weak correlation between Laestadian family background and regular attendance (vs. no or rare participation, $\Phi=0.20$, $p<0.001$). Laestadian adherence was moderately correlated with religious self-ascription (vs. non-believer, $\Phi=0.33$, $p<0.001$) and regular participation (vs. no or rare attendance, $\Phi=0.27$, $p<0.001$). Being unaffiliated was weakly correlated with no or rare attendance (vs. regular attendance, $\Phi=0.20$, $p<0.001$). Among the Laestadians, 80.7 percent reported an additional affiliation with the Established Church. The corresponding figures were 16.7 percent among the other religiously affiliated, 11.4 percent in the non-religiously affiliated, and 10.3 percent in the unaffiliated.

***The association of sociodemographic and health-related variables with NSSI—
bivariate analyses***

Lifetime NSSI was significantly associated with younger age, female gender (4.7%), low household income (5.8%), anxiety and depression symptoms (15.2%), and lifetime prevalence of exposure to violence (7.0%, Table 1). The education level was not related to NSSI after stratification on age groups. Although being of possible clinical relevance, the slightly higher NSSI prevalences among the Sami categories, compared to the non-Sami, comprised a statistically insignificant difference.

The association of religious factors with lifetime NSSI—bivariate analyses

Being unaffiliated was the R/S factor most associated with lifetime NSSI (7.7%, Table 2), whereas Laestadian adherence was most negatively related (1.2%). However, a meager number of Laestadians reporting NSSI (n=5), no or rare attendance (n=14), and being unsure or having no religious belief (n=14) hampered stratification by these R/S factors and age groups. Laestadian family background was also significantly less associated with NSSI but not after stratification by age groups. Post hoc pairwise comparisons revealed a significantly higher NSSI prevalence among non-believers (5.7%, not tabulated) compared to all other categories but no significant differences between being religious, a less devoted believer, or unsure. Furthermore, being a non- or rare attendee (4.7%, Table 2) was significantly associated with NSSI, compared to regular (2.3%) and irregular (3.1%) attendance.

Table 2.

Mediation analysis of the effect of religious attendance on NSSI via violence exposure and anxiety and depression symptoms

Compared to no or rare attendance, there was a significant negative total effect of regular attendance on NSSI (OR=0.59, adjusted for sociodemographics, Figure 3).

Regular attendance's direct negative impact, however, was only borderline significant (OR=0.70, $p=0.048$, Table 3—insignificant in the IPW model).

Although we found a strong significant association between lifetime violence exposure and NSSI (OR=3.18) and anxiety and depression symptoms (OR=3.59), there was no significant association between religious participation and violence exposure. However, we found a robust negative association between regular attendance and anxiety and depression symptoms (OR=0.71), which in turn had a strong association with NSSI (OR=4.53). The findings suggested a highly significant mediating effect of regular attendance via less anxiety and depression symptoms, accounting for 95 percent of the impact of religious participation on NSSI (Figure 3). In a separate analysis for all denominations, we found that Laestadian adherence had a significant and beneficial association with NSSI (OR = 0.32 [95% CI 0.13–0.80], not tabulated), adjusted for sociodemographic factors.

Being female was a significant risk correlate for NSSI (OR=2.09), whereas older age (OR=0.91) and high household income (OR=0.66) were protective correlates (Table 3). Ethnicity showed no significant effect on NSSI. Finally, there were no significant interaction effects between religious attendance rate and age, gender, or ethnicity. Including IPW did not change the main findings.

Table 3.

Figure 3.

Discussion

In a Sami and non-Sami population-based sample, *Religion and Health in Arctic Norway* revealed an overall 3.3 percent lifetime prevalence of NSSI across ethnicities. Regular attendees (2.3%) and Laestadian adherents (1.2%) had lower NSSI prevalences, whereas the occurrence was higher in non- or rare attendees (4.7%) and unaffiliated (7.7%). These findings are in line with an extensive review by Bonelli and Koenig (2013), indicating a positive association between R/S and better mental health (Bonelli & Koenig, 2013). Even after adjustment for sociodemographics, there was still a negative association between regular attendance and NSSI, seemingly fully mediated by fewer anxiety and depression symptoms.

The significant negative association (OR=0.71) of religious attendance with anxiety and depression symptoms is in line with findings from another cross-sectional Norwegian population-based study (Sørensen, Danbolt, et al., 2012) and its well-known protective effect on both major depression (Balbuena et al., 2013) and completed suicides (Kleiman & Liu, 2018). While our results support childhood maltreatment being the leading cause of NSSI (Cipriano et al., 2017; Whitlock et al., 2013) mediated by depression and anxiety (Brown et al., 2018), there was no relationship between religious participation and violence exposure. The findings may indicate that religious attendance moderates the effect of childhood maltreatment on self-injury. NSSI typically functions as a regulator of internal emotions, thoughts, or sensations (Taylor et al., 2018)—being a powerful distraction method from intense cycles of rumination and negative affect (Bentley et al., 2014)—as self-punishment or as an expression of distress (Taylor et al., 2018). Our results suggest a buffering effect of the social resources

indicated by religious activity, making the individuals less vulnerable to maladaptive coping behaviors and the development of pathological long-term effects (Forster et al., 2020). For example, in adolescents, perceived social support from peers and teachers mitigates the impact of maltreatment and parental dysfunction—when considering NSSI and suicidal behavior—and this protective effect increases with the number of support sources (Forster et al., 2020). Also, the anticipation or perception of support from R/S fellowships—being significantly more likely social sources of help in times of need (Merino, 2014)—is associated with less suicidal behavior, indicating that the comfort of just *knowing* about this available support seems to strengthen mental health (Hovey et al., 2014). Furthermore, research shows that individuals are more likely to choose alternative behaviors over NSSI if they are engaging in more active occupations or socializing as opposed to being passive (Nock et al., 2009). Nonetheless, our study did not include any explicit measures of social support. Even our religious attendance variable only measured activities during the past six months. To fit our findings with the buffering hypothesis, we presupposed that religious activity was unchanged since childhood. Furthermore, both Laestadians and many other religious groups endorse norms against alcohol and substance use or abuse, being NSSI risk factors (Cipriano et al., 2017) not included in our models. Thus, social modeling of healthy behaviors in such settings might explain why high worship frequency is inversely associated with alcohol and drug dependence (Baetz et al., 2006). Religious attendance might also be associated with socially adaptive religious coping strategies (involving, e.g., prayer and left out in this study) known to be negatively associated with NSSI, like finding God or a higher power a helpful partner during stress (Buser et al., 2017). On the other side, religious participation might be inversely related to maladaptive coping strategies associated with NSSI, like a person’s uncertainty about being the recipient of divine

love and worries about one's relationship with the divine (Buser et al., 2020; Buser et al., 2017), or the desire to maintain independence from the divine (Buser et al., 2020).

Concerning Laestadian adherence, it is appropriate to discuss its possible beneficial effect against NSSI because of its historical social and cultural significance, particularly among the Sami (Langås-Larsen et al., 2018). However, the low NSSI figure (n=355), the insufficient quantity of Laestadians (n=431), and the substantial intercorrelations of the R/S factors hindered the adjustment of more R/S variables. For example, the correlated religious attendance rate might explain NSSI's negative relation with Laestadian adherence and its positive association with denominational non-affiliation. Regardless, Laestadianism is not an NSSI risk factor in our sample, despite more violence exposure among females (Eriksen et al., 2015). However, the referred study did not adjust for Sami family background without Sami self-ascription, a category correlated with Laestadian affiliation, thus indicating a possible ethnic confounder. If we do suppose Laestadian influence causes religious anxiety and depression, further personal involvement in Laestadian communities will presumably reduce this religious stress. Diminished stress may, in turn, reduce the danger of resorting to the use of violence in interpersonal relations. Thus, religious participation in Laestadian communities might buffer the impact of violence exposure (Eriksen et al., 2015; Eriksen et al., 2018) and anxiety and depression (Eriksen et al., 2018) among the Sami, in the same way as R/S and strong social ties seem to buffer the effect of discrimination and acculturative stress among other ethnic minorities (Lai et al., 2017).

We presume that an individual's religious view of life would seek to integrate into the social dimensions of R/S, like religious attendance. Our findings, however, suggest no significant additional effect from being religious compared to being an agnostic. The relevance of social support might explain why R/S belief has shown no

significant independent impact on depression (Balbuena et al., 2013) or completed suicides (Kleiman & Liu, 2018) previously or on NSSI in our study.

Relative to non-Sami, the Sami NSSI figures were only slightly and insignificantly higher, following regional adolescent research (Eckhoff et al., 2019; Kvernmo & Rosenvinge, 2009) but contrasting with Native Americans (Kuentzel et al., 2012; Monto et al., 2018; Vaughn et al., 2015) and findings of more violence exposure, anxiety and depression symptoms (Eriksen et al., 2018), and suicides (Silviken et al., 2006) among the Sami. The higher figures among females and young adults in this study are also in agreement with a recent review (Cipriano et al., 2017). Furthermore, the effect of household income on NSSI is well-known (Lodebo et al., 2017; Vaughn et al., 2015), as well as the probable relationship between low socioeconomic status and multiple stressors increasing the predisposition to mental health disorders, including inadequate upbringing and social exclusion (Lodebo et al., 2017).

Strengths and limitations

The survey's meagre response rate (27%)—particularly in those younger than 30 (<11%), who most frequently report NSSI—might have caused a selection bias and raises the question of the external validity and generalizability of our study (Brustad et al., 2014). Still, SAMINOR 2 is the numeric most extensive population-based study of health and living conditions in Sami areas, tapping both R/S factors and NSSI and adding essential knowledge to the limited research field of indigenous peoples and NSSI (Gholamrezaei et al., 2017). However, because the questionnaire did not explicitly define self-injury as being non-suicidal, all suicide attempters—and thus probably also the more severe cases involving NSSI—were excluded from our sample. The strict inclusion criteria might explain the slightly lower NSSI prevalence (3.3%) relative to

other comparable studies (4–23%) (Cipriano et al., 2017). Furthermore, the main problem using a cross-sectional design is the inability to address reverse causality and possible bidirectional feedback effects. For example, depressive persons are less likely to attend religious services over time (Li et al., 2016). Finally, the debate about the role of religion is stronger than ever (Reaves, 2012). During the 1960s, secularization was usually seen as the inevitable byproduct of modernization (Berger, 1967). Since then, however, there has been a general resurgence of religion, in which human involvement in R/S has been strengthened, especially on the level of individual consciousness (Berger, 1999). This process has led to an increase in the significance of R/S. However, we do not expect this resurgence of R/S to affect the main findings of this study.

Conclusion

The results indicated regular religious attendance could be a possible protective factor against NSSI in the Sami and non-Sami Arctic population, feasibly mediating its effect through fewer anxiety and depression symptoms—probably connected to received or perceived social support. Confirmation by longitudinal studies, however, is recommended.

Funding: The project was supported by SANKS under grant numbers S 06-2017, S 12-2017, and S 06-2019 and by Finnmark Hospital Trust under grant number 2015/2236-2.

Conflicts of Interest: None of the authors has any conflicts of interest.

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Figure 1. Flow chart of inclusion—Religion and Health in Arctic Norway

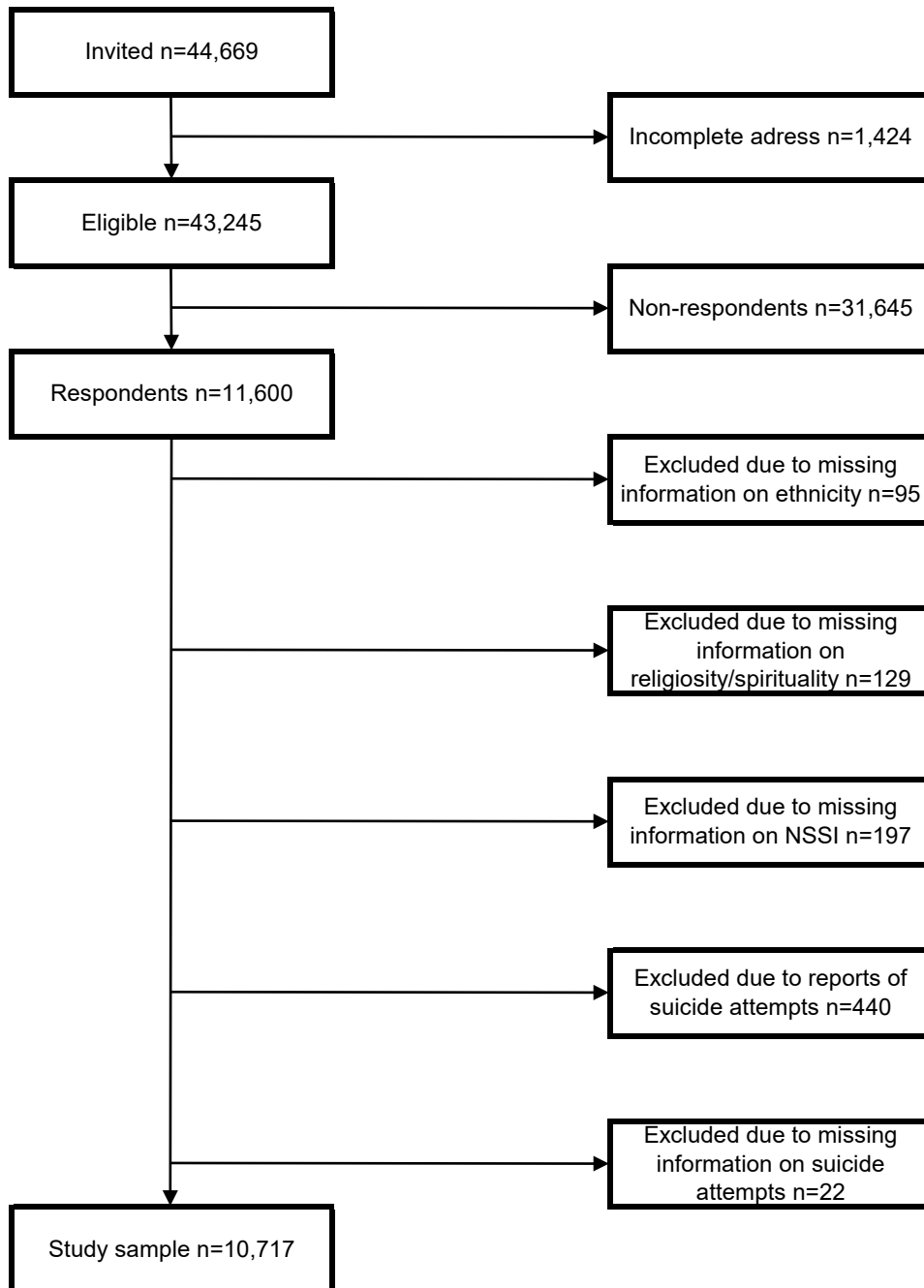


Figure 2. The conceptual mediation model showing how the effect of religion/spirituality on NSSI is potentially mediated by violence exposure and symptoms of anxiety and depression

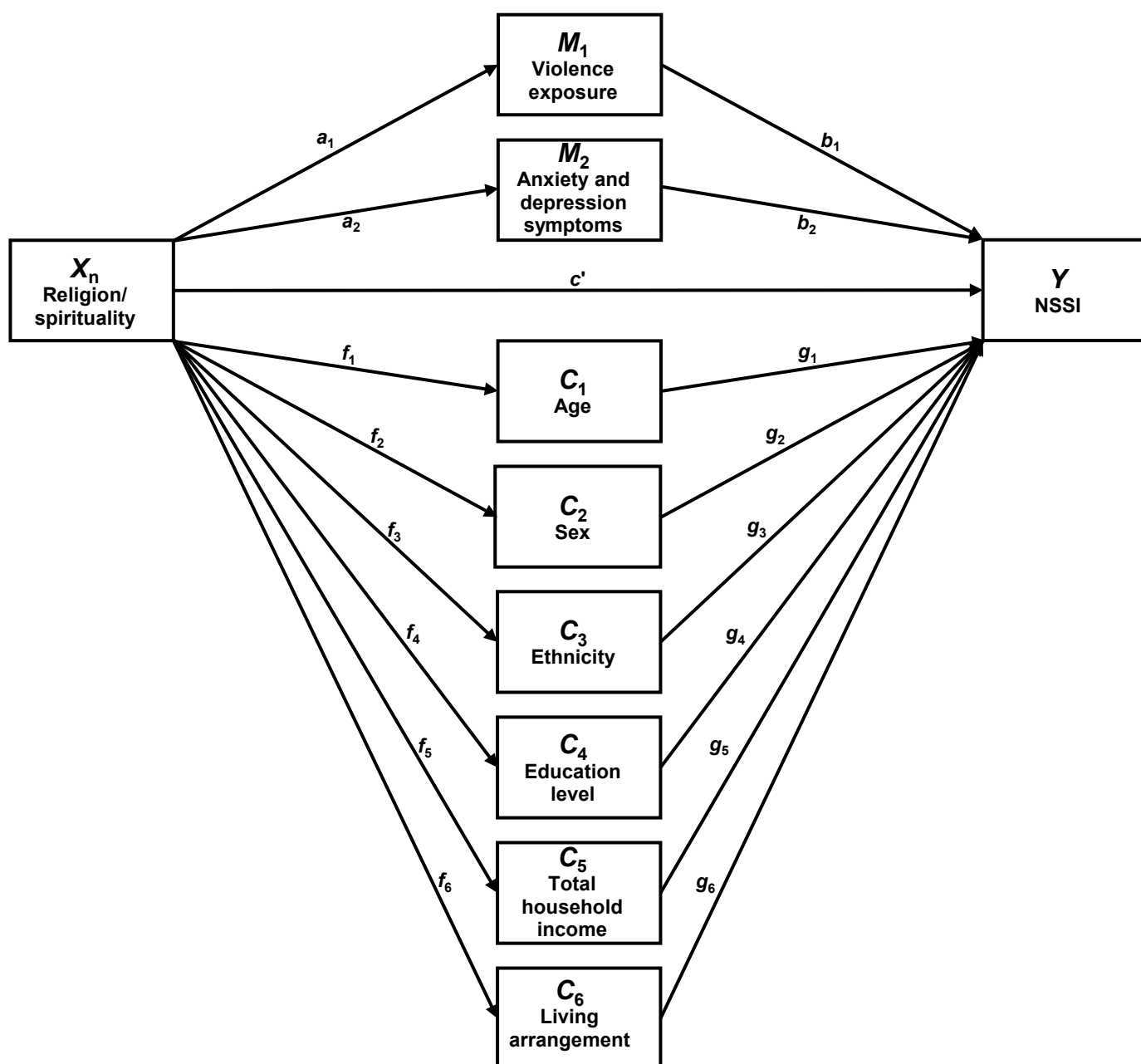
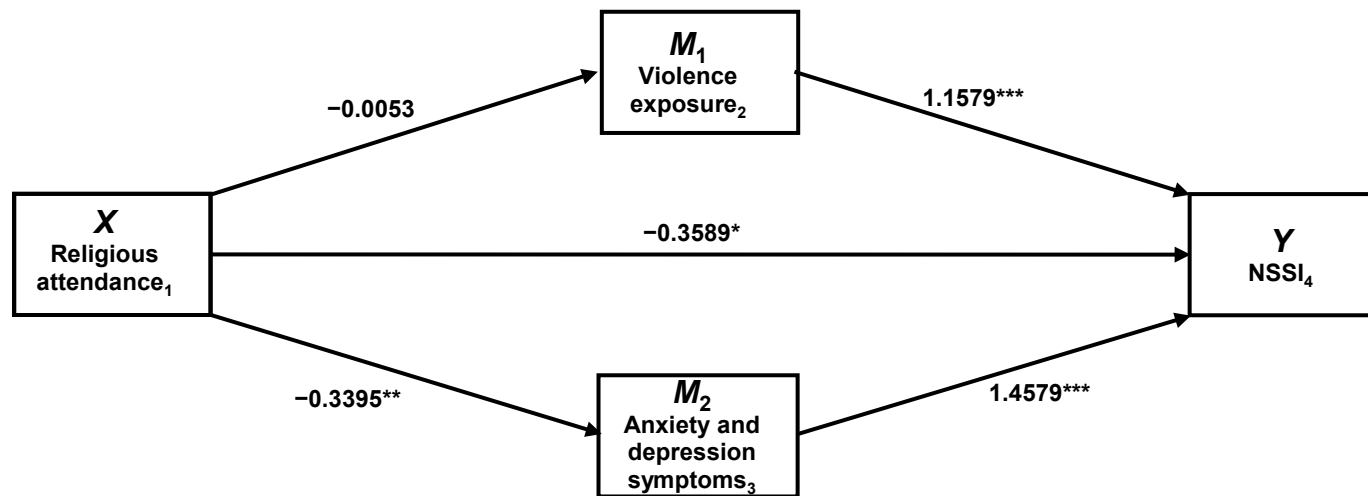


Figure 3. Mediation model showing the effect of religious attendance on NSSI as mediated by violence exposure and symptoms of anxiety and depression



Indirect effect on NSSI mediated by anxiety and depression symptoms: -0.4950**
 Total effect on NSSI adjusted for sociodemographic factors: -0.5230** (95% CI -0.8598--0.1863)
 Ratio of indirect effect of total effect: 0.95

The figure shows the effect of regular religious attendance, compared to non or rarely-attendance. Mixed-effect logistic regression coefficients are given. Adjusted for age, sex, ethnicity, education level, total household income, and living arrangement. Municipality is included as a random effect. For simplicity the confounders are not shown. Asterisks indicate significant paths (*p<0.05, **p<0.01, ***p<0.001). ¹At a church, congregation house, or religious building past 6 months. ²Lifetime—emotional, physical, and/or sexual. ³Hopkins Symptom Checklist-10 score above clinical cut-off level (1.85) during past 4 weeks. ⁴Lifetime non-suicidal self-injury excluding respondents reporting suicide attempts.

Table 1. Bivariate analyses of the association of control variables with lifetime

	Freq.	%	NSSI [‡]				X ²
			Yes (n=355)		No (n=10,362)		
			Freq.	%	Freq.	%	
Sociodemographic control variables							
Ethnicity							
Non-Sami self-ascription	7,095	66.20	220	3.10	6,875	96.90	2.9†
Sami self-ascription	2,153	20.09	80	3.72	2,073	96.28	
Sami back-ground without Sami self-	1,469	13.71	55	3.74	1,414	96.26	
Total	10,717	100.00	355	3.31	10,362	96.69	
Sex							
Male	4,773	44.54	76	1.59	4,697	98.41	79.5*
Female	5,944	55.46	279	4.69	5,665	95.31	
Total	10,717	100.00	355	3.31	10,362	96.69	
Age group							
18–29 years	1,312	12.24	193	14.71	1,119	85.29	712.8*
30–39 years	1,498	13.98	86	5.74	1,412	94.26	
40–49 years	2,460	22.95	53	2.15	2,407	97.85	
50–59 years	2,740	25.57	17	0.62	2,723	99.38	
60–69 years	2,707	25.26	6	0.22	2,701	99.78	
Total	10,717	100.00	355	3.31	10,362	96.69	
Education level (years)							
1° or lower 2° school (1–9)	1,580	14.89	32	2.03	1,548	97.97	39.6 ⁴
Upper 2° school (10–12)	2,877	27.11	71	2.47	2,806	97.53	
College or university (13–15)	2,769	26.09	139	5.02	2,630	94.98	
University (>15)	3,387	31.91	111	3.28	3,276	96.72	
Total	10,613	100.00	353	3.33	10,260	96.67	
Total household income¹							
Low	1,405	13.48	81	5.77	1,324	94.23	43.5*
Intermediate	5,579	53.54	191	3.42	5,388	96.58	
High	3,437	32.98	71	2.07	3,366	97.93	
Total	10,421	100.00	343	3.29	10,078	96.71	
Living arrangement							
Living with someone	8,891	83.58	290	3.26	8,601	96.74	0.7†
Living alone	1,747	16.42	64	3.66	1,683	96.34	
Total	10,638	100.00	354	3.33	10,284	96.67	
Health-related risk factors							
Anxiety and depression symptoms²							
No	9,266	90.28	196	2.12	9,070	97.88	473.1*
Yes	998	9.72	152	15.23	846	84.77	
Total	10,264	100.00	348	3.39	9,916	96.61	
Violence exposure³							
No	6,910	67.91	121	1.75	6,789	98.25	181.6*
Yes	3,265	32.09	227	6.95	3,038	93.05	
Total	10,175	100.00	348	3.42	9,827	96.58	

‡Non-suicidal self-injury—excluding respondents reporting lifetime suicide attempts.

Freq.=frequency; n=number of observations. Bold values represent cells having adjusted residuals of p-value≤0.05.

*p-value≤0.001.

†Not significant.

¹Gross income low: <301,000 NOK. Intermediate: 301,000–750,000 NOK. High: >750,000 NOK.

²Hopkins Symptom Checklist-10 score above clinical cut-off level (1.85) during past 4 weeks.

³Lifetime—emotional, physical, and/or sexual.

⁴Not significant after stratification on age groups.

Table 2. Bivariate analyses of the association of religious/spiritual factors with lifetime NSSI[‡]

	Freq.	%	NSSI [‡]		X ²			
			Yes (n=355) Freq.	%		No (n=10,362) Freq.	%	
Religious/spiritual factors								
Family background								
Laestadian family background	2,233	23.27	54	2.42	2,179	97.58	10.8**	
Other family background	7,364	76.73	286	3.88	7,078	96.12		
Total	9,597	100.00	340	3.54	9,257	96.46		
Congregational affiliation¹								
Established Church	8,984	86.46	257	2.86	8,727	97.14	38.7**	
Laestadian congregation	431	4.15	5	1.16	426	98.84	6.4*	
Other religious congregation	360	3.46	12	3.33	348	96.67	<0.1†	
Non-religious denomination	341	3.28	17	5.21	309	94.79	3.2†	
No denomination	873	8.40	67	7.67	806	92.33	57.5**	
Total	10,391	100.00	342	3.29	10,049	96.71		
Religious attendance rate²								
Never or rarely (not past 6 months)	2,946	27.77	137	4.65	2,809	95.35	24.9**	
Irregularly (1–6 times past 6 months)	5,216	49.17	162	3.11	5,054	96.89		*
Regularly (once pr. month or more past 6 months)	2,446	23.06	56	2.29	2,390	97.71		
Total	10,608	100.00	355	3.35	10,253	96.65		
Religious importance and view of life								
I do not believe there is any god	1,780	16.80	101	5.67	1,679	94.33	39.3**	
Unsure	2,002	18.89	69	3.45	1,933	96.55		
I believe there is a god, but religion is not so important in my everyday	5,121	48.32	137	2.68	4,984	97.32		*
Religious (I am a believer/confessing or personally Christian)	1,694	15.99	46	2.72	1,648	97.28		
Total	10,597	100.00	353	3.33	10,244	96.67		

[‡]Non-suicidal self-injury—excluding respondents reporting lifetime suicide attempts.

Freq.=frequency; n=number of observations. Bold values represent cells having adjusted residuals of p-value≤0.05.

*p-value≤0.05; **≤0.01; ***≤0.001; †not significant.

¹Multiple affiliations possible.

²At a church, congregation house, or religious building.

Table 3. Logistic regression coefficients for the presumed religious attendance-influence multiple mediator-model depicted in Figure 2

Antecedent	<i>M</i> ₁ Violence exposure ³			<i>M</i> ₂ Anxiety and depression symptoms ⁴			Y NSSI ¹					
	Coeff.	(95% CI)		Coeff.	(95% CI)		Coeff.	(95% CI)				
X Religious attendance rate² (ref. never or rarely [not past 6 months])	<i>a</i> ₁			<i>a</i> ₂			<i>c</i> '					
Irregularly (1–6 times past 6 months)	-0.0892	(-0.1974 –	0.0191)	-0.2177	(-0.3816 –	-0.0538)	-0.1515	(-0.4232 –	0.1203)			
Regularly (once pr. month or more past 6 months)	-0.0053	(-0.1342 –	0.1237)	-0.3395	(-0.5419 –	-0.1372)	-0.3589	(-0.7153 –	-0.0025)			
<i>M</i>₁ Violence—lifetime exposure³ (ref. no exposure)												
Yes	—	—	—	1.2779	(1.1309 –	1.4249)	<i>b</i> ₁	1.1579	(0.8974 –	1.4184)		
<i>M</i>₂ Anxiety and depression symptoms⁴ (ref. no symptoms)												
Yes	1.2783	(1.1312 –	1.4255)	—	—	—	<i>b</i> ₂	1.4579	(1.1938 –	1.7220)		
<i>C</i>₁ Age	-0.0019	(-0.0054 –	0.0017)	-0.0248	(-0.0302 –	-0.0194)	<i>g</i> ₁	-0.0965	(-0.1078 –	-0.0852)		
<i>C</i>₂ Sex (ref. male)												
Female	0.4458	(0.3510 –	0.5406)	0.3596	(0.2059 –	0.5132)	<i>g</i> ₂	0.7389	(0.4453 –	1.0325)		
<i>C</i>₃ Ethnicity (ref. non-Sami self-ascription)							<i>g</i> ₃					
Sami self-ascription	0.7538	(0.6369 –	0.8707)	0.1173	(-0.0552 –	0.2898)		-0.2060	(-0.5108 –	0.0988)		
Sami background without Sami self-ascription	0.4860	(0.3546 –	0.6175)	0.0218	(-0.1859 –	0.2296)		0.0707	(-0.2781 –	0.4194)		
<i>C</i>₄ Education level (ref. upper 2° school [10–12])							<i>g</i> ₄					
1° or lower 2° school (1–9)	-0.0243	(-0.1831 –	0.1345)	0.3034	(0.0717 –	0.5351)		0.1505	(-0.3575 –	0.6586)		
College or university (13–15)	0.1063	(-0.0217 –	0.2344)	0.0115	(-0.1836 –	0.2065)		0.1421	(-0.2032 –	0.4874)		
University (>15)	0.2950	(0.1708 –	0.4192)	-0.3081	(-0.5096 –	-0.1066)		0.1189	(-0.2350 –	0.4727)		
<i>C</i>₅ Total household income (ref. intermediate)							<i>g</i> ₅					
Low	0.2538	(0.1071 –	0.4004)	0.5992	(0.4047 –	0.7936)		0.0217	(-0.3098 –	0.3533)		
High	-0.1918	(-0.2988 –	-0.0847)	-0.5124	(-0.6951 –	-0.3296)		-0.4148	(-0.7258 –	-0.1037)		
<i>C</i>₆ Living arrangement (ref. living with someone)							<i>g</i> ₆					
Living alone	0.2146	(0.0824 –	0.3469)	-0.1457	(-0.3453 –	0.0540)		0.0078	(-0.3384 –	0.3540)		
Constant	<i>I</i> _{<i>M</i>₁}	-1.3694	(-1.6002 –	-1.1386)	<i>I</i> _{<i>M</i>₂}	-1.6262	(-1.9578 –	-1.2947)	<i>I</i> _{<i>Y</i>}	-0.7653	(-1.3225 –	-0.2081)

Mixed-effect logistic regression models applying log-likelihood estimation—municipality included as a random effect (95% confidence interval). Bold values are significant paths with p-value≤0.05.

¹Lifetime prevalence of non-suicidal self-injury—excluding respondents reporting suicide attempts.

²At a church, congregation house, or religious building past 6 months.

³Lifetime—emotional, physical, and/or sexual.

⁴Hopkins Symptom Checklist-10 score above clinical cut-off level (1.85) during past 4 weeks.