

# The health experience of the COVID-19 pandemic among the Sámi in Sweden: A cross-sectional comparative study

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*There is an international concern that the COVID-19 pandemic could have had serious effects on Indigenous peoples' livelihoods and health. To our knowledge, no research has been published regarding the impact of COVID-19 on the lives of the Sámi people. The aim of this study is to assess the health care and social experience of the pre-vaccine phase of the COVID-19 pandemic among the Sámi, in comparison with the national population, in Sweden.*

*Two population-based surveys, in the Sámi and the Swedish populations, were conducted between February and May 2021. In addition to sociodemographic and health information, a questionnaire regarding the health experience of COVID-19 designed by the Public Health Agency of Sweden was included. Both surveys targeted individuals aged 18–84 years and the participation rate was 40.9% in the Sámi study and 44.3% in the national study.*

*Based on the data collected, Sámi in Sweden seem to have been affected in a similar or even in a milder way than the national population during the pre-vaccine phase of the COVID-19 pandemic. Further studies are needed to explore the distribution of these outcomes among different Sámi subgroups. Register studies are also needed to evaluate the clinical (morbidity and mortality) impact of COVID-19 in the Sámi population.*

## Introduction

As colonial history has demonstrated, Indigenous populations are often disproportionately impacted by infectious diseases (Czyzewski, 2011; La Ruche et al., 2009). This has been, and is still, explained by several factors including inequalities in the social determinants of health, different

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immunity, supply shortages and lack of coordination and communication from governmental bodies. Consequently, during the coronavirus (COVID-19) pandemic concerns were raised that the disease could have serious effects on Indigenous peoples' livelihoods and health (Curtice & Choo, 2020; Power et al., 2020; Retter, 2020). So far, there is no evidence that these fears have come true on a universal scale. There are both examples of Indigenous groups who have suffered disproportionately more from the COVID-19 pandemic, e.g. in Brazil and the USA, and examples of Indigenous groups who have not, e.g. in Canada and Peru (Alves et al., 2022).

Politically, the Arctic is defined as the northernmost parts of the eight states who, since 1996, have been collaborating through the Arctic Council, including Alaska (USA), Northern territories (Canada), Greenland (Denmark), the whole of Iceland (Iceland), the counties of Nordland, Troms and Finnmark (Norway), the counties of Västerbotten and Norrbotten (Sweden), the whole of Finland (Finland), and the northernmost oblasts of Russia. More than 1,1 million Indigenous individuals live all over the Arctic region except in Iceland, and they belong to more than 40 different Indigenous peoples (Young & Bjerregaard, 2019).

The first case of COVID-19 in the Arctic was registered in late February 2020 in the Troms and Finnmark counties of Norway (Petrov et al., 2020). The first doses of vaccine were available in late December and increased vaccination occurred during spring 2021. In the pre-vaccine phase, incidence and death rates from COVID-19 were lower in the Arctic regions compared to other regions of the Arctic countries (Petrov et al., 2020), while the magnitude of the differences decreased in the post-vaccine phase, with higher incidence rates registered in Alaska, Northern Sweden and Northern Russia compared to central and southern regions in these countries (Tiwari et al., 2022). The USA, Russia and Sweden were also the countries with the highest measured COVID-19 incidences in the Arctic (Petrov et al., 2020; Tiwari et al., 2022), though differences in methodologies between nations may have affected the figures.

There is a lack of epidemiological information related to the COVID-19 pandemic among the Indigenous peoples of the Arctic (Petrov et al., 2021; Retter, 2020), including the Sámi people, who are the Indigenous people of northernmost Norway, Sweden, Finland and the Kola Peninsula of Russia (an area hereafter referred to as *Sápmi*) (Retter, 2020). In addition to Arctic parts of Sweden (Norrbotten and Västerbotten), Sápmi also includes the counties of Jämtland and Västernorrland (Figure 1).

The Swedish demography is skewed towards the south, with the highest population density around the three largest cities in southern Sweden, that is Göteborg and Malmö (south-west) and Stockholm (south-east) as shown in Figure 1. The Sámi demography is largely unknown as national registers do not record ethnicity, but estimates are around 100,000 of which 20,000–40,000 live in Sweden. While Sámi culture differs greatly in different parts of Sápmi, traditional Sámi sustenance includes reindeer herding, fishing, hunting, small-scale farming and arts. In Sweden, until 1993 national legislation only confirmed reindeer herding Sámi as genuine Sámi. This, in combination with forced delocalisations of Sámi in the early 1900s, still creates a lot of internal tension in Sámi society (Lantto, 2014). Today many Sámi live in large cities. These so-called City-Sámi have continued many aspects of a traditional Sámi lifestyle, for example in relation to consumption of traditional food and maintaining a high level of outdoor physical activity (Nilsson et al., 2011).

Typically, Sámi culture and family ties extend across the national borders of northernmost Scandinavia. In addition, reindeer herding also involves crossing national borders twice every year in connection with herd migration between winter and summer pastures. During the COVID-19 pandemic, Sweden received certain international attention for having milder lock-down restrictions compared to other countries (Paterlini, 2021). Despite this, Norway and Sweden agreed on an exception from the national border closing, allowing only reindeer-herding Sámi to cross the borders during the pandemic (Retter, 2020).

While different register-based studies on COVID-19 have been published in Sweden (Drefahl et al., 2020; Nordström et al., 2022; Sund et al., 2022), only one population-based survey describing the COVID-19 experience of the Swedish population has been published by the Public Health Agency of Sweden (Folkhälsomyndigheten, 2021).

To our knowledge, no empirical research has been published regarding the impact of COVID-19 on the lives of the Sámi people in Sweden or elsewhere in Sápmi. Thus, the aim of this study is to assess the health care and social experience of the COVID-19 pandemic among the Sámi in Sweden, in comparison with the general national population.

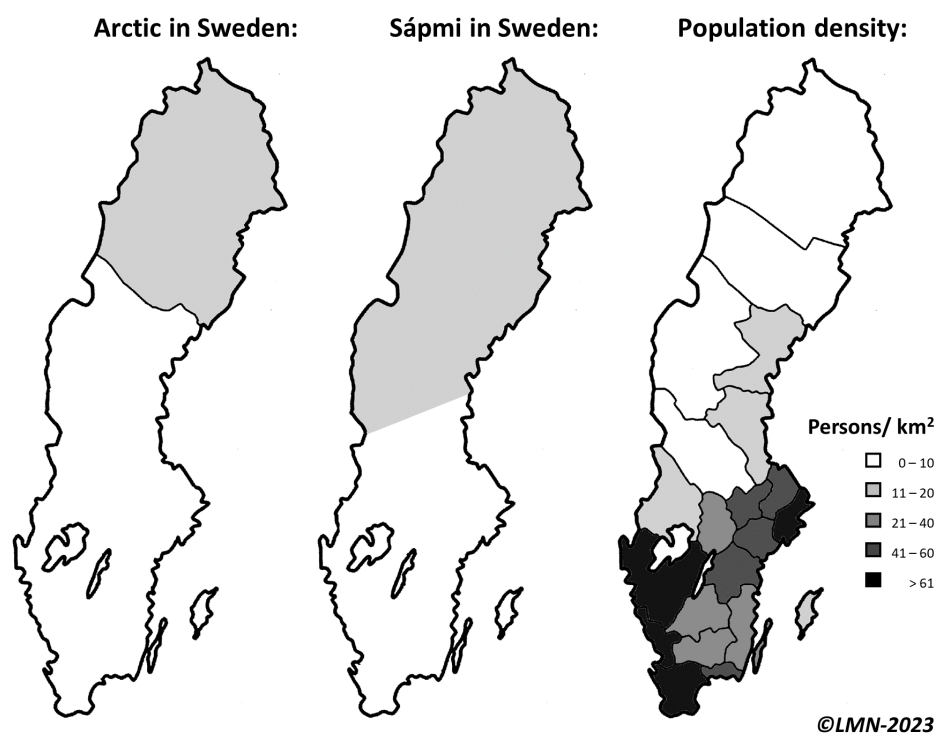


Figure 1: Arctic areas and Sápmi (traditional Sámi land) areas within the borders of Sweden, and population density by region (county) according to data from Statistics Sweden 2021.

## Methods

The questionnaire used for this study was mainly based on the Health on Equal Terms (HET) questionnaire developed by the Public Health Agency in Sweden since 2004. Since 2016 this survey is performed every second year. In 2021 an extra HET questionnaire was added to study the public health effects of the COVID-19 pandemic.

## Study design

Two population-based cross-sectional surveys, one among the Sámi (SámiHET) and the other among the general Swedish population (HET), were conducted between February and May 2021. In the SámiHET survey, Sámi persons identified through three partly overlapping registers were selected; the Sámi electoral roll ( $n = 8754$ ), the reindeer mark registry ( $n=4395$ ) and labour statistics based on administrative sources identifying persons with an income from reindeer herding ( $n=847$ ). Sámi persons randomly included in the national sample ( $n = 76$ ), or not available because of over-coverage ( $n=1055$ ) were excluded from the SámiHET study, leaving a targeted population of 9249 persons of whom 3658 responded. In the HET survey, a random stratified sample of

39859 Swedish citizens were invited of whom 20879 responded. In addition to sociodemographic and health information, a specific questionnaire regarding the health experience of COVID-19 designed by the Public Health Agency of Sweden was included. Both surveys targeted individuals aged 18–84 years and the participation rate were 40.9% in the Sámi study and 44.3% in the national study.

The HET questionnaire covered mainly health behaviours, work, psychosocial and social circumstances, and self-reported health conditions. In addition, using the unique personal identification number assigned to all Swedish citizens, the sample data were linked to national registers administered by Statistics Sweden to obtain demographical and socio-economic information. For instance, data regarding education were collected from the education register, and data of income, economic support, sickness benefits and pensions from the income and taxation register.

Both surveys (SámiHET and HET) used the same questionnaire to allow comparability. However, Sámi-specific sections were added in the SámiHET including questions on access to health care, exposure to violence, discrimination and racism, as well as Sámi identity and language. The geographical distribution of the participants differed between the two studies. In SámiHET 79.3 percent of the participants lived in the three northernmost regions of Sweden, while this proportion was much lower, only 6.4 percent, in the HET study (Stoor et al., 2023).

The SámiHET data collection procedures mimicked those of the national HET and Statistics Sweden conducted the data collection process and the different register linkages in both surveys. More detailed information about the national HET can be found on the Public Health Agency of Sweden webpage (Folkhälsomyndigheten, 2023) and elsewhere for the SámiHET (Stoor & San Sebastián, 2022)

## Measures

### *Health outcomes*

Taking an ‘outcome-wide epidemiological approach’ (VanderWeele, 2017), where several health outcomes are explored simultaneously, we asked nine questions to cover three health dimensions of the population’s experience with the COVID-19 pandemic, such as: (1) testing and access to care; (2) worries and loneliness; and (3) outdoor activities.

The first dimension of testing and access to care was captured by three questions. The variable (1.1) testing positive for COVID-19 was defined by answering ‘yes’ to the question: ‘Have you tested positive for COVID-19?’, contrasting this against the alternative answer ‘no’. The two variables, (1.2) avoiding seeking health care and (1.3) visit to health care cancelled, were defined as answering ‘yes, several times’ to the two questions ‘During the corona pandemic, have you avoided seeking care (e.g. health care, dental care, psychologist or maternity care)?’ and ‘During the corona pandemic, have you had a planned care visit cancelled by the care provider (e.g. health care, dental care, psychologist or maternity care)?’, respectively, contrasting this against the alternative answers ‘yes,’ ‘sometimes’ or ‘no’.

The second dimension concerning worries and loneliness was addressed by four questions. The two variables, (2.1) nervous of becoming sick and (2.2) nervous about others becoming sick were defined by answering ‘a lot’ or ‘quite a lot’ to the questions ‘To what extent during the corona pandemic have you been worried about becoming seriously ill yourself from COVID-19?’ and ‘To what extent have you been worried during the corona pandemic that someone close to you will become seriously ill from COVID-19?’, respectively, contrasting this against the alternatives ‘not at all’ and ‘to a certain degree’. The variable (2.3) experience of loneliness was defined by answering ‘yes’ to the question ‘Have you been bothered by loneliness and isolation during the corona pandemic?’, contrasting this against the alternative ‘no’ and the variable (2.4) experience of loneliness more than previously was defined by answering ‘more than before’ to the question ‘To

what extent during the corona pandemic have you been bothered by loneliness and isolation?', contrasting this against the alternatives 'less than before' and 'no difference'.

The third dimension of outdoor activities was addressed by two questions. The variable (3.1) being outdoors each day was defined by answering 'everyday' to the question 'During the corona pandemic, how often have you been outdoors in parks, natural or green areas (e.g. walking, cycling or working in the garden)?', contrasting this against the alternatives 'never', 'several times per year', 'several times per month' and 'several times per week'. The variable (3.2) being outdoors more than previously was defined by answering 'more than before' to the question 'How often have you been outdoors in parks, nature or green areas (e.g. walking, cycling or working in the garden) compared to before?', contrasting this against the alternatives 'less than before' and 'no difference'.

### *Covariates*

Throughout the analyses sex, age, civil status, education and economic level were used as covariates: a) sex was coded according to registered sex as man and woman; b) age was coded into four groups (18–29, 30–44, 45–64 and 65–84 years); c) marital status into married, unmarried and divorced/widowed; d) the level of education divided into compulsory, medium and postgraduate as characterised by Statistics Sweden; and e) the economic level was assessed by the individual's disposable income, defined according to Statistics Sweden.

### *Statistical analysis*

Frequency tables and percentages were used to present the descriptive characteristics of the population stratified by ethnicity. The prevalence of the different outcomes was then calculated and bivariate regression analyses between ethnicity and the nine different health outcomes were applied (model 0). Subsequent regression models including all the covariates (model 1) were then estimated. Prevalence ratios (PR) were used as the measure of effect with their 95% confidence intervals (95% CI) to provide inference. Given the potential differences by sex/gender across the health outcomes, all regression analyses were conducted separately for men and women. All analyses were conducted using R software.

### *Ethics*

In Sweden, no system exists for reviewing Indigenous research ethical aspects ahead of research. However, both the use of the national HET survey in the present study and the SámiHET study were approved by the Swedish Ethical Review (Dnr 2021-02398, and Dnr 2020-04803, Ö 70-2020/3.1 and Dnr 2021-06372-02, respectively). In addition, the SámiHET study was commissioned by the Sámi Parliament in Sweden, and continuous consultations with the mandated members of the board of the Sámi Parliament throughout the process were held. In October 2022, preliminary data from the SámiHET study, including some of the variables presented in this paper, were presented to the Sámi Parliament, and in February 2023 the same data were presented at a seminar open to the public at the Jokkmokk winter market, an important Sámi gathering with roots more than 400 years back in time.

## **Results**

In total 1590 Sámi men (43%) and 2068 Sámi women (57%) participated in the study along with 7909 men (46%) and 9312 women (54%) from the general Swedish population. Table 1 shows the population characteristics of the samples stratified by ethnicity. In both groups, there was a quite similar distribution of participants regarding sex, age and education with a higher participation of women, older ages and those who had finished secondary school (middle level of education). Differences however were found in the composition of the marital status and income variables. In the Sámi sample, a lower proportion of participants were married (42.67%) compared to the Swedish population (49.25%) with a similar proportion of divorced or widowed (around 16–17%). The Sámi earned, as average, less money than the Swedish population.

**Table 1:** Population characteristics in total and according to ethnicity, Sweden 2021

	Sámi (n=3,658)	National sample (n=17,221)	Total (n=20,879)
<b>Sex/gender</b>			
Men	1,590 (43.47)	7,909 (45.93)	9,499 (45.50)
Women	2,068 (56.53)	9,312 (54.07)	11,380 (54.50)
<b>Age (years)</b>			
18–29	364 (9.95)	1,956 (11.36)	2,320 (11.11)
30–44	768 (21.00)	3,130 (18.18)	3,898 (18.67)
45–64	1,402 (38.33)	5,953 (34.57)	7,355 (35.23)
65–84	1,124 (30.73)	6,182 (35.90)	7,306 (34.99)
<b>Marital status</b>			
Married	1,561 (42.67)	8,481 (49.25)	10,042 (48.10)
Unmarried	1,507 (41.20)	5,785 (33.59)	7,292 (34.93)
Divorced/Widowed	590 (16.13)	2,955 (17.16)	3,545 (16.98)
<b>Education level</b>			
High	1,043 (28.56)	5,203 (30.44)	6,246 (30.11)
Medium	2,176 (59.58)	9,529 (55.75)	11,705 (56.43)
Low	433 (11.86)	2,360 (13.81)	2,793 (13.46)
<b>Income (mean, SEK)</b>	270,968.6	306,060.6	299,898.2

Table 2 shows the prevalence of different health outcomes in men and women stratified for Sámi in Sweden and the national sample, and Table 3 shows the relationship between Sámi ethnicity and COVID outcomes by comparing Sámi in Sweden with a reference sample from the national HET survey. Here follows a description of these results according to the three dimensions of health investigated in relation to the COVID-19 pandemic.

#### *Testing and access to care*

Sámi reported a lower prevalence of having a COVID-19 positive test both in men (Sámi 8.5%, national sample 11.8%) and women (Sámi 8.1%, national sample 11.1%) than the national sample. This difference was statistically significant in both sexes (adjusted PR in men = 0.77; 95% CI: 0.64–0.93 and adjusted PR in women = 0.73; 95% CI: 0.62–0.86).

The pattern of avoiding seeking health care differed between Sámi men and women in relation to the national sample. Sámi men had a significantly lower prevalence of avoiding health care compared to the national sample (Sámi 4.4%; national sample 6.2%; adjusted PR = 0.71; 95% CI: 0.55–0.92), while Sámi women had a slightly higher prevalence of avoiding health care (Sámi 8.0%; National sample 7.1%), though not statistically significant.

No differences in the prevalence of how often visits to health care were cancelled, neither in men (Sámi, 2.2%; national sample 2.6%) nor in women (Sámi, 3.9%; national sample 3.6%) were found. Noteworthy, differences between the sexes were larger than differences between ethnicities, both regarding the prevalence of avoiding health care and the prevalence of cancelling visits to health care (Table 2).

**Table 2:** Prevalence (%) of the health outcomes by ethnicity in men and women, Sweden 2021

	Men		Women	
	Sámi	National sample	Sámi	National sample
<b>Testing and access to care</b>				
Tested positive to covid	8.5	11.8	8.3	11.1
Avoided seeking health care	4.4	6.2	8.0	7.1
Visit to health care cancelled	2.2	2.6	3.9	3.6
<b>Worries and loneliness</b>				
Nervous of becoming sick	22.1	17.2	28.0	26.2
Nervous about others becoming sick	48.5	42.4	61.9	54.9
Experience of loneliness	16.3	18.8	23.6	24.6
Experience of loneliness greater than previously	47.5	54.7	64.0	65.9
<b>Outdoor activities</b>				
Being outside each day	49.0	35.5	54.1	43.4
Going outside more than previously	14.0	20.5	22.8	29.2

### *Worries and loneliness*

Sámi men were more worried of being sick from COVID-19 compared to their counterparts (Sámi 22.1%, national sample 17.2%; adjusted PR = 1.19; 95% CI: 1.07–1.33), while there were no similar significant differences in women (Sámi 28.0%, national sample 26.2%). The prevalence of Sámi being worried about others becoming sick from COVID-19 was significantly higher both among men (Sámi 48.5%, national sample 42.4%; adjusted PR = 1.18; 95% CI: 1.11–1.25) and women (Sámi 61.9%, national sample 54.9%; adjusted PR = 1.13 95% CI: 1.08–1.17) compared to the national sample. In general, the worry that others would suffer from a serious illness during the pandemic was higher among Sámi as well as participants in the national sample, than the worry that they themselves would suffer.

The reporting of loneliness during the COVID-19 pandemic was not enhanced among Sámi, neither in men (Sámi 16.3%; national 18.8%) nor in women (Sámi 23.6%, national sample 24.6%). An experience of being lonely more often during the COVID-19 pandemic compared to before was reported by more than 50% of the participants. Sámi men reported an increase in loneliness significantly less frequently than the national sample (Sámi 47.5%, national sample 54.7%; adjusted PR = 0.88; 95% CI: 0.83–0.93), while no significant difference was found among women (Sámi 64.0%, national sample 65.9%).

### *Outdoor activities*

More Sámi reported spending extra time outdoors daily than the national sample both in men (Sámi 49%, national sample 35.5%; PR = 1.26; 95% CI: 1.19–1.34) and women (Sámi 54.1%, national sample 43.4%; PR = 1.23; 95% CI: 1.17–1.29). However, the proportion of Sámi who reported an increase in spending time outdoors compared to the pre-pandemic time was lower than the proportion in the national sample, both in men (Sámi 14%, national sample 20.5%; PR = 0.71; 95% CI: 0.63–0.82) and women (Sámi 22.8%, national sample 29.2%; PR = 0.76; 95% CI: 0.70–0.83).

**Table 3.** Relationship between ethnicity and covid outcomes, comparing Sámi in Sweden with a reference national sample. Prevalence ratios and their 95% confidence intervals (95% CI)

	Men		Women	
	Model 0 PR (95% CI)	Model 1 * PR (95% CI)	Model 0 PR (95% CI)	Model 1 * PR (95% CI)
Tested positive to covid				
No	1	1	1	1
Yes	0.72 (0.60–0.86)	0.77 (0.64–0.93)	0.75 (0.64–0.88)	0.73 (0.62–0.86)
Avoided seeking health care				
No	1	1	1	
Yes	0.71 (0.55–0.92)	0.71 (0.55–0.92)	1.12 (0.94–1.34)	
Visit to health care cancelled				
No	1		1	
Yes	0.83 (0.57–1.21)		1.08 (0.83–1.40)	
Nervous of becoming sick				
No	1	1	1	
Yes	1.29 (1.15–1.43)	1.19 (1.07–1.33)	1.07 (0.99–1.16)	
Nervous about others becoming sick				
No	1	1	1	1
Yes	1.14 (1.08–1.22)	1.18 (1.11–1.25)	1.13 (1.08–1.17)	1.13 (1.08–1.17)
Experience of loneliness				
No	1	1	1	
Yes	0.87 (0.76–0.98)	0.92 (0.81–1.04)	0.96 (0.87–1.05)	
Experience of loneliness greater than previously				
No	1	1	1	
Yes	0.87 (0.82–0.92)	0.88 (0.83–0.93)	0.97 (0.94–1.01)	
Being outside daily				
No	1	1	1	1
Yes	1.38 (1.30–1.47)	1.26 (1.19–1.34)	1.25 (1.19–1.31)	1.23 (1.17–1.29)
Going outside more than previously				
No				
Yes	1	1	1	1
	0.68 (0.60–0.78)	0.71 (0.63–0.82)	0.78 (0.72–0.86)	0.76 (0.70–0.83)

\*adjusted for age, marital status, education and income



## Discussion

In this population-based cross-sectional study we found both similarities and differences when comparing the experiences of the pre-vaccine phase of the COVID-19 pandemic in the Sámi people in Sweden (SámiHET) with participants in a national Swedish survey (HET). The lower prevalence of COVID-19 infection confirmed by a test among the Sámi in Sweden during the pre-vaccine phase corresponds with reports from Canada (Waldner et al., 2021), where Indigenous people in the initial stages of the pandemic had a significantly lower prevalence as well as fatality rates compared to the non-Indigenous Canadian population. Considering that most Sámi live in the Arctic parts of Sweden, our results may also mirror geographical differences in Sweden. In the pre-vaccine phase, the prevalence and case fatality ratio was lower in Arctic parts of Sweden compared to the non-Arctic parts (Petrov et al., 2020), though this was not consistent over time, with decreased differences between Arctic and non-Arctic parts of Sweden during the post-vaccine period (Tiwari et al., 2022). In addition, since the test capacity in Sweden was reported to be insufficient in the North during the pre-vaccine phase of the pandemic (Fredriksson & Hallberg, 2021), underreporting is more likely to have occurred in the national HET data than to data from the SámiHET. However, from a broader global perspective there are examples of the opposite, that is, Indigenous people who have suffered disproportionately more from the pandemic in comparison with the majority population (Alves et al., 2022). For example, in Brazil, COVID-19 related deaths among the Indigenous population were reportedly double that of the general population; and in the USA, the Navajo Nation surpassed New York in numbers of per capita COVID-19 cases (Curtice & Choo, 2020).

The pattern of repeatedly avoiding seeking health care and cancelling visits to health care did not differ much between Sámi in Sweden and the national sample, with a minor difference in Sámi men, who were less likely to repeatedly avoid seeking health care during the pre-vaccine period of the pandemic. In Sápmi, the average geographical distance to health care centres is larger than the national mean. This means that planned visits to health care centres are likely related to more severe health threats compared to areas with a shorter distance to a health care centre. This situation may have affected the relatively low prevalence of repeatedly avoiding or cancelling health care visits among the Sámi.

The higher prevalence of worrying about close friends, relatives and family suffering from disease among Sámi compared to the national sample is not surprising, when considering the strong importance of the extended family in Sámi culture (Kuokkanen, 2009). For example, because of this, the social stress that may result from social distancing may have increased worrying more among Sámi than in the general population. On the other hand, worrying about others during a state of societal crisis is not negative, but may be a sign that social networks remain functional and support resiliency. In fact, it could even be considered a positive reaction during a global health crisis, meaning that individuals are involved, empathic, and considerate for their important others. Indeed, our findings indicate that Sámi men experienced less loneliness and a lower increase in loneliness compared to Swedish men in general during the pre-vaccine phase of the pandemic. It may be that Sámi men were able to harness pre-existing social networks to mitigate negative social effects (loneliness) better than the general male Swedish Population. If so, that may have been an important boost for resiliency towards good mental health during the pandemic for Sámi men.

During the pandemic, the Swedish Public Health Agency promoted outdoor activities as a means of staying healthy (Folkhälsomyndigheten, 2021), and an increase in outdoor activities was considered a positive health outcome of the pandemic. We found that Sámi in Sweden reported a higher prevalence of daily outdoor activities and a lower prevalence of increasing these activities during the pandemic, compared to the general Swedish population. This is in line with previous studies showing that reindeer herding as well as non-reindeer herding Sámi in Västerbotten county have a higher level of leisure time outdoor activities compared to the non-Sámi population in

Västerbotten (Nilsson et al., 2011). The pre-existing high level of outdoor activities among Sámi might be a likely explanation for the lower level of increase in these activities compared to the national sample during the pre-vaccine phase of the COVID-19 pandemic. Regardless, the relatively stronger outdoor lifestyle of Sámi may have been an important hedge against negative health effects.

Taken together, we argue that our findings suggest that the Sámi in Sweden have experienced similar, but weaker, impacts during the pre-vaccine phase of the COVID-19 pandemic, compared to the general Swedish population with regards to the explored dimensions of this study. The relatively weaker impact among Sámi may be due to a combination of lower COVID-19 infection rates, less avoidance of using health care services and stronger access to health promoting aspects of Sámi culture, i.e. stronger social networks and more active outdoor lifestyles. However, due to a lack of longitudinal health data (pre-pandemic) among Sámi in Sweden (Stoor, 2016) it will be difficult to assess the degree to which this played a part in buffering Sámi health during the pandemic, using actual health outcomes – with the exception for COVID-19 morbidity and mortality (which can be assessed retrospectively using register data).

### **Methodological considerations**

The main strength of this study is the availability of data from both Sámi from all over Sweden and a national representative sample collected during the same period of time, and the use of identical questions with regards to the COVID-19 pandemic in both surveys, allowing comparability.

Differences in the geographical distribution of the participants of the SámiHET and the HET studies may have affected our results. Most Sámi live in the north while the general Swedish population is skewed towards the south. We cannot rule out the potential bias this may have added to our results. However, there are examples of studies where geographical matching of Sámi with their non-Sámi neighbours did not remove the health gap in focus (Hassler et al., 2005). The use of several outcomes, capturing different dimensions of exposure to the COVID-19 pandemic is also a strong asset of the study.

The moderate response rate to the surveys included in this study, that is 41–44%, may result in selection bias due to under-representation of men, young people and people with low education, as previously shown (Stoor & San Sebastián, 2022). There is also a risk of response bias, since participants may have understood the questions differently. One example of this is the question: ‘During the corona pandemic, how often have you been outdoors in parks, natural or green areas (e.g. walking, cycling or working in the garden)?’. This question is reflecting a modern life in a city to a greater extent than outdoor activities common among Sámi such as hunting, picking berries and herbs, fishing or hiking on skis or by foot or collecting material for arts, and herding. Finally, a limitation is the lack of data during the entire period of the pandemic. In Sweden, the vaccine level reached 80% by the end of the pandemic (Paterlini, 2021) and the experience of the post-vaccine period of the pandemic may differ from that in the pre-vaccination period.

### **Conclusion**

During the pre-vaccine phase of the COVID-19 pandemic, Sámi in Sweden seem to have been affected in a similar but weaker way than the national population. Further studies are needed to explore the distribution of these outcomes among different Sámi subgroups. Register studies will also be needed to evaluate the clinical (morbidity and mortality) impact of COVID-19 on the Sámi population.

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