

# Psychological distress during the COVID-19 pandemic: changes over time and the effect of socioeconomic status

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## Summary

**INTRODUCTION:** The COVID-19 pandemic strongly affected mental health, increasing the prevalence of depression, anxiety, and stress worldwide. Previous research has shown that low education and low income can negatively impact mental health. During the pandemic, the population of Switzerland had to change their daily lives, which might have influenced their mental health.

**AIMS OF THE STUDY:** We used longitudinal data on mental health during the COVID-19 pandemic to (a) assess psychological distress in the adult general population, (b) investigate changes in psychological distress during the pandemic, and (c) evaluate the association of income and education with psychological distress.

**METHODS:** Participants were recruited between January and May 2021 using a random sampling method, provided by the Federal Office of Statistics, from the adult general population in the canton of Lucerne (age  $\geq 20$  years,  $n = 5092$ ). Sociodemographic data were collected with a baseline questionnaire. Mental health data were collected via monthly digital follow-up surveys using the validated Depression, Anxiety, and Stress Scale (DASS-21, three subscales with five categories from “normal” to “extremely severe”) to assess psychological distress. We used descriptive statistics to measure psychological distress and a one-way repeated measures ANOVA to test for the differences between the mean depression, anxiety, and stress scores over time. We used multilevel ordered logistic regression models to assess the association of income and education with psychological distress, adjusting for sex, age, nationality, employment, and previous Polymerase Chain Reaction (PCR) tests, as these factors are known to influence psychological distress and socioeconomic position within countries.

**RESULTS:** In total, 953 (83%) individuals completed at least one digital follow-up survey (mean age = 57 years, range: 20–91). Most had achieved secondary education (95%) and had a monthly household income of 6001–12,000 Swiss Francs (41%). The majority (>80%) of the population reported “normal” depression, anxiety, and stress levels according to the DASS-21. We found no significant change in any of the subscales over time. Com-

pared to those with middle household incomes, people with low household incomes reported higher anxiety levels (Odds Ratio [OR] = 2.11,  $p = 0.041$ ). People with a tertiary education reported lower anxiety levels than those with a secondary education (OR = 0.39,  $p = 0.009$ ).

**CONCLUSIONS:** Most participants reported normal levels of psychological distress during the COVID-19 pandemic from February to November 2021. People with lower education levels and low incomes were more vulnerable to anxiety and should be considered in mental health campaigns.

## Introduction

The COVID-19 pandemic has affected mental health [1–5]. A meta-analysis found a 21% increase in the prevalence of psychological distress in the general population during the pandemic [6]. According to the World Health Organization (WHO), the prevalence of depression and anxiety increased by up to 25% and caused more than 110 disability-adjusted life years (DALYs) per 100,000 population worldwide [2]. Compared to before the pandemic, several studies have found increases in mental health problems, such as depression, anxiety, and stress [3, 7–10]. Studies investigating the Ebola and Severe Acute Respiratory Syndrome (SARS) pandemics also showed worse mental health and increased suicide rates during those pandemics [11, 12]. Employment status [13], health status, Polymerase Chain Reaction (PCR) tests, and seropositivity [15] may affect psychological distress. Age, sex, and nationality also affect psychological distress [14, 15]. Nationality’s effect means that within countries, people who have migrated from elsewhere may be more affected.

As in other countries, the Swiss population had to modify their daily lives to adapt to the pandemic. The Swiss government declared the first restrictions in Switzerland based on increasing numbers of COVID-19 cases in March 2020 [16], and slowly lifted them before imposing stricter measures in autumn and winter 2020 due to rising infection numbers. Compared to other countries Switzerland experienced the second COVID-19 wave with minor restrictions during the winter of 2020/2021.

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During the pandemic, sociodemographic characteristics, such as work challenges or changes, were associated with worse mental health [2]. This aligns with previous studies' reports that socioeconomic status influences mental health outcomes. Specifically, lower education and lower income are associated with increased psychological distress [17, 18].

Most studies assessing the interplay of mental health and socioeconomic status during the pandemic are cross-sectional [2]. The DASS-21 (Depression, Anxiety, and Stress Scale) with 21 items is a commonly used screening instrument for psychological distress [19, 20]. However, to identify where prevention is needed and develop strategies to address mental health problems, a population must be studied over time. Therefore, this study aimed to (a) describe psychological distress in the general population during the pandemic, (b) investigate changes in psychological distress during the pandemic, and (c) investigate associations of income and education with psychological distress.

## Materials and methods

The Swiss national research project "Corona Immunitas" [21] mainly sought to measure the spread of SARS-CoV2 and understand multiple related factors, such as the pandemic's effects on mental health conditions. During the pandemic, the Corona Immunitas research program continuously provided the Swiss government with evidence-based epidemiological data to support decision-making processes. Over 50,000 participants from 14 research sites were involved in the national study [21]. This paper reports on data collected in the canton of Lucerne. Recruitment for this study occurred in two phases. The first phase ran from January 25 until February 25, 2021. The second phase ran from May 24 until July 1, 2021. The research site, Lucerne, is a collaboration between the University of Lucerne and the Lucerne Cantonal Hospital [22].

## Sample

The Swiss Federal Statistical Office (FSO) provided a representative random sample of eligible adult residents in Lucerne Canton. Individuals with short residence permits, diplomats, and people living in nursing homes were excluded. The sample was age-stratified into two groups: 20–64 years and  $\geq 65$  years. To be eligible, individuals had to reside in the Canton of Lucerne, be at least 20 years old at enrolment, and speak German, French, Italian, or English. A detailed description of the participants is presented in the results section and table 1. The responsible ethics committee in North- and Central Switzerland approved the Corona Immunitas study at the research site Lucerne (BASEC Number 2020-01247) in December 2020, and the study adhered to the 1995 Declaration of Helsinki principles (revision in 2013) [23]. All participants provided written informed consent.

## Procedure

Eligible participants ( $n = 5092$ ) were invited to participate in the study by post. Those who consented to participate ( $n = 1133$ ) first provided a venous blood sample for a one-time seroprevalence (SARS-CoV-2 antibody) test and completed a baseline questionnaire that included sociode-

mographic information. Trained nurses collected the blood samples while adhering to safety measures to minimise COVID-19 spread or exposure. Vulnerable participants (those aged 65+, chronically ill, or with BMI  $>30$  kg/m<sup>2</sup>) could elect to have their blood drawn in a mobile unit at their homes. Participants without internet access could complete the questionnaire on paper before or after the blood sample. Then, participants were invited to join the longitudinal Corona Immunitas digital follow-up cohort. Participants in the digital follow-up cohort received digital questionnaires regularly to gather further data, such as mental health information. The data were collected and managed with secured Research Electronic Data Capture (REDCap) software [24]. The questionnaires to assess psychological distress were sent in February, March, June, September, and November 2021. Participants enrolled in the second phase received questionnaires in June, September, and November 2021.

In this article, we report on participants who provided the one-time blood sample, completed the baseline questionnaire, and participated in at least one of the five psychological distress questionnaires during the digital follow-up cohort. Participants filled out the DASS-21 questionnaire once (31%), twice (27%), three times (31%), four times (7%), or five times (22%) (figure 1).

## Psychological distress

Psychological distress was assessed using the 21-item validated Depression, Anxiety, and Stress Scale (DASS-21), a short version of the DASS-42 [19]. The DASS-21 is a reliable self-reporting instrument with three subscales (depression, anxiety, and stress) of seven items each. Several studies have assessed the reliability of the DASS-21 and reported Cronbach's alpha from 0.74–0.93 [25, 26]. Therefore, the DASS-21 has shown good reliability in repeated assessments using normal samples [20]. Participants reported their symptoms in the previous week on a 4-point Likert scale (from 0 "never" to 3 "almost always"). Higher scores indicate greater psychological distress. We computed psychological distress scores according to the manual, summing up the single-item scores and multiplying them by two (range: 0–42). Depression, anxiety, and stress are categorised as normal, mild, moderate, severe, or extremely severe (Depression: normal [0–9], mild [10–13], moderate [14–20], severe [21–27], extremely severe [28–42]. Anxiety: normal [0–7], mild [8–9], moderate [10–14], severe [15–19], extremely severe [20–42]. Stress: normal [0–14], mild [15–18], moderate [19–25], severe [26–33], extremely severe [34–42]) [19].

## Other health variables

We assessed previous PCR test(s) (No PCR test; Yes, tested positive; Yes, tested negative) and health status. Self-reported health status was assessed by asking whether participants suffered from no, one, or several chronic diseases (cancer, diabetes, immunocompromised, hypertension, cardiovascular disease, chronic respiratory disease, allergies, or any other chronic condition).

### Socioeconomic status

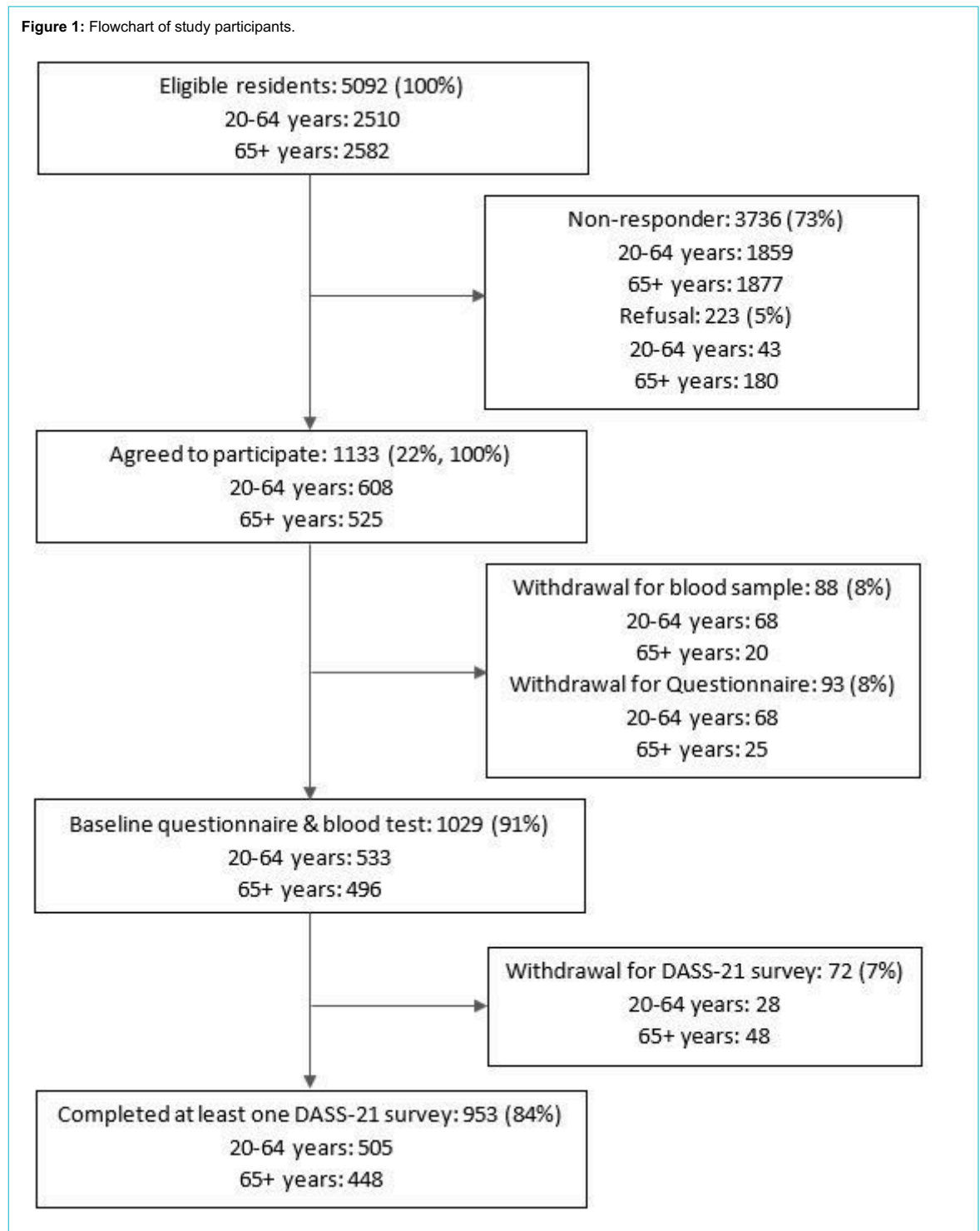
Socioeconomic status was defined as a theoretical framework to measure individuals', households', or communities' resources [27]. Income and education represent individuals' material and personal resources, which strongly predict socioeconomic status [13, 28]. To measure socioeconomic status, the monthly (gross) household income in Swiss Francs (CHF) was categorised as “low” ( $\leq 6000$  CHF, table 1); “middle” (6001–12,000 CHF); “high” (12,001–18,000 CHF), or “very high” ( $\geq 18,001$  CHF) compared to the Swiss average income [29]. The highest achieved education was categorised as “primary” (manda-

tory 11 years of school); “secondary” (vocational training, high school or technical school), or “tertiary” (university or college degree) [30].

### Sociodemographic variables

We assessed self-reported gender (male, female, or other), age at study enrolment (years), nationality (Swiss, dual nationality (including Swiss), or other nationality), employment status (not employed; employed; retired), smoking status (yes, former smoker, or never smoked), household size (no other person, one person, or more than one person).

**Figure 1:** Flowchart of study participants.



## Data analysis

For the descriptive statistics, continuous variables were summarised as means (M) with standard deviations (SD) and categorical variables by frequency and percentages. A one-way repeated measures ANOVA was performed to test for mean differences in depression, anxiety, and stress scores over the months, accounting for multiple data points from the same person.

The correlation between the education and income variables was low ( $r = 0.168$ ). Therefore, we conducted separate regression analyses with income and education for each subscale. Multivariate multilevel ordered logistic regression (ologit) analysis is a non-linear regression analysis to predict the relationship between dependent and independent variables. The dependent variables were the subscales (depression, anxiety, and stress). We ran each variable with the independent variables (income and education). In the multivariable multilevel ordered logistic regression analysis, we adjusted for variables that were significant at  $p \leq 0.05$  in all three subscales. Stata (version 17) was used for all statistical analyses.

## Results

Of those who agreed to participate, a total of 953 (84%) participants were included in this study (figure 1). The mean age was 57 years (range: 20–91) (table 1). Gender was evenly distributed at 50% each, men and women. The majority were Swiss (89%), had achieved at least secondary education (95%), and had a middle household income (6001–12,000 CHF, 41%). More than half of the participants reported suffering from one or several chronic diseases (52%).

### Aim 1 – Psychological distress

Most participants rated their psychological distress as normal (for depression  $\leq 9$ , anxiety  $\leq 7$ , and stress  $\leq 14$ ; figure 2). For visual purposes, we have shortened the y-axis range to 0–75%. Moderate to extremely severe levels were reported as 5.0%–10.1% on the depression scale, 4.4%–5.6% on the anxiety scale, and 3.5%–6.8% on the stress scale. Cronbach's alpha ranged from 0.78–0.83, indicating good to moderate internal consistency across all months (figure 2).

**Table 1:**  
Characteristics of the study population (n = 953).

		Total sample		Age 20 – 64 years		Age $\geq 65$ years	
		n	%	n	%	n	%
<b>Total</b>		953	100	504	53	448	47
<b>Gender</b>	Female	474	50	285	57	189	43
	Male	479	50	219	43	259	57
<b>Nationality*</b>	Swiss	848	89	422	84	426	95
	Dual nationality	43	4	32	6	11	2
	Other nationality	59	6	48	10	11	2
<b>Highest education achieved*</b>	Primary	50	5	22	4	28	6
	Secondary	512	54	259	51	253	56
	Tertiary	386	41	222	44	164	37
<b>Employment status*</b>	Not employed	34	4	34	7	0	0
	Employed (part- or full-time)	471	49	455	90	16	4
	Retired	446	47	14	3	432	96
<b>Current monthly (gross) household income in Swiss Francs*</b>	Low ( $\leq 6000$ )	388	41	169	34	219	49
	Middle (6001–12,000)	391	41	227	45	164	37
	High (12,001–18,000)	79	8	57	11	22	5
	Very high ( $\geq 18,001$ )	33	4	23	5	10	2
<b>Household size*</b>	No other person	150	16	62	12	88	20
	One person	452	47	159	31	293	65
	More than one person	351	37	284	57	67	15
<b>Health status**</b>	No chronic disease	453	48	298	59	155	34
	One chronic disease	289	30	147	29	142	32
	More than one chronic disease	211	22	60	12	151	34
<b>Smoking status</b>	Yes, smoker	146	15	101	20	45	10
	Former smoker	229	24	100	20	129	29
	No, never smoked	578	61	304	60	274	61
<b>Self-reported previous SARS-CoV-2 PCR test(s)*</b>	No PCR test	632	66	288	57	344	77
	Yes, tested positive	39	4	25	5	14	3
	Yes, tested negative	198	21	128	25	70	16
		M	SD	M	SD	M	SD
Age at the time of study		57.0	17.0	43.7	12.1	71.9	5.5
Body mass index (kg/m <sup>2</sup> )*		25.3	4.5	25.2	4.8	25.4	4.1

M: mean; n: number; PCR: polymerase chain reaction; SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus 2; SD: Standard Deviation

\* Has missing values

\*\* Self-reported chronic disease categorised as chronic respiratory illness, cancer, immunocompromised, hypertension, cardiovascular disease, diabetes, allergies, or any other chronic condition

### Aim 2 – Differences in psychological distress over time

The one-way repeated measures ANOVA showed no significant difference in the means of the three subscales over time (depression:  $F [4,1817] = 2.32, p = 0.055$ ; anxiety:  $F [4,1819] = 1.10, p = 0.353$ ; stress:  $F [4,1819] = 0.73, p = 0.569$ ).

### Aim 3 – Socioeconomic status and psychological distress

The univariable multilevel ologit regression analysis showed that women, participants with dual- or non-Swiss nationality, those who were part- or full-time employed, and those who had previously tested negative with a PCR test were more likely to report worse psychological distress (supplementary table S1). We adjusted for these variables in the multivariable model. In the multivariable multilevel ologit regression models, income and education were significantly associated with anxiety, but not with depression or stress (table 2). People in the low-income group (Odds Ratio [OR] = 2.11; Confidence Interval (CI) 1.03–4.33;  $p = 0.041$ ) were more likely to suffer from anxiety during the pandemic than those in the middle-income group. People with a tertiary education (OR = 0.39; CI 0.19–0.79;  $p = 0.009$ ) were less likely to suffer from anxiety during the pandemic than those with a secondary education.

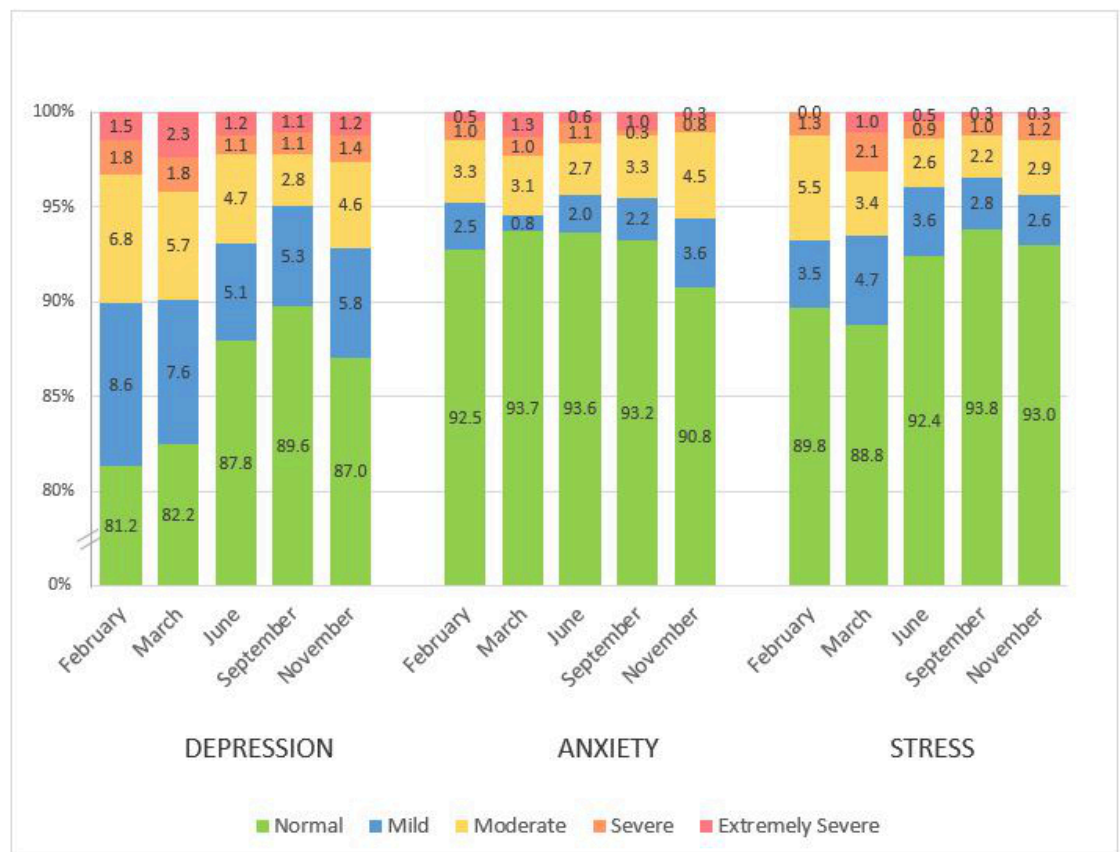
### Discussion

Most participants reported normal levels of psychological distress during the pandemic, and we found no significant change over time in any of the three subscales (figure 2). Education and income were associated only with anxiety levels during the pandemic. Participants with low incomes were more likely to report anxiety, whereas highly educated participants were less likely to report anxiety (table 2).

In our study, only 10–20% of participants reported high psychological distress during the pandemic (i.e. moderate to extremely severe depression, anxiety, or stress levels, figure 2). Studies from other countries, such as Saudi Arabia, Serbia, and China, using the DASS-21 reported higher proportions of people with anxiety, depression, and stress. The prevalence ranged between 20%–30% [3, 7, 8]. However, all three studies examined mental health at the onset of the pandemic, between February and April 2020. In contrast, we started data collection one year later, in February 2021, which may explain the low proportion of participants in our sample who reported high psychological distress. Additionally, other countries (notably China) had stricter COVID-19 measures, like lockdowns, which may have contributed to worse mental health effects compared to the semi-confinement enacted in Switzerland [16].

We found no significant change in depression, anxiety, or stress between February and November 2021. However, it would be presumptuous to claim that the pandemic did not affect psychological distress at all. A study from Southern Switzerland [31] assessed depression, anxiety, and stress

**Figure 2:** Psychological distress per month. The number of participants varied per month. Percentage distribution adjusted to the total number of participants per month: February: n = 379, March: n = 365, June: n = 632, September: n = 688, November: n = 692.



between August 2020 and May 2021 and found an increase in psychological distress: The prevalence of depression increased from 7.5% to 12.5%, anxiety from 4.8% to 8.1%, and stress from 5.5% to 8.8%. The authors attributed the increased prevalence of psychological distress to the effects of the second COVID-19 wave (October 2020 – February 2021). In contrast, our assessments started after the second COVID-19 wave. In Switzerland, the government measures did not change between February and September 2021. Access to public spaces was permitted with a COVID-19 certificate in September 2021 as the COVID-19 infection rates stabilised [32, 33]. That could also indicate a less volatile and, potentially, less concerning phase of the pandemic, which our results reflect.

Education and income were associated with anxiety levels during the pandemic (table 2). A multi-cohort study from Finland showed that people with low socioeconomic statuses suffer more from mental health conditions than those with high socioeconomic statuses [11]. Our results confirm recent research from China, where a low current income was also associated with higher anxiety [34]. A low income may have reduced the resources available to cope with the crisis. During the pandemic, many people had to handle the uncertainty of losing their jobs. Therefore, individuals with less financial support would logically suffer from anxiety. In Switzerland, some people were able to work from home. Others, however, became unemployed or had to apply for subsidies. The Swiss government implemented “short-term work schemes” to financially support citizens who could not work due to COVID-19 restrictions. However, a study from China found that government subsidies did not alleviate the impact of reduced income on anxiety [34]. The financial resources of those with higher incomes and the ability to work from home may have contributed to better psychological distress outcomes in Switzerland compared to those reported by studies in other countries [3, 7, 8].

In our study, respondents with higher education reported lower anxiety levels (table 2). This is consistent with previous findings that lower levels of education were generally associated with higher psychological distress [1, 7, 35]. One potential explanation could be that people with higher education levels are better informed about various aspects of the pandemic. A better understanding of the situation might prevent high levels of anxiety. People with higher education levels generally have better health liter-

acy [36], defined as the ability to find information to improve their knowledge and skills related to their health behaviours [37]. During the COVID-19 pandemic, the information overload and abundance of misleading news led to the term “infodemic” being coined – describing how the situation could lead to increased anxiety [38]. People with lower education levels might have been overwhelmed by the complexity and amount of information available, harming their physical and mental health [39].

### Strengths and limitations

Our study is based on a representative sample of the adult general Swiss population during the pandemic. Using the validated and well-established DASS-21 questionnaire, which has good reliability and validity, is another strength of our study [40]. The longitudinal design helped us to investigate changes in psychological distress and contributed to the need for long-term data that the WHO has requested. Another strength of our study is its digital design, which allowed for digital follow-up data to be collected regularly and conveniently. Despite the digital design, we included a considerable proportion of participants who were older than 65 years.

Our study also has limitations. We do not know if participants who reported high psychological distress had prior mental health problems, either pre-pandemic or from the first year of the pandemic. Furthermore, as in the Swiss Federal Statistical Office typology of migration status, we defined people with a migration background as those who are not Swiss or have dual nationalities (including Swiss). This definition may mean different things to different participants as we did not account for birthplace.

Despite the randomised recruitment of participants and their likelihood of being representative of the target population, some concerns about bias remain. The healthy volunteer effect may have introduced a selection bias into our sample. Among the randomly contacted individuals, those with systemic or mental health issues (especially depression) might have lacked the strength or motivation to participate in the study [41]. Another limitation could be that the study was introduced as a COVID-19 study [21] and included a seroprevalence test during the pandemic. These tests might have been difficult to access or expensive to acquire in other contexts, and, thus, could have motivated a specific group to participate. However, our data did not

**Table 2:**

Association of income and education with each subscale: Multivariable multilevel ologit regressions. **Bold** font indicates statistical significance at  $p \leq 0.05$ . The multivariable multilevel ologit model was adjusted for sex, age, nationality, employment, and previous PCR test.

	Depression			Anxiety			Stress*		
	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
<b>Income*</b>									
Baseline: Middle (6001–12,000)									
Low ( $\leq 6000$ )	1.33	0.70–2.53	0.380	2.11	1.03–4.33	<b>0.041</b>	0.98	0.46–2.10	0.963
High (12,001–18,000)	0.82	0.28–2.39	0.717	1.33	0.40–4.39	0.639	0.56	0.15–2.02	0.372
Very high ( $\geq 18,001$ )	0.20	0.02–1.82	0.153	0.72	0.10–5.20	0.742	0.44	0.06–3.21	0.420
<b>Education</b>									
Baseline: Secondary									
Primary	0.72	0.17–2.99	0.652	0.65	0.14–3.04	0.581	0.71	0.12–4.11	0.700
Tertiary	0.93	0.51–1.71	0.825	0.39	0.19–0.79	<b>0.009</b>	0.96	0.47–1.97	0.918

CI: Confidence interval; OR: Odds ratio; p: P-value; ologit: ordered logistic regression.

\* Contains missing values

allow for a non-participant analysis. Additionally, the exclusion of diplomats, asylum seekers, and people living in nursing homes may have influenced the proportion of foreigners. This may have led to underestimating the impact of the pandemic on psychological distress. However, the cantonal statistics for Lucerne indicate that the proportion of foreigners there is lower than in other cantons [42].

We also found that a high percentage of the study population (41%) had low household incomes. Around 47% of the study participants were retired, with a pension as their only source of income, which can explain this statistic. Among the retired participants, 49% were in the low-income group. The Swiss monthly pension is 1849 Swiss francs for women and 1873 for men [43]. Further details about savings would be needed to more accurately estimate participants' available finances.

### Conclusions

It is encouraging that most participants rated their psychological distress as normal during the pandemic, from February to November 2021. People with lower education levels and low incomes are more vulnerable to suffering from anxiety and should be considered in mental health campaigns.

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### Potential competing interests

All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. No potential conflict of interest related to the content of this manuscript was disclosed.

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## Appendix: Supplementary table

Table S1:

Univariable ordered logistic regression. **Bold** font indicates statistical significance at  $p \leq 0.05$ .

	Depression			Anxiety			Stress		
	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
<b>Sex</b>									
Baseline: female			<b>0.010</b>			<b>0.024</b>			<b>0.015</b>
Male	0.49	0.29–0.85		0.49	0.26–0.90		0.42	0.21–0.84	
<b>Age categories</b>									
Baseline: 20–64			<b>0.000</b>			<b>0.000</b>			<b>0.000</b>
≥65 years	0.22	0.12–0.38		0.29	0.15–0.57		0.09	0.04–0.21	
<b>Nationality*</b>									
Baseline: Swiss			<b>0.000</b>			<b>0.000</b>			<b>0.001</b>
Dual nationality	8.0	2.60–24.65		13.94	4.68–41.52		9.46	2.91–30.72	
Other nationality <sup>a</sup>	3.01	1.13–8.00		5.67	2.12–15.16		3.85	1.30–11.43	
<b>Highest education achieved*</b>									
Baseline: secondary			0.864			<b>0.022</b>			0.885
Primary	1.05	0.31–3.59		1.44	0.41–5.12		1.39	0.32–6.02	
Tertiary	1.07	0.62–1.85		0.49	0.25–0.96		1.16	0.58–2.32	
<b>Employment status*</b>									
Baseline: Not employed			<b>0.000</b>			<b>0.002</b>			<b>0.000</b>
Employed (part- or full-time)	1.11	0.25–4.97		1.14	0.21–6.21		1.15	0.22–6.00	
Retired	0.29	0.06–1.32		0.38	0.07–2.12		0.14	0.02–0.79	
<b>Monthly household income Swiss Francs*</b>									
Baseline: Middle income (6'001–12'000)			0.596			0.530			0.552
Low (≤6000)	1.31	0.74–2.35		2.21	1.07–4.22		0.80	0.38–1.65	
High (12,001–18,000)	0.86	0.30–2.43		1.50	0.46–4.93		0.61	0.15–2.44	
Very high (≥18,001)	0.18	0.02–2.00		1.22	0.20–7.55		0.70	0.10–4.88	
<b>Household size</b>									
Baseline: no other person			0.924			0.162			0.087
One person	0.40	0.19–0.86		0.97	0.36–2.58		0.84	0.29–2.45	
More than one person	0.85	0.40–1.82		2.19	0.82–5.80		2.48	0.88–7.00	
<b>Health status <sup>b</sup></b>									
Baseline: no chronic disease			0.052			0.428			<b>0.022</b>
One chronic disease	0.77	0.42–1.42		1.20	0.58–2.49		1.10	0.54–2.26	
>1 chronic disease	0.49	0.24–1.01		1.36	0.62–3.00		0.21	0.06–0.71	
<b>Smoking status</b>									
Baseline: smoker			<b>0.029</b>			0.073			<b>0.013</b>
Former smoker	0.37	0.16–0.85		0.72	0.28–1.84		0.37	0.14–0.98	
No, never smoker	0.39	0.19–0.79		0.49	0.21–1.12		0.31	0.13–0.71	
<b>Self-reported previous SARS-CoV-2 PCR test(s)*</b>									
Baseline: no PCR test			<b>0.012</b>			<b>0.008</b>			<b>0.009</b>
Yes, tested positive	2.30	0.65–8.12		3.01	0.79–11.46		2.33	0.51–10.69	
Yes, tested negative	2.24	1.16–4.30		2.50	1.23–5.10		2.77	1.26–6.07	

OR: Odds ratio; CI: Confidence interval; p: p-value; SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus 2; PCR test: Polymerase Chain Reaction test

\* Contains missing values

<sup>a</sup> Any other nationality besides Swiss<sup>b</sup> Health Status, self-reported chronic diseases were categorised in: Respiratory illness, Cancer, Immunocompromised, Hypertension, Cardiovascular diseases, Diabetes, Allergies, Any other chronic condition