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The impact of COVID-19 on cancer care of outpatients with low socioeconomic status

Elisabeth L. Zeilinger[1] | Simone Lubowitzki[1] | Matthias Unseld[2] |
Carmen Schneckenreiter[1] | Daniel Heindl[1] | Philipp B. Staber[1,3] |
Markus Raderer[3,4] | Peter Valent[1,3,5] | Sabine Zöchbauer-Müller[3,4] |
Rupert Bartsch[3,4] | Gerald Prager[3,4] | Ulrich Jaeger[1,3] | Alexander Gaiger[1,3]

[1]Division of Hematology and Hemostaseology, Department of Internal Medicine I, Medical University of Vienna, Vienna, Austria

[2]Division of Palliative Medicine, Department of Internal Medicine I, Medical University of Vienna, Vienna, Austria

[3]Comprehensive Cancer Center, Medical University of Vienna, Vienna, Austria

[4]Division of Oncology, Department of Internal Medicine I, Medical University of Vienna, Vienna, Austria

[5]Ludwig Boltzmann Institute for Hematology and Oncology, Vienna, Austria

Correspondence
Alexander Gaiger, Division of Hematology and Hemostaseology, Department of Internal Medicine I, Medical University of Vienna, Waehringer Guertel 18-20, A-1090 Vienna, Austria.
Email: alexander.gaiger@meduniwien.ac.at

Abstract

Patients with low socioeconomic status (SES) are among the most underserved groups of people regarding cancer care. Analyzing the impact of the coronavirus-induced disease 2019 (COVID-19) pandemic on health care disparities and calling attention to inequalities in cancer care is crucial to justify and initiate adequate countermeasures. We aimed to determine whether the COVID-19 pandemic aggravated health care disparities of cancer outpatients related to their SES and analyzed patient data of the largest university center providing services for patients with hematologic and oncologic disorders in Austria from 2018 to 2021. SES was assessed using three indicators: monthly net household income, level of education and occupational prestige. In total, 1217 cancer outpatients (51.1% female) with a mean age of 59.4 years (SD = 14.2) participated. In the first year of the pandemic, the relative proportion of individuals with low income, low education level and low occupational prestige seeking cancer care at our outpatient center decreased significantly ($P \leq .015$). The strongest indicator was income, with a consistent effect throughout the first pandemic year. Countermeasures and specific interventions to support cancer patients with low SES in their access to health care should be initiated and prioritized.

KEYWORDS
ambulatory care, COVID-19, healthcare disparities, social class, socioeconomic factors

What's new?

The COVID-19 pandemic caused disruptions to cancer care all over the world. But has it also worsened existing healthcare disparities for patients with low socioeconomic status? Here, using data from a European welfare state where patients have easy access to cancer treatment regardless of their employment or insurance status, the authors compared the socioeconomic

status of cancer outpatients who received treatment before and during the pandemic. In the first year of the pandemic, people with low socioeconomic status were seeking cancer care significantly less frequently than before the pandemic. Countermeasures to reach this underserved patient group are needed.

1 | INTRODUCTION

The pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) poses an unprecedented challenge on health care systems all over the world. Oncological care and screening were impacted as routine follow up visits and screenings were postponed or inpatients were switched to outpatient treatment.[1,2]

The influence of socioeconomic status (SES) on cancer care and survival of cancer patients is well established.[3] Important indicators for SES are income, education level and occupational prestige.[4] Oncology practitioners and researchers are apprehensive that the coronavirus-induced disease 2019 (COVID-19) situation has already exacerbated existing disparities in health care and will continue to do so.[5] A recent viewpoint reported on these health disparities in the United States and called for empirical data to support this view and provide a basis for national and international countermeasures.[6]

In our study, we compared SES indicators of cancer outpatients being treated at the largest university center providing services for patients with oncologic and hematologic disorders in Austria before and during the pandemic to examine the impact of COVID-19 on disparities in access to cancer care. We present data from Austria, a European welfare state where patients have easy access to cancer treatment regardless of their employment or insurance status. Every patient with an oncologic or hematologic disorder can be seen in our center even without referral from a GP or specialist. Our data were collected at a university hospital where the most up-to-date cancer treatment options are offered and the highest standard of care is delivered. Cancer patients from all over the country seek treatment in this hospital, which contributes to the significance and representativeness of our data.

2 | MATERIALS AND METHODS

2.1 | Procedure

The present study was embedded in an ongoing research project at the Divisions of Hematology and Oncology at the Medical University of Vienna, Austria. Participants provided information on their current monthly net household income, highest level of education and occupational prestige via questionnaires. The following inclusion criteria were used: (1) confirmed diagnosis of cancer or other neoplastic condition, (2) age ≥18, (3) capacity to consent, (4) sufficient German-language skills. Overall response rate of patients returning the questionnaire was 75%. The response rates for each distinct time period are depicted in Table 1 and did not differ significantly (P = .15).

2.2 | Statistical analysis

We used three categories each for analyzing income (<1300 EUR/1300-2200 EUR) and education level (primary education/secondary education/postsecondary or tertiary education); and two categories for occupational prestige (white collar workers, employees/blue collar workers and unemployed people). We excluded retired persons for analyzing occupational prestige, as we had no information about their former employment status, leading to a reduced sample size of n = 573 for this analysis. Based on the assumption that income and education level were ordinally scaled, we used Mann-Whitney U-tests and Kruskal-Wallis H-tests with post hoc Dunn tests. Bonferroni corrections for multiple tests were applied. Occupational prestige was analyzed as dichotomous variable with χ^2 tests. Cohen's d was used as effect size and interpretation followed Cohen's guidelines.[7]

We analyzed three distinct time periods within the first year of the pandemic, based on the interventions and lockdowns that were in place at each period: (1) March 2020-May 2020, first months of the pandemic including the first lockdown, (2) June 2020-October 2020, where restrictions were partly lifted, (3) November 2020-February 2021, where a second hard lockdown went into effect. Detailed restrictions that were in place at each time period are depicted in Table S1.

3 | RESULTS

In total, 1217 outpatients with cancer or other neoplastic conditions (51.1% female) participated, including 734 patients within 2 years prior to the COVID-19 pandemic, and 483 within the first year of the pandemic. Diagnoses of the sample are depicted in Table 2. There were significantly more patients with a hematologic diagnosis in the sample during the pandemic than in the sample before the pandemic. For all other cancer entities, no statistical significant differences in frequencies before and during the pandemic were found. Mean age of the total sample was 59.4 years (SD = 14.2). The 2 years prior to the COVID-19 pandemic were combined for all further analysis, representing the reference period before the pandemic. There were no statistically significant differences between these 2 years in income, level of education and occupational prestige.

Changes in SES indicators across all time periods are shown in Figure 1. Frequencies and subsample sizes are depicted in Table 1. Analysis of differences between the reference period before COVID-19 and the entire first year of the pandemic yielded highly statistically significant results with small effect sizes for all three SES indicators, that is, income (P < .001, d = 0.32), education level (P = .001, d = 0.19) and occupational prestige (P = .015, d = 0.2). People with

TABLE 1 Frequencies of indicators for socioeconomic status before and during the first year of the pandemic

		First pandemic year		
Indicator of socioeconomic status	2 years prior COVID-19 n (%)	March 2020-May 2020 n (%)	June 2020-October 2020 n (%)	November 2020-February 2021 n (%)
Monthly net household income				
<1300 Euro	189 (25.7)	12 (16)	33 (16.8)	34 (16)
1300-2200 Euro	261 (35.6)	21 (28)	55 (28.1)	67 (31.6)
>2200 Euro	284 (38.7)	42 (56)	108 (55.1)	111 (52.4)
Education level				
Primary education	78 (10.6)	7 (9.3)	12 (6.1)	11 (5.2)
Secondary education (<12 years education)	328 (44.7)	33 (44)	79 (40.3)	83 (39.2)
Postsecondary/tertiary education (≥12 years education)	328 (44.7)	35 (46.7)	105 (53.6)	118 (55.7)
Occupational prestige				
Blue collar worker or unemployed	156 (44.4)	7 (26.9)	33 (36.7)	36 (34)
White collar worker/employees	195 (55.6)	19 (73.1)	57 (63.3)	70 (66)
N	734	75	196	212
Response rate	77.3%	73.5%	78.1%	71.4%

Note: N = 1217.

TABLE 2 Types of cancer in the sample

	2 years prior COVID-19		First year of COVID-19 pandemic	
Cancer type	N	Percent	N	Percent
Hematological	127	17.3	178	36.9
Breast	90	12.3	45	9.3
Lung	74	10.1	35	7.2
Soft tissue	74	10.1	37	7.7
Colon/rectum	56	7.6	25	5.2
Head and neck	50	6.8	27	5.6
Kidney/urinary tract/bladder	44	6.0	18	3.7
Pancreas	34	4.6	21	4.3
Brain	29	4.0	16	3.3
Prostate	23	3.1	9	1.9
Stomach/esophagus	22	3.0	8	1.7
Hepatobiliary	19	2.6	7	1.4
Malignant melanoma	17	2.3	12	2.5
Female genital organs	6	0.8	2	0.4
Thyroid	4	0.5	1	0.2
Testis	2	0.3	2	0.4
Other	63	8.6	40	8.3
Total	734	100	483	100

low income, low education level and low occupational prestige were, on average, less likely to seek treatment at the outpatient oncology and hematology center during the first year of the COVID-19 pandemic than the 2 years before the pandemic.

A more detailed analysis of four time periods, one before the pandemic and three within the first year of the pandemic, showed statistically significant overall differences between those four time periods in income and education level, but not for occupational prestige. For income, all three time periods of the pandemic year were significantly different from the years before the pandemic, showing small effect sizes. Education level decreased significantly only during the second lockdown, also with a small effect size. Statistical figures for post hoc tests are depicted in Table S2.
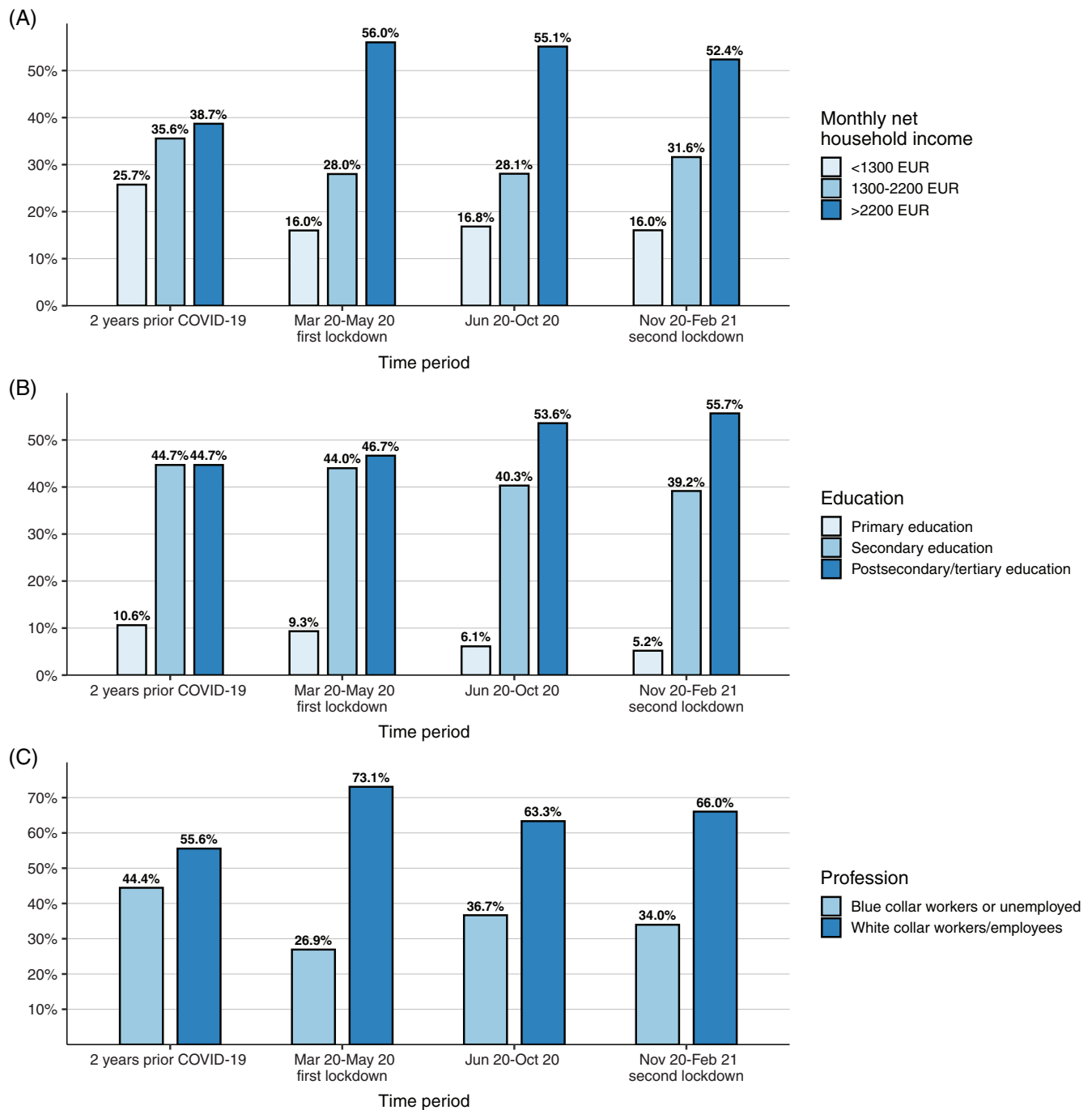
FIGURE 1 Indicators of socioeconomic status of patients seeking cancer care before and during the first year of the COVID-19 pandemic. The figure shows changes in three indicators of socioeconomic status over different time periods. The bar charts on the left represent the combined 2 years before the pandemic (March 2018-February 2020). The remaining three bar charts represent three distinct time periods within the first year of the pandemic [Color figure can be viewed at wileyonlinelibrary.com]

Examining those aspects in patients with a hematologic diagnosis, only, the same results were found. During the first year of the pandemic, people with low income ($P < .001$, $d = 0.48$), low education level ($P < .001$, $d = 0.34$) and low occupational prestige ($P = .063$, $d = 0.2$) were less likely to seek cancer care at our outpatient center. Other cancer entities were not analyzed separately because the subsamples were too small, resulting in multiple cell counts below 5 and thus unreliable results.

4 | DISCUSSION

Our results show that people with lower SES were less frequently seen in our outpatient clinic during the first pandemic year compared to the 2 years before the pandemic, indicating an aggravating impact of the COVID-19 pandemic on already existing health care disparities. The findings support the observations by Balogun and colleagues[6] from the United States that already existing disparities in cancer

treatment and screening associated with low SES are exacerbated by the pandemic.[6,8]

In the present study, the changes in income level were consistent throughout the whole pandemic year and showed the largest effects of all three SES indicators in the total sample and in the subsample with a hematologic diagnosis. Education level did not differ in the first months of the pandemic but increased significantly during the second lockdown, indicating an alarming trend of fewer people with low SES receiving cancer treatment. Employment status showed comparable effect sizes, but did not reach statistical significance in the multigroup comparison in both in the total sample and the subsample with a hematologic diagnosis. This was presumably due to the reduced sample size for this analysis. It is worth noting that people living in Austria are provided with health insurance regardless of their employment. In countries where insurance coverage is highly dependent on employment status, this aspect may have a far more aggravating impact on health care. Furthermore, in low- and middle-income countries, cancer care for people with low SES may be even more affected by the COVID-19 pandemic than in high-income countries such as Austria or the United States.[9]

People with low SES are generally more burdened by stressors and tend to underestimate the importance of cancer screening and cancer care.[10] The fear of a possible COVID-19 infection in the hospital may have outweighed the perceived benefit of cancer care. There are indications for general reductions in cancer screening and diagnoses, especially in countries were cancer screening services had been temporarily suspended like in the United Kingdom.[11] In Austria, cancer screening and health care services were never closed, but it may be that patients did not use these services for fear of COVID-19 infection. Recent studies indicate that people with low SES tend to have more fear of COVID-19,[12] and that an elevated fear of COVID-19 is linked to delays in care among patients with cancer.[13] The decline of people with low SES in our outpatient center may therefore also be associated with a decline in cancer screening and diagnosis in this population. This would also suggest that people with low SES are underutilizing health services during the pandemic compared to people with high SES.

Our outpatient center offers care with low-threshold access, and does not require a referral from a GP or specialist. However, during the first year of the pandemic, hospital access requirements (eg, mandatory face masks) were in place and often changed on short notice. People with low SES may not have been able to gather this information (eg, what type of face mask or what type of COVID-19 test was needed) in time to access the hospital. Additionally, because people with low SES often have jobs with inflexible work schedules, it may have been difficult for them to return at a later date with the mandatory access requirements.

In the early months of the pandemic, teleconsultations were increased to reduce face-to-face contacts. Aftercare visits that could be easily rescheduled without negative consequences for the patient were also postponed. These actions were not related to SES and are not expected to affect our results. Importantly, our outpatient center remained open to any patient seeking consultation or treatment.

4.1 | Limitations

We analyzed data from voluntary participants. Not every single patient visiting the oncology and hematology center was included, which can result in selection bias. However, there were no differences in response rates between time periods, indicating no specific bias. Still, it could be that response patterns changed and people with low SES were less likely to participate in our study during the pandemic. As discussed, people with low SES are generally more burdened by stressors. The stress of the pandemic could have led to a reduced response rate of people with low SES compared to people with higher SES.

Furthermore, our sample during the pandemic contained more patients with a hematologic diagnosis than the sample before the pandemic. This can be a potential bias and limits the generalizability of our results. Other cancer entities were equally distributed in the two samples. To tackle this potential bias, we examined the subsample of patients with a hematologic diagnosis, separately and confirmed the results found in the total sample. Furthermore, we did not assess stage of cancer or the necessity of treatment as these aspects are generally not SES-dependent.

5 | CONCLUSIONS

Cancer outpatients with low SES were less frequently seen during the first year of the COVID-19 pandemic compared to the years before the pandemic. Despite having a significant impact on survival, this prognostic factor is currently neither integrated into routine care nor counteracted by specific programs addressing the needs of patients with low SES. The uptake of telemedicine and easily accessible medical support close to home could be promising strategies,[14] if designed as a low-threshold offer tailored to the needs of people with low SES. Furthermore, public health strategies, such as health education programs, should be enforced to communicate the importance of continuity of health care for chronic diseases such as cancer despite the presence of the pandemic.

AUTHOR CONTRIBUTIONS
Elisabeth L. Zeilinger: Conceptualization, Methodology, Formal analysis, Investigation, Data Curation, Writing—Original Draft, Visualization, Project administration. Simone Lubowitzki: Investigation, Data Curation, Writing—Review & Editing, Project administration. Matthias Unseld: Investigation, Data Curation, Writing—Review & Editing,

Project administration. Carmen Schneckenreiter: Investigation, Data Curation, Writing—Review & Editing, Visualization. Daniel Heindl: Investigation, Data Curation, Writing—Review & Editing. Philipp B. Staber: Investigation, Writing—Review & Editing. Markus Raderer: Investigation, Writing—Review & Editing. Peter Valent: Investigation, Writing—Review & Editing. Sabine Zöchbauer-Müller: Investigation, Writing—Review & Editing. Rupert Bartsch: Investigation, Writing—Review & Editing. Gerald Prager: Investigation, Writing—Review & Editing. Ulrich Jaeger: Investigation, Writing—Review & Editing. Alexander Gaiger: Conceptualization, Methodology, Writing—Review & Editing, Supervision, Project administration.

DATA AVAILABILITY STATEMENT

The data that support the findings of our study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

The study was approved by the institutional ethics committee of the Medical University of Vienna, Austria (EC Nr: 2255/2016; 1241/2021). Informed consent was obtained from each study participant.

ORCID

Elisabeth L. Zeilinger https://orcid.org/0000-0002-0625-500X
Matthias Unseld https://orcid.org/0000-0002-1699-9846
Gerald Prager https://orcid.org/0000-0002-7854-7781

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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