



Short communication

Living conditions, lifestyle habits and health in the general population in spring 2020 and one year into the COVID-19 pandemic in Sweden – Results from two cross-sectional studies carried out in 2020 and 2021

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ARTICLE INFO

Keywords:

COVID-19
Health behaviour
Social factors
Health problems
Population studies

ABSTRACT

The aim of the study was to investigate mental and physical health as well as living conditions and lifestyle habits in the adult general population in spring 2020 and one year into the COVID-19 pandemic in Sweden comparing results from two cross-sectional studies carried out in February–May 2020 and 2021. The study population comprises 2,273 persons in 2020 and 2,216 persons in 2021 who responded to the national public health survey sent to random population samples in one county in Sweden. The age group was 16–84 years, and the response rates were 45% and 44%, respectively. Differences in living conditions (economic difficulties, social support and worrying about losing one's job), lifestyle habits (physical activity, daily smoking, sitting duration and alcohol use), and health (self-rated health, pain in shoulders or neck, sleeping difficulties, anxiety or worry, and obesity) between years 2020 and 2021 were analysed using multiple binary logistic regression in men and women, adjusting for age group and educational level. Very few statistically significant differences were observed between 2020 and 2021 regarding living conditions, lifestyle factors and health. The main finding was that the prevalence of anxiety and worry increased among women. Surveillance of the long-term public health consequences of the pandemic in the general population using robust data and methods, is important for planning and targeting preventive activities.

1. Background

The Public Health Agency of Sweden evaluated the consequences of the COVID-19 pandemic on public health in Sweden during 2020 based on national data and international research ([The Public Health Agency of Sweden, 2021](#)). Changes in lifestyle factors were observed, including people being less physically active and eating less vegetables but more snacks and sweets. People in socio-economically vulnerable areas and situations were particularly affected by the direct and indirect consequences of the pandemic. Previously, we compared those who responded to the national public health survey before and directly after the covid-19 outbreak in March 2020 in one county in Sweden ([Molarius and Persson, 2022](#)). The only differences observed then were that sleeping difficulties were less common and being worried about losing one's job was more common among those who responded after the outbreak. However, studies over several years are needed to investigate

the longer-term consequences of the COVID-19 pandemic.

The importance of monitoring mental disorders as well as risk factors such as unemployment, economic difficulties, alcohol consumption, and lack of social support in the population during the pandemic was emphasized by Gunnell et al ([Gunnell et al., 2020](#)). Since the early days of the pandemic, numerous studies have been published, including a review on the mental health effects of the pandemic ([Prati and Mancini, 2021](#)) and a rapid review on cardiovascular risk factors ([Freiberg et al., 2021](#)). Neither of these reviews included, however, studies from Sweden. In addition, as Freiberg et al ([Freiberg et al., 2021](#)) indicated, a high number of epidemiological studies on the impact on modifiable cardiovascular risk factors have been published, but only a few have used probability sampling methods. Many studies have been conducted only after the outbreak of the pandemic and based on questionnaires distributed via social media, leading to self-selection, and have therefore probably exaggerated the effects of the pandemic ([Hotopf et al., 2020](#)).

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<https://doi.org/10.1016/j.pmedr.2022.102093>

Received 18 May 2022; Received in revised form 16 December 2022; Accepted 17 December 2022

Available online 19 December 2022

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Epidemiologically robust methods, such as population studies based on random sampling and using the same questions before and after the outbreak of the pandemic, are therefore required to monitor the consequences at population level.

Sweden chose a different strategy during the pandemic than most other countries in Europe. The overall goal was similar, to reduce the mortality and the morbidity in the population, but also to limit the negative consequences for individuals and society. The regulations and general advice issued by the Public Health Agency on April 1, 2020, aimed at protecting people older than 70 years and to avoid overwhelming the health care system (Kavaliunas et al., 2020). The advice was about personal hygiene routines to limit spread, staying home when feeling unwell, avoid large gatherings, maintaining distances indoor and outdoor, and to refrain from unnecessary travel, but there was no lockdown.

The aim of this study was to investigate mental and physical health as well as living conditions and lifestyle habits in the adult general population in spring 2020 and one year into the COVID-19 pandemic in Sweden comparing results from two cross-sectional studies carried out in February-May 2020 and 2021.

2. Methods

The national population survey “Health on equal terms?” was conducted by the Public Health Agency of Sweden in February-May 2020 and 2021 among persons aged 16–84 years. The present study is based on data from one county (Värmland) where extended simple random samples were drawn both years. The questionnaire was sent to 5,091 persons in 2020 and 5,088 persons in 2021 in the county. In total, 2,273 and 2,216 persons answered the questionnaires, and the overall response rates were 45% and 44%, respectively. The questionnaire was postal but could also be answered online. Data collection was discontinued after two postal reminders. In 2020, 75% of the respondents ($n = 1,711$) answered the questionnaire before the COVID-19 outbreak in Värmland county in March. Since very few differences in living conditions, lifestyle factors and health were observed in the study population before and after the outbreak (Molarius and Persson, 2022), the data for year 2020 were pooled together. In addition, a sensitivity analysis was carried out where changes between 2020 and 2021 were analysed only among those who responded before the first reminder (before the COVID-19 outbreak) in 2020 ($n = 1,711$) and those who responded before the first reminder in 2021 ($n = 1,655$). This was done to be able to compare the results before and one year after the COVID-19 outbreak. Since late respondents are generally younger and more often non-native persons than early respondents (Molarius and Persson, 2022) only early respondents in both years were included in the sensitivity analysis.

Information on gender, age, and level of education (compulsory education, secondary education, and postsecondary education) are based on register data from Statistics Sweden. *Economic difficulties* were estimated with the question “During the last 12 months, have you ever had difficulty in managing the regular expenses for food, rent, bills etc.?” The response options were “no”, “yes, once”, “yes, more than once” where the last two categories were combined to yes. *Social support* was measured with the question “Do you have anyone you can share your innermost feelings with and confide in?” (yes/no). Employed people were defined as being *worried about losing their job* if they answered “yes” to the question “Are you worried about losing your job in the coming year?”.

Two questions for measuring *physical activity* were used (for details see (Molarius and Persson, 2022) and (The Public Health Agency of Sweden, 2022a)). These questions are used to measure whether the respondent reaches 150 activity minutes per week as recommended by the World Health Organization. The number of minutes from the physical training and daily activities were summed together, with the number from the first of these two variables counting double (The Public

Health Agency of Sweden, 2022a). *Sitting* duration was asked with the question “How much do you sit during a normal day, not counting sleep?” The answer categories were dichotomised into those who sit less than 10 h and at least 10 h a day. *Smoking* was measured using the question “Do you smoke” (“no”, “yes, sometimes”, “yes, daily”). *Alcohol consumption* was measured using Alcohol Use Disorders Identification Test-C (AUDIT-C). We used the following cut-offs for risk-drinker: 6 or more points in men and 5 or more points in women (The Public Health Agency of Sweden, 2022a).

Self-rated health (SRH) was measured with the question “How would you describe your health in general?” (very good, good, fair, poor and very poor). In the analysis the options very good and good were combined to good SRH. Symptoms were derived from the question: Do you have any of the following discomforts or symptoms? These included “aches in the shoulders or neck”, “sleeping difficulties” and “anxiety or worry”. The answer categories “Yes, minor discomfort” and “Yes, severe discomfort” were combined to “Yes”. *Obesity* was based on self-reported weight and height and defined according to the World Health Organization as body mass index ≥ 30 kg/m².

The study followed the Swedish guidelines for studies in social sciences and humanities, in accord with the Declaration of Helsinki and the data are protected by the law of official statistics. The participants were informed that completed questionnaires would be linked to the Swedish official registries through personal identification numbers, to access registry information on gender, age, country of birth and educational level. The respondents thus gave their informed consent to the linking of registry data by answering the survey questionnaire. The personal identification numbers were deleted before the data was delivered to Region Värmland. Statistics Sweden carried out the sampling, data collection and linkage with registry data and delivered the pseudonymized data. The study was approved by the Swedish Ethical Review Authority (Dnr 2020-04202 and 2021-03719).

Differences in living conditions, lifestyle habits, and health between years 2020 and 2021 were analysed using multiple binary logistic regression (reference group 2020) in men and women, adjusting for age group and educational level. The results are reported as odds ratios (OR) and 95% confidence intervals (95% CI) for difference between years for each living condition, lifestyle habit and health condition at a time. To adjust for multiple comparisons in Table 1 and in the sensitivity analysis, we used the Romano-Wolf method (Clarke et al., 2020) to adjust the p-values for men and women. All analyses were conducted in IBM SPSS Statistics, version 26, except for the Romano-Wolf procedure which was done in Stata MP/4 version 16.1.

3. Results

Table 1 shows the results of the study. About one in ten had had economic difficulties during the last year and the same proportion of employed persons were worried about losing their job, both these factors were more common among women. The prevalence of social support was very high, about 90%. About two thirds were physically active at least 150 min per week. Sitting more than 10 h a day and being a risk drinker was more common among men than among women. Less than one in ten were daily smokers. About 70% had good self-rated health. Symptoms such as aches in the shoulders or neck, sleeping difficulties and anxiety or worry were more common among women than among men. About 20% had obesity.

Very few differences were observed between 2020 and 2021 in the study population regarding living conditions, lifestyle factors and health (Table 1). When adjusted for age and educational level, the only statistically significant differences observed were that both the prevalence of risk drinking (OR: 1.46, 95% CI: 1.11–1.91) and the prevalence of anxiety and worry (OR: 1.32, 95% CI: 1.11–1.56) increased among women. A decrease in daily smoking for men (OR: 0.65, 95% CI: 0.45–0.93) was also observed but it was not significant after adjusting the p-values for multiple comparisons ($p = 0.214$). A small but not

Table 1

Prevalence of living conditions, lifestyle factors and health among men and women 16–84 years in 2020 and 2021 and adjusted odds ratios (with 95% confidence intervals in parenthesis) for difference in living conditions, lifestyle factors and health between 2020 and 2021.

	Men				Women			
	2020	2021	OR* (95% CI)	p-value**	2020	2021	OR* (95% CI)	p-value**
N	1063	1061			1210	1155		
<i>Living conditions (%)</i>								
Economic difficulties	8.5	7.5	0.83 (0.60–1.15)	0.943	11.8	10.2	0.82 (0.63–1.08)	0.785
Social support	88.4	88.0	0.97 (0.74–1.27)	1	91.9	90.8	0.88 (0.66–1.18)	0.974
Worried about losing one's job (employed)	8.9	8.6	0.96 (0.64–1.44)	1	12.2	11.1	0.80 (0.56–1.14)	0.861
<i>Lifestyle factors (%)</i>								
Physically active	62.7	66.5	1.19 (0.99–1.42)	0.522	66.3	65.3	0.96 (0.81–1.15)	0.974
Sits at least 10 h/day	21.7	20.5	0.93 (0.75–1.15)	0.990	14.6	15.5	1.07 (0.85–1.35)	0.974
Daily smoker	7.4	4.9	0.65 (0.45–0.93)	0.214	6.9	7.2	0.99 (0.71–1.37)	0.974
Risk drinker	16.0	15.7	0.95 (0.75–1.20)	0.991	8.7	12.3	1.46 (1.11–1.91)	0.041
<i>Health (%)</i>								
Good self-rated health	68.2	72.8	1.21 (0.99–1.46)	0.467	68.5	70.0	1.08 (0.90–1.29)	0.974
Pain in shoulders or neck	46.7	47.8	1.05 (0.88–1.25)	0.991	57.0	58.6	1.06 (0.90–1.25)	0.974
Sleeping difficulties	37.8	37.1	0.98 (0.82–1.18)	1	48.7	52.1	1.14 (0.96–1.34)	0.752
Anxiety or worry	29.3	28.5	0.97 (0.80–1.17)	0.992	41.9	48.3	1.32 (1.11–1.56)	0.015
Obesity	18.1	19.2	1.09(0.87–1.37)	0.991	19.5	18.5	0.92 (0.74–1.14)	0.974

* Odds ratio for difference between years adjusted for age group and educational level.

** P-values are adjusted for multiple comparisons using the Romano-Wolf method.

statistically significant increase in physical activity and good self-rated health was observed among men. There were no differences in living conditions nor in other lifestyle factors or health. The results of the sensitivity analysis (not shown) were very similar to those of the main analysis. The only exception was that the increase in risk drinking of alcohol among women was no longer statistically significant (OR: 1.36, 95% CI: 1.00–1.85).

4. Discussion

In this population-based study, the prevalence of anxiety and worry increased among women between 2020 and 2021. The prevalence of risk drinking increased among women, but it rather returned to the same level as in 2018 than increased due to the pandemic (Region Värmland, 2021). In addition, it was no longer statistically significant in the sensitivity analysis. Otherwise no statistically significant differences were observed between 2020 and 2021 in the study population regarding living conditions, lifestyle factors and health.

The findings of the present study are in line with results from a review where the psychological impact of COVID-19 pandemic was found to be small in magnitude and highly heterogeneous, and no change for instance in social support was observed (Prati and Mancini, 2021). In another review a small increase in mental health symptoms soon after the outbreak of the COVID-19 pandemic was detected but it decreased to pre-pandemic levels by mid-2020 among most populations (Robinson et al., 2022). However, an increase in mental health problems was observed among women in the present study, which is in line with the findings of previous studies (Zaninotto et al., 2022; Niedzwiedz et al., 2021). A study from Chile found that women reported an increase in household chores and in childcare and were more likely to have lost their employment or experienced a loss of income due to the pandemic (Borrescio-Higa and Valenzuela, 2021). The increase in being worried about losing one's job among the employed observed directly after the outbreak (Molarius and Persson, 2022) does not seem to have continued since no increase was observed between 2020 and 2021 in the present study. In addition, both weight gain and weight decrease have been reported during the pandemic (Deschasaux-Tanguy et al., 2021). This is in line with the current study where no difference in the prevalence of obesity was observed in the study population between 2020 and 2021.

What comes to lifestyle factors, the review of Freiberg et al. (Freiberg et al., 2021) concluded that physical activity decreased whereas sedentary behavior and alcohol consumption increased during the

COVID-19 lockdowns. However, there were methodological shortcomings in many of these studies. Decreased smoking prevalence was reported from a large population-based study in the UK (Niedzwiedz et al., 2021). The prevalence of daily smoking decreased among men in the current study, but after adjustment for multiple comparisons the difference was no longer statistically significant. The prevalence of daily smoking has also been decreasing under a long period in Sweden (The Public Health Agency of Sweden, 2022a). In contrast to the results of the UK study, we did not observe an increase in adverse alcohol use.

The present survey was limited to one county, where the cumulative incidence of COVID-19 was lower than in Sweden in general (The Public Health Agency of Sweden, 2022b), but the restrictions due to the pandemic, e.g. to keep social distance to other people, to work from home when possible, to refrain from seeing people outside the own family among those over 70 years of age, and limited public gatherings, were similar. Very few statistically significant differences were observed between 2020 and 2021 regarding living conditions, lifestyle factors and health in this study. In Sweden, no total lockdown was taking place which may have contributed to the small observed differences between 2020 and 2021. However, for example, life expectancy decreased about 0.8 years between 2019 and 2020 in Sweden (Aburto et al., 2022; Eurostat, 2021) and returned to the pre-pandemic level in 2021 (Statistics Sweden, 2022). Surveillance of the long-term public health consequences of the pandemic in the general population and differences between populations, using robust data and methods, is thus of utter importance for planning and targeting preventive activities.

Funding

The survey was funded by Region Värmland.

CRedit authorship contribution statement

Anu Molarius: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. **Fredrik Lundin:** Methodology, Formal analysis, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that has been used is confidential.

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