Short Communication

Educational inequalities in risk perception, perceived effectiveness, trust and preventive behaviour in the onset of the COVID-19 pandemic in Germany

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ABSTRACT

Objectives: This study analysed educational inequalities in risk perception, perceived effectiveness, trust and adherence to preventive behaviours in the onset of the COVID-19 pandemic in Germany.
Study design: This was a cross-sectional online survey.
Methods: Data were obtained from the GESIS Panel Special Survey on the coronavirus SARS-CoV-2 Outbreak in Germany, including 2949 participants. Stepwise linear regression was conducted to analyse educational inequalities in risk perception, perceived effectiveness, trust and adherence to preventive behaviours considering age, gender, family status and household size as covariates.
Results: We found lower levels in risk perception, trust towards scientists and adherence to preventive behaviour among individuals with lower education, a lower level of trust towards general practitioners among individuals with higher education and no (clear) educational inequalities in perceived effectiveness and trust towards local and governmental authorities.
Conclusion: The results underline the relevance of a comprehensive and strategic management in communicating the risks of the pandemic and the benefits of preventive health behaviours by politics and public health. Risk and benefit communication must be adapted to the different needs of social groups in order to overcome educational inequalities in risk perception, trust and adherence to preventive behaviour.

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Introduction

Risk communication and adherence to preventive behaviour are core elements of the success of public health interventions to prevent and decrease the spread of infection diseases, such as the COVID-19. Since its official declaration as a pandemic in March 2020, Germany has undertaken different measures to prevent the spread of SARS-CoV-2 accompanied by the communication of risks of SARS-CoV-2.[1]

The successful containment of the pandemic by appropriate preventive behaviours and a support of public health measures strongly depends on risk perception, perceived effectiveness of interventions and trust towards individuals and institutions handling the pandemic. COVID-19-related studies suggest that individuals with low educational status show less COVID-19 preventive behaviours than others.[2–4] Moreover, single studies indicated lower risk perception, perceived effectiveness and trust among individuals with a lower educational status.[1,3,5,6]

This study builds on previous single studies and aims to analyse differences in risk perception, perceived effectiveness, trust towards different authorities and adherence to preventive behaviours by educational status in the onset of the COVID-19 pandemic in Germany. In contrast to previous studies, this study allows a direct comparison of educational differences of factors important for the successful containment of the pandemic. The main research question is whether risk perception, perceived effectiveness, trust towards different authorities and adherence to preventive behaviours differ by educational status and whether an adaption of public health strategies in communicating the risks of the pandemic and benefits of preventive behaviour is required.

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Methods

Study population

We used data from the GESIS Leibniz Institute for the Social Sciences panel's subsample of online respondents (n = 3186). Data for the present study were collected from 16 to 29 March 2020 − the onset of the pandemic in Germany − and included German-speaking individuals aged between 18 and 70 years.[7]

Measurements

Outcomes

Risk perception was measured by a sum score of five items. These capture the respondents' assessment of the likelihood that they or someone in their immediate environment would become infected with SARS-CoV-2, would need hospitalisation due to a SARS-CoV-2 infection, would need to be in quarantine or would infect other persons in the next 24 months (ranging from 0: 'not at all likely' to 7: 'absolutely likely'; Cronbach's alpha: 0.82).

Perceived effectiveness was measured by a sum score of seven items that captured respondents' perceptions of effectiveness against policy measures taken to close public and private sector facilities, ban visits to facilities with vulnerable groups and movement restrictions (ranging from 0: 'not effective at all' to 7: 'very effective'; Cronbach's alpha: 0.87).

As part of the survey, respondents were asked whether and to what extent they trust different authorities handling with the COVID-19 pandemic (ranging from 0: 'do not trust at all' to 4: 'trust completely'): the general practitioner, local authorities (local health authority, municipal and city administration), governmental authorities (Robert Koch Institute, Federal Chancellor, Federal Government, Ministry of Health) and scientists.

Preventive behaviour was measured by a sum score of eight items on behaviour to decrease risks of a COVID-19-infection in the past 7 days (Cronbach's alpha: 0.52): avoidance of certain places, maintaining a minimum distance, adjusting school and work situations, quarantine measures, more frequent and prolonged hand hygiene, use of disinfectants, stocking up on water and food, reduced personal contacts and wearing a face mask (response options: 'No' and 'Yes').

All outcomes were scaled on a range of 0−100.

Independent variables

Educational level was measured using the ISCED-97 scale (12) and was recoded into three categories (low, intermediate and high). Covariates were gender, age (ten 5-year categories), marital status (unmarried, married or in partnership, widowed and divorced) and household composition (one, two or three or more persons).

Statistical analyses

We excluded participants with missing information on variables for any of the considered variables (n = 2949). First, sample characteristics were described by percentages, mean levels and standard deviations (SDs). Second, stepwise linear regression was conducted in which education (M1), age (as continuous variable) and gender (M2), family status (M3) and household size (M4) were successively included in the models. The degree of model fit was assessed with R^2.

Results

The study population included 51.2% men and 48.8% women. The proportions of age groups ranged from 2.3% (aged <25 years) to 26.7% (aged 51−65 years). Overall, 66.3% of the respondents were married, 22.2% unmarried, 7.7% divorced and 3.7% widowed. Moreover, 48.5% lived in a two-person household, 40.3% in a household with three or more household members and 11.2% in a single household. A total of 10.9% of the respondents had a low, 31.4 had an intermediate and 57.7% had a high educational status. The mean level of risk perception was 50.7 (SD: 17.3), of perceived effectiveness 79.1 (SD: 16.9), of trust towards general practitioner 78.7 (SD: 23.1), of trust towards local authorities 65.5 (SD: 21.4), trust towards governmental authorities 71.7 (SD: 21.5), of trust towards scientists 80.9 (SD: 19.9) and of adherence to preventive behaviour 49.6 (SD: 15.8).

Compared with respondents with high educational status, lower educated respondents had a significantly decreased risk perception, trust towards scientists and adherence to preventive behaviour, independently from model specification (see Table 1). For trust towards governmental authorities, the results showed significant lower values for respondents with an intermediate educational status; significant differences between high and low educated respondents were not found. A reversed educational gradient was observed for trust towards general practitioners with significantly higher trust levels for intermediate and low educated respondents compared with high educated respondents. No clear significant educational inequality was found for perceived effectiveness and trust towards local authorities.

In the regression analyses, some of the sociodemographic factors were related to the outcomes considered (see Supplementary Tables S1−S7). Older individuals were significantly more likely to report lower risk perception and prevention behaviours but consistently had higher trust scores. Women were significantly more likely than men to perceive containment measures as effective and to report higher levels of trust in local and government authorities and to engage in prevention behaviours. Finally, singles, in contrast to married individuals, had significantly lower risk perceptions, lower perceived effectiveness and lower trust in local authorities and prevention behaviours. In addition to educational status, the associations found were particularly strong for age and gender.

Discussion

Main findings

We found lower levels in risk perception, trust towards scientists and adherence to preventive behaviour among individuals with lower education. There was a lower level of trust towards general practitioners among individuals with higher education and no (clear) association of educational status with perceived effectiveness of containment measures and trust towards local and governmental authorities.

The finding of significant associations of educational status with risk perception, trust towards scientists and adherence to preventive behaviour complies with other studies.[1,3,8] However, as this study was conducted in the onset of the pandemic in Germany, associations might have changed over time as shown in the study of Rattay et al.[1] Moreover, lower education was associated with lower levels of trust towards scientist, which might be explained by a lower scientific knowledge of lower educated individuals and an inadequate communication of scientific evidence to lower educated individuals.[9] We found higher levels of trust towards general practitioners among lower educated individuals as found in a study among U.S. cancer patients.[10] This might be explained by a generally higher tendency of people with a lower education to not question the medical profession's actions. Finally, perceived effectiveness of containment measures was generally at a higher level and did not significantly vary by educational status, which undermines the general trust towards the efficacy of local and governmental measures in terms of COVID-19. Moreover, age, gender and family were

Table 1
Stepwise linear regression for risk perception, perceived effectiveness, trust and adherence to preventive behaviour by educational status (GESIS Online Panel 2020, n = 2949).

Model (M)	Risk perception	Perceived effectiveness	Trust towards				Adherence to preventive behaviour
			General practitioner	Local authorities	Governmental authorities	Scientists	
	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)
M1							
High educational status	*Reference category*						
Intermediate educational status	−2.6*** (−3.9, −1.2)	1.2 (−0.1, 2.6)	3.6*** (1.8, 5.5)	2.2* (0.5, 3.9)	−1.6 (−3.3, 0.1)	−2.4** (−4.0, −0.8)	−2.8*** (−4.0, −1.5)
Low educational status	−5.6*** (−7.6, −3.5)	−0.2 (−2.2, 1.8)	5.7*** (3.0, 8.5)	3.5** (0.9, 6.0)	−1.0 (−3.5, 1.6)	−2.9* (−5.2, −0.5)	−4.7*** (−6.6, −2.9)
R^2	0.012	0.001	0.009	0.004	0.001	0.004	0.012
M2							
High educational status	*Reference category*						
Intermediate educational status	−1.1 (−2.5, 0.2)	0.9 (−0.5, 2.3)	1.8 (−0.0, 3.7)	1.3 (−0.4, 3.0)	−2.9** (−4.6, −1.1)	−2.9*** (−4.5, −1.3)	−2.9*** (−4.1, −1.6)
Low educational status	−3.3** (−5.4, −1.3)	0.1 (−1.9, 2.1)	3.0* (0.2, 5.7)	2.7* (0.1, 5.2)	−2.3 (−4.9, 0.3)	−3.6** (−6.1, −1.2)	−4.2*** (−6.1, −2.3)
R^2	0.055	0.020	0.044	0.015	0.022	0.010	0.036
M3							
High educational status	*Reference category*						
Intermediate educational status	−1.2 (−2.6, 0.2)	0.8 (−0.6, 2.2)	1.9* (0.1, 3.8)	1.3 (−0.4, 3.1)	−2.8** (−4.6, −1.1)	−2.7** (−4.3, −1.1)	−3.0*** (−4.3, −1.7)
Low educational status	−3.3** (−5.4, −1.3)	0.2 (−1.9, 2.2)	3.2* (0.4, 6.0)	2.7* (0.1, 5.3)	−2.2 (−4.8, 0.4)	−3.5** (−5.9, −1.0)	−4.1*** (−6.0, −2.2)
R^2	0.058	0.024	0.046	0.015	0.028	0.013	0.044
M4							
High educational status	*Reference category*						
Intermediate educational status	−1.2 (−2.6, 0.2)	0.8 (−0.6, 2.2)	1.9* (0.1, 3.8)	1.3 (−0.4, 3.1)	−2.9** (−4.6, −1.1)	−2.7** (−4.3, −1.1)	−3.0*** (−4.3, −1.7)
Low educational status	−3.3** (−5.3, −1.2)	0.2 (−1.8, 2.2)	3.1* (0.4, 5.9)	2.6* (0.0, 5.2)	−2.3 (−4.9, 0.3)	−3.5** (−5.9, −1.1)	−4.0*** (−5.9, −2.1)
R^2	0.058	0.024	0.047	0.017	0.029	0.013	0.046

CI, confidence interval; M1, bivariate model; M2, M1 + age and sex; M3: M2 + family status; M4: M3 + household type.
*$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

significantly related to risk perception, perceived effectiveness, trust and adherence to preventive behaviours, which is in line with previous studies.[1,3–6] To reach individuals with a low educational status as well as other social groups, planned risk management by leadership in times of pandemic is necessary.[11]

Methodological issues

It is an asset that we used data from a representative population-based survey conducted at the onset of the COVID-19 pandemic. One limitation of this study is the lack of information on pandemic knowledge that might strongly interrelate with risk perception, perceived effectiveness and adherence to preventive behaviour. As the survey was conducted at the onset of the pandemic and cross-sectionally, we were not able to analyse how appraisals might have changed over the course of the pandemic. Moreover, the interpretation of the results and the level of disparities found by educational status may be influenced by the scaling of the outcome variables as well as by the different response categories of the raw items of the respective outcomes. Scaling the variables to an index from 0 to 100 allows for a comparison of coefficients across the outcome variables but permits only imprecise conclusions about how strong the disparities found are for a single outcome. Moreover, the comparability of the outcomes may be affected by the different response categories of the raw items, for example, by a different response pattern. Finally, it is known that some of the used outcomes may depend on factors, such as income, health status or personal traits, which have not been surveyed and may explain the low explained variance found in our study.[1,3,5,6]

Implications

The study indicates educational inequalities in risk perception, trust towards scientists and adherence to preventive behaviour in the onset of the COVID-19 pandemic in Germany. The results underline the relevance of a comprehensive and strategic management in communicating the risks of the pandemic and the benefits of preventive health behaviours by politics and public health. Risk and benefit communication must be adapted to the different needs of social groups to overcome educational inequalities in risk perception, trust and adherence to preventive behaviour.

Author statements

Ethical approval

Not required. This study analysed anonymised data for scientific purposes.

Competing interests

None declared.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.puhe.2022.02.021.

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