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Mechanisms behind COVID-19 scepticism among socially marginalised individuals in Europe

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ABSTRACT

Homeless and materially disadvantaged people are considered particularly vulnerable to COVID-19 infection. So far, there is no systematic knowledge about how the homeless and materially disadvantaged people perceive the risks of COVID-19 and what factors influence the development of sceptical views and underestimation of dangers posed by the virus. The aim of our study is therefore to: (1) Explore COVID-19 risk perception of socially marginalised individuals, focusing on their assessment of the probability of getting infected by the virus and the perceived harmful consequences of the disease; and (2) examine the factors influencing COVID-19 risk beliefs of these individuals. We use cross-sectional survey data with 273 participants from eight countries and data from 32 interviews and five workshops with managers and staff of social care organisations in ten European countries. Our results indicate that among survey participants, 49% can be labelled COVID-19 sceptics with regard to probability of getting infected, and 38% with regard to harmful consequences of the disease. We find that COVID-19 scepticism is related to low levels of all types of social capital, low trust in information from authorities and being a minority. However, the most important predictor is the respondents' general lack of concern about health risks. Additionally, the qualitative data indicates the multifaceted nature of COVID-19 scepticism, as it may relate to the origins of COVID-19, the probability of infection, its consequences and protective measures, among others. Improved understanding about factors influencing COVID-19 scepticism in these groups contributes to a better understanding of the information disorder during crises, and the ways in which this could be managed through policies against marginalisation, including in disaster risk reduction.

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1. Introduction

The COVID-19 pandemic has challenged the world with the experience of a long-term crisis. Demonstrating a large spectrum of vulnerabilities that can arise during long-term crises, the pandemic has highlighted the need to inform, motivate and support individuals to pursue protective measures to mitigate these vulnerabilities (Brown, Coventry, and Pepper 2021; Robinson et al. 2021). In the context of the information disorder that is particularly prominent during crises, it is important to understand how individual, social-structural and situation-specific factors affecting the availability, comprehension and response to crisis information can further aggravate vulnerabilities (Hansson et al. 2021).

Groups who are at high-risk of severe COVID-19 impacts like the elderly, people with health conditions and frontline workers (e.g. Lesley et al. 2021; Seifert 2021; Sperling 2021) are well-known. The needs of socially marginalised individuals—such as people living in material deprivation and the homeless—in dealing with vulnerability from coronavirus are increasingly recognised (e.g. Holmes et al. 2020; Orru et al. 2021a; Rosenthal et al. 2020; Tsai and Wilson 2020).

As Siegrist, Luchsinger, and Bearth (2021, 797) state, ‘Health risk perception is the strongest predictor of people’s acceptance of the implemented measures and of their behaviour’. In other words, risk perception is an important driver for the acceptance of the governments’ implemented measures to control COVID-19 (Entradas 2022; He et al. 2021; Siegrist, Luchsinger, and Bearth 2021; Wang et al. 2021). The inverse is also true, as risk misperceptions and conspiracy beliefs, which downplay the seriousness and trivialise the threat posed by COVID-19, are likely to hinder health protective behaviour (Chayinska et al. 2022; Rothmund et al. 2020).

Evidence on higher mortality rates, increased risk of getting infected, and being a hospital case in the most deprived areas and among individuals with socioeconomic disadvantages mounted as the pandemic evolved (e.g. Baena-Díez et al. 2020; Mena et al. 2021; Niedzwiedz et al. 2020; Office for National Statistics 2020; Riou et al. 2021). It is therefore particularly important to study COVID-19 scepticism in socially marginalised groups like homeless people, as these have a higher probability of being infected with COVID-19 and are more likely to suffer severe consequences if they become infected (Tsai and Wilson 2020). Furthermore, the care organisations that normally offer material support and guidance to these individuals have struggled in coping with the demands of the pandemic (Orru et al. 2021a).

So far, there are only a few studies on the factors influencing COVID-19 scepticism within the general population (e.g. Küppers et al. 2021; Latkin et al. 2022), and even less information is available on how the homeless and materially disadvantaged people interpret the risks related to COVID-19. The aim of our study is to fill this gap in knowledge by: (1) exploring COVID-19 risk perception of socially marginalised individuals, focusing on their assessment of the probability of getting infected by the virus and the perceived harmful consequences of the disease; and (2) examining the factors influencing COVID-19 risk beliefs of these individuals. We use cross-sectional survey data with 273 participants from eight countries and data from 32 interviews and five workshops with managers and staff of social care organisations in ten European countries.

In this article, we refer to low risk perception related to COVID-19 as ‘COVID-19 scepticism’. We follow Latkin et al. (2022) definition of COVID-19 scepticism as ‘the denial of the seriousness of the illness and the perception that the pandemic is overblown or a hoax’ (Latkin et al. 2022).

Understanding the mechanisms behind COVID-19 scepticism among socially marginalised individuals builds the basis for helping those in need to access and understand risk and crisis information. We hope to contribute to discussions on strategies that allow coping with the information disorder in the long-term and complex crises like a pandemic.

2. Theoretical background and previous research

2.1. Defining COVID-19 scepticism

Sjöberg, Moen, and Rundmo (2004) define risk perception as 'the subjective assessment of the probability of a specified type of accident happening and how concerned we are with the consequences. To perceive risk includes evaluations of the probability as well as the consequences of a negative outcome' (Sjöberg, Moen, and Rundmo 2004). Accordingly, the literature on perceiving COVID-19 (and other diseases) related risks addresses the denial of existence of the virus as well as its impacts. However, the distinction between scepticism and risk denial, doubt and low risk perception in the literature is blurred. Drawing from the conceptual framework of climate change scepticism (Rahmstorf 2004), Küppers et al. (2021) distinguish between COVID-19 trend sceptics (who deny that there is a pandemic or a virus at all), attribution sceptics (who acknowledge the threat imposed by the virus, but deny its natural origin and claim that it is manufactured) and impact sceptics (who see the virus as harmless, with typical beliefs including that the virus is not worse than a casual flu). Henceforth, we apply 'scepticism' to describe individuals who perceive a low risk associated with a) getting infected with COVID-19 and b) the consequences of coronavirus disease. And we look at the factors influencing these beliefs among the socially marginalised individuals.

When considering the various harmful understandings about the pandemic, we rely on a typology devised by Hansson et al. (2021), who distinguish six types of related messages: (1) undermining the use of protective measures; (2) encouraging the use of harmful remedies; (3) false information regarding the mechanisms of spreading the virus; (4) denial of the threat or false predictions regarding its ending; (5) frightening people to facilitate fraud; (6) harassment of the alleged culprits.

2.2. Beliefs of socially marginalised individuals regarding the risks of COVID-19

While evidence on socio-economic inequalities worsening the pandemic outcomes is emerging (e.g. Baena-Díez et al. 2020; Niedzwiedz et al. 2020; Riou et al. 2021), to the best of our knowledge so far only Allaria et al. (2021) have focused on how the hazards of coronavirus were perceived by the homeless and what their practices to protect themselves were. Although COVID-19 was perceived as a risk by homeless people, the experience of being homeless placed this risk among other priorities of self-preservation, such as maintaining a place to live, access to food and health-care (Allaria et al. 2021). Among the general population, research showed varying levels of perceived risk (He et al. 2021) and of anxiety (Shiina et al. 2021) in different countries.

2.3. Factors influencing beliefs on the risks of COVID-19

In the following, we summarise the theoretical background on the mechanisms behind COVID-19 risk perception among the general population.

2.3.1. Socio-demographic factors

Several studies have found females to perceive higher COVID-19 related risk than males (Dryhurst et al. 2020; He et al. 2021; Siegrist, Luchsinger, and Bearth 2021; Wang et al. 2021). In accordance with older age being a risk factor for more severe COVID-19 cases, multiple studies have found it to be positively related to higher risk perception of COVID-19 (Brown, Coventry, and Pepper 2021; Entradas 2022; Giordani et al. 2022; He et al. 2021; Wang et al. 2021; Latkin et al. 2022), although in some cases (Küppers et al. 2021; Siegrist, Luchsinger, and Bearth 2021) age was not shown to be a significant predictor. While individuals with higher income and economic activity perceive higher COVID-19 related risks (Giordani et al. 2022; He et al. 2021), those with

lower income and education as well as racial and ethnic minorities were more susceptible to conspiracy beliefs about the pandemic (Bavel et al. 2020; Romer and Jamieson 2020).

2.3.2. Health and health worries

Poorer personal health as a factor influencing risk perception related to COVID-19 has also been pointed out (Latkin et al. 2022; Rothmund et al. 2020; Siegrist, Luchsinger, and Bearth 2021). Thus, it seems that general concern about one's own physical health and a general fear of becoming ill could be an important factor explaining the relationships between, for example, age and risk perception of COVID-19. In accordance with this, previous studies have also found a relationship between health anxiety and fear of being infected with COVID-19 (e.g. Mertens et al. 2020). Health anxiety refers to the tendency to misinterpret normal or benign physical symptoms and believe that one has or is acquiring a serious illness, in the absence of any actual illness (Mertens et al. 2020).

Drawing from the above literature, we expect the results of our survey to show a higher number of COVID-19 sceptics among men (Hypothesis 1) and among younger respondents (Hypothesis 2). Additionally, we expect people who generally have higher levels of health worries (fear of becoming ill) to have a higher COVID-19 risk perception (Hypothesis 3). Moreover, we expect people who report belonging to minorities and migrants to be more sceptical, perceiving less COVID-19 risk (Hypothesis 4). We additionally explore whether living conditions affect the risk perception of vulnerable individuals.

2.3.3. Psychosocial factors

Trust in government actors plays an important role in compliance with pandemic regulations (Bargain and Aminjonov 2020; Bavel et al. 2020; Blair, Morse, and Tsai 2017). In addition, it has been found to be strongly related to risk perception, which in turn fights pandemic fatigue and further reduces non-compliance with public health regulations (Scandurra et al. 2023). General trust in politicians and government lowers concerns about COVID-19 (Dryhurst et al. 2020; Entradas 2022), while believing that the government honestly informs the public about the pandemic indicates more health fears (Siegrist, Luchsinger, and Bearth 2021). We hypothesise that trust in the information that the government provides about the measures to mitigate the virus is negatively correlated with COVID-19 scepticism (Hypothesis 5).

2.3.4. Socio-structural factors

In the context of the COVID-19 pandemic, not only the sources of information but also exposure to it and behaviours of seeking it may impact the perception of virus-related risks. Wang et al. (2021) found that risk exaggerators were more likely to obtain COVID-19 information from multiple sources, whereas risk deniers may even ignore COVID-19 related information and actively refrain from seeking it (Wang et al. 2021). Reliance on television as a source of information was unambiguously linked to perceived severity of pandemic-related risk (Entradas 2022; He et al. 2021; Romer and Jamieson 2020; Rothmund et al. 2020). Low trust in news sources and public media has also been found to make individuals more susceptible to false information (Hansson et al. 2020, 2021; Torpan et al. 2021). Trusting and paying attention to social media as a source of COVID-19 related information had a decreasing effect on perceived risk of COVID-19 (Entradas 2022; He et al. 2021; Rothmund et al. 2020). However, the role of social media in spreading misinformation and conspiracy beliefs about the pandemic has been well documented (e.g. Allington et al. 2021; Hansson et al. 2021). We expect to find reliance on mainstream media (TV, radio, daily newspapers) and social workers as the main sources of information to be a prerequisite for perception of high risk and social media as a source of news to provoke COVID-19 scepticism (Hypothesis 6).

Social capital can have a significant impact on how beliefs regarding risks influence individuals (Morsut et al. 2022). Research on the role of social capital shaping risk perception has found mixed results. General trust in other people has been associated with lower perceived COVID-19-related health risk (Siegrist, Luchsinger, and Bearth 2021), while Latkin et al. (2022) found that COVID-19 sceptics reported a lower proportion of friends who adhered to social distancing. We hypothesise all types of social capital (bonding, bridging and linking) to be negatively correlated with being a COVID-19 sceptic (Hypothesis 7).

2.3.5. Exposure and experience related factors

The level of risk perception is found to be in line with the COVID-19 infection level in the region. Anxiety about the disease is measured higher in countries with higher rates of infection (Shahin and Hussien 2020; Shiina et al. 2021). On the individual level, being infected or having infected family members or acquaintances predict higher risk perception (Dryhurst et al. 2020; Giordani et al. 2022; Shiina et al. 2021). We hypothesise that COVID-19 scepticism among vulnerable people is negatively correlated with the infection rate of the country (Hypothesis 8) and personal exposure to the virus (Hypothesis 9).

3. Methods

To test our hypotheses, we combined quantitative data drawn from the survey with 273 participants in socially marginalised situations from eight European countries with 32 qualitative personal interviews and five workshops with managers and staff of social care organisations in ten European cities. More detailed data on the interviews and workshops is presented in the [Appendix](#). Such a multifaceted approach enabled us to collect data directly from individuals currently facing social disadvantages and complement it with in-depth interviews reflecting experiences of social workers that attended to them daily.

3.1. Quantitative survey

We carried out a cross-sectional questionnaire survey among the clients of Salvation Army and similar care organisations providing services like food aid, night shelter and long-term accommodation in Belgium, the Czech Republic, Estonia, Hungary, the Netherlands, Norway, Portugal and Spain. Participants were recruited mainly in the second half of 2020 and the first half of 2021, and were asked to rate their experiences with COVID-19 since March 2020. The study was approved by the research ethics committees in all the participating countries.

3.1.1. Survey themes

The following survey themes and their operationalisation used in this study were set forth in Orru et al. (2021b). Some of the variables that we use are included as background variables that we control for in the multivariate analyses, and others are key independent variables that we use to test our hypotheses. Below, we indicate which variables we use to test our hypotheses by referring to each hypothesis in the text behind the relevant variables. In this section, we present the key dependent variables first, then the background variables that we control for in the analyses and, finally, the key independent variables that we use to test our hypotheses (1-9).

Risk perception: The key dependent variables that we examine in the present study are related to risk perception. We measure risk perception by the following statements: 'I don't believe the virus causes me notable harm' (perceived consequences of the disease), and 'Since March 2020, I have been afraid of being infected with COVID-19' (perceived probability of getting infected by the virus). Answer alternatives ranged from 1 (totally disagree) to 5 (totally agree) for all statements.

Living arrangements: We mainly focus on the level of protection provided by living arrangements as a source of social marginalisation and use the Framework for Understanding Homelessness on a Global Scale (Busch-Geertsema, Culhane, and Fitzpatrick 2016) that allows us to classify people without accommodation, people living in temporary or crisis accommodation and people living in severely inadequate and/or insecure housing.

Psychological and physiological health: We apply Nikoo et al. (2015) enumeration of the frequent physical and mental illnesses among individuals in precarious material situations. We asked: 'Have you ever been told by a doctor that you have any of the following conditions?' provided 15 different answer alternatives and made two variables of these. The variable 'physiological diagnoses' concerns heart and lung conditions (i.e. risk group), while the variable 'psychological diagnoses' includes schizophrenia, depression and personality disorders. We control for these variables in our multivariate analyses, when we test our hypotheses.

Demographic variables: The survey includes questions about sex (cf. Hypothesis 1), age (cf. Hypothesis 2), residence status (national citizen, asylum seeker, residing in the country without documentation etc.) and whether respondents perceive that they represent a minority (cf. Hypothesis 3).

Health worries: Previous studies have found a relationship between health anxiety and worry about COVID-19 infection (Mertens et al. 2020). In this survey, we have a question measuring general health worries: 'I generally worry about risks related to my health (e.g. falling ill)' (cf. Hypothesis 4).

Trust in government information about COVID-19: We measure trust in government information about COVID-19 (cf. Hypothesis 5) with the statement: 'I trust the information that the government of this country provides on the ways of avoiding COVID-19 infection'. Answer alternatives ranged from 1 (totally disagree) to 5 (totally agree).

Information sources: Respondents were asked: 'What have been the two most important sources of information for you on the pandemic? Please name two sources'. (cf. Hypothesis 6). Respondents could choose between 12 answer alternatives, including television, newspaper, social media, friends, their own observations, police and social workers.

Social capital (cf. Hypothesis 7): Social capital includes aspects related to bonding (the degree and quality of close social relationships, e.g. friends, family), bridging (the degree of respondents' connectedness to their neighbourhood and local environment) and linking social capital. The latter is closely related to trust in government information about COVID-19 as linking capital measures trust in authorities. We measure bonding social capital based on social support and community attachment scales by Lin, Hirschfeld, and Margraf (2019). Bonding capital: 'I experience a lot of understanding and security from others'; 'I know a very close person whose help I can always count on'; 'I know several people with whom I like to do things'. Bridging capital: 'I regularly stop and talk with people in the area where I live'; 'I feel like I belong to the area where I live'. We measure linking social capital with the following questions, adapted from the European Social Survey core: 'I can trust police'; 'I can trust social workers'. Answer alternatives ranged from 1 (totally disagree) to 5 (totally agree) for all the statements.

Exposure to COVID-19: The survey measures exposure to COVID-19 in several ways. We measure COVID-19 exposure at the country level. We have made a 'living in a country with a high infection rate' variable by combining the countries Portugal, Spain and the Czech Republic (cf. Hypothesis 8). These were the countries with the highest infection rate per inhabitant. In the rest of the paper, we refer to this variable as the Country COVID-19 exposure variable. We also asked respondents whether they have been infected themselves, whether friends have been infected and whether they have lost someone close due to COVID-19 (cf. Hypothesis 9).

3.1.2. Analyses

We use one-way Anova tests to compare whether the mean scores of different groups are equal (the null hypothesis) or (significantly) different. We use Chi square tests to compare groups' scores on particular variables if we, for instance, cannot compare means due to the variables'

level of measurement. The Chi square test verifies whether the actual distribution of groups on a variable is statistically significantly different from a coincidental distribution or an independent normally distributed sample.

We use hierarchical, linear regression analyses where independent variables are included in successive steps to assess the conditions explaining variation in the respondents' answers to two key variables: 'Since March 2020, I have (not) been afraid of being infected with COVID-19' and 'I don't believe the virus causes me notable harm'. The most basic independent variables are included first, such as age, sex, living arrangements. Then the other independent variables are included. The regression analyses enable us to examine the separate effects of the independent variables on the dependent variables, controlled for the other variables.

3.2. Qualitative data

We carried out 32 qualitative interviews and five workshops with managers and staff of government services and NGOs (such as the Red Cross and the Salvation Army) across 10 European countries (the Czech Republic, Estonia, Finland, Germany, Hungary, Italy, Lithuania, the Netherlands, Norway and Portugal) within the period from May 2020 to April 2021. A purposive sampling strategy was employed during the country studies to capture the experiences of four key types of organisations providing various services:

- Soup kitchens (and food banks) attended by people experiencing homelessness or those with difficulties coping due to their material or psychological situation;
- Day centres that offer counselling and hygiene facilities to the homeless and individuals with coping difficulties;
- Temporary shelters, including night shelters and refuges, for individuals who spend their day elsewhere; and
- Residential facilities offering 24/7 services, including resocialisation and alcohol and drug rehabilitation activities, which clients utilise for up to several months.

Upon written informed consent, the semi-structured interviews focused on: (1) the ways in which the organisation responded to the challenges introduced by the first wave of the COVID-19 pandemic; (2) what helped or hindered the response; and (3) what the effects on the organisation's clients were. Key informants were determined on the basis of their level of experience and involvement in addressing pandemic-related influences on the care organisation, whereas many interviewees were engaged with or oversaw several care organisations.

The same research questions were administered in five online workshops with the representatives of care organisations in Estonia, Hungary, Belgium and Norway from June to September 2021. The purpose of the workshops was to follow up the themes in the interviews and discuss these in a systematic way, delving deeper into the insights into how clients of care organisations coped with and perceived the pandemic. The study team members first introduced the results of individual interviews and the survey and then asked for participants' reflections on the findings from the perspective of their organisation. The main topic which came out of the interviews and the main theme of the workshops was the clients' perceptions of the risks related to COVID-19 infection (both probability and consequences) and the organisations' work to disseminate correct information and counter misperceptions.

Our research team members, who also performed the interviews, shared the task of undertaking preliminary analyses of interviews and documents, with those in languages other than English being read and summarised in case studies by native speakers. We used qualitative thematic content analysis (Nowell et al. 2017) of the country reports to identify major commonalities and differences related to the study aims.

4. Results

4.1. Quantitative data

4.1.1. Description of the sample

Altogether, we analysed answers provided by 273 respondents from eight European countries in our survey (Table 1).

The duration of stays in a centre/facility may also be temporary, indicating that the main line of demarcation is between people living in their own homes and the two other groups, which we may refer to as different types and degrees of homelessness. Thus, although the distribution of living arrangements differs among countries, people living in their homes make up considerable shares in three of the countries, while people living on the street make up a considerable share in all the studied countries. We also see from the two bottom rows in Table 1 that there is a share of 30% who report that they are female in the sample, which make up 79 respondents. Comparing living arrangements, people living in their homes had the highest share of female respondents, with 45% females, followed by facility (36% females) and street and temporary (23% females).

Table 2 shows respondents' age distribution in three types of living arrangements.

Table 2 indicates that 55% of the respondents are between 40 and 60 years old. People living in a facility/centre are generally older, with 75% aged 50 years or older. Corresponding shares for street and temporary facilities and individuals staying at home are 53% and 49%, respectively. Thus, we see that respondents living in their own homes are generally younger.

We also asked respondents about their residence status: 74% report that they are 'national citizens' in the country in which they have been sampled; 13% report that they are 'immigrant with residence permit'; 0.5% reported to be asylum seekers; 6% reported to be 'residing in the country without documentation'; and, finally, 5% did not answer this question. Comparing living arrangements, 31% of people living in their homes were immigrants or asylum seekers or without documentation, while corresponding shares for those living in a centre/facility and those living on the street were 23% and 16%, respectively.

Table 1. Respondents from the eight countries, including the share of female respondents.

	Home	Facility/Centre	Street and temporary	Other	Total	Share of females
Estonia	15%	43%	36%	7%	61	25%
Hungary	0%	0%	100%	0%	32	48%
Norway	57%	14%	29%	0%	28	43%
Portugal	40%	6%	48%	6%	52	19%
Spain	60%	0%	35%	5%	20	55%
Czech Rep.	0%	5%	86%	8%	37	27%
Belgium	38%	0%	62%	0%	26	23%
Netherlands	6%	0%	76%	18%	17	6%
Total	25%	13%	57%	5%	100%	30%
Total	69	35	155	14	273	79

Table 2. Respondents' age distribution in six categories.

	Home	Facility/centre	Street and temporary	Total
18–29	4%	0%	6%	5%
30–39	18%	15%	13%	14%
40–49	28%	9%	29%	26%
50–59	28%	36%	27%	29%
60–69	12%	30%	23%	21%
70 or above	9%	9%	3%	5%
Total	100%	100%	100%	100%

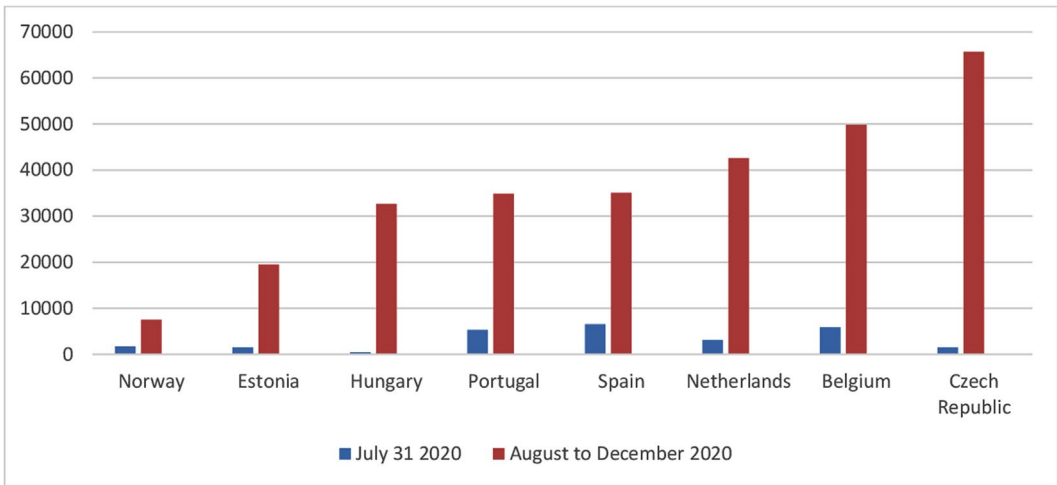


Figure 1. The level of infection per million inhabitants in the participating countries until July 31 2020 and from August to December 2020 (data source: www.worldometers.info).

Table 3. The four most prevalent sources of information about COVID-19 used by the respondents in the three studied groups.

	Television	Social media	Social workers	Newspaper
Home	58%	29%	9%	12%
Facility/centre	57%	23%	11%	26%
Street and temporary	46%	19%	21%	12%
Total	53%	22%	17%	14%
P-value	0.506	0.279	0.044	0.094

In response to the question ‘Would you consider yourself part of a minority (e.g. cultural, ethnic, health/disability related, sexual orientation)?’, 18% answered yes (17% of those living in their homes, 3% of those living in a centre/facility and 21% of those living on the street.)

4.1.2. Exposure to COVID-19 among the respondents

Figure 1 shows the level of infection per million inhabitants in the participating countries until July 31st 2020 and from August to December 2020. The two periods largely cover the first and the second wave of COVID-19 in the countries.

Finally, when it comes to direct and indirect exposure to COVID-19, respondents from Spain (20%), Portugal (14%) and the Czech Republic (16%) had the highest shares of respondents who had been infected themselves. Respondents in the first two countries reported that 10 to 13 of their acquaintances had been infected with COVID-19.

4.1.3. Information sources about COVID-19 among the respondents

Respondents were asked: ‘What have been the two most important sources of information for you on the pandemic? Please, name two sources.’ Respondents could choose between 12 answer alternatives, including television, newspaper, social media, friends, their own observations, police and social workers. Table 3 shows the four most prevalent sources of information about COVID-19 used by the respondents in the three studied groups.

Results indicate that television (53%) is the most prevalent source of information on the pandemic in all the studied groups, followed by social media (22%). Respondents living in their

homes (58%) and in a facility/centre (57%) have the highest share of television. People living in their homes have a higher share of social media, while people living on the street have the highest share of social/medical workers as their most important source of information. Chi-square analyses indicate that the differences between the groups' shares for information sources are statistically significant at the 5% level for social workers and 10% level for newspapers.

4.1.4. COVID-19 scepticism among the respondents

We operationalised COVID-19 scepticism through the following:

1. The question on the probability of getting infected by the virus: 'Since March 2020, I have been afraid of being infected with COVID-19'. While 27% strongly disagreed, 22% disagreed, 13% neither agreed nor disagreed, while 22% agreed and 16% strongly agreed. Thus, 49% of the respondents can be labelled COVID-19 sceptics with regard to probability of infection.
2. The question focusing on consequences: 'I don't believe the virus causes me notable harm'. While 15% strongly disagreed, 27% disagreed, 21% neither agreed nor disagreed, while 26% agreed and 12% strongly agreed. Thus, 38% of the respondents can be labelled COVID-19 sceptics with regard to consequences.

4.1.5. Bivariate correlation analyses of factors influencing COVID-19 scepticism

In Table 4, we show factors influencing COVID-19 scepticism among the respondents. The coefficients provided are bivariate Pearson's R correlations. We have changed the order of the values in the 'Afraid of being infected with COVID-19' question, which means that agreement with both questions in the table indicates COVID-19 scepticism.

Table 4 indicates that the following variables are related to not being afraid of COVID-19 infection: male gender, living in a country with lower COVID-19 infection levels, not living in your own home, lower levels of all types of social capital, lower levels of trust in the government's COVID-19 information, not using television as an important source of information about COVID-19, and using social media as an important source of information about COVID-19.

The following variables are related to holding the view that the virus won't cause notable harm: considering you to be part of a minority, living in a country with lower COVID-19 infection levels, and lower levels of bonding social capital.

4.1.6. Multivariate analysis of factors influencing not being afraid of COVID-19 infection

In Table 5 we present linear regression analyses of the dependent variable: 'Since March 2020, I have been afraid of being infected with COVID-19'. As in Table 4, we have turned the values in the answer alternatives, which means that the analyses show factors influencing 'not being afraid of COVID-19 infection, since March 2020'.

Table 5 shows that respondents' health worries, i.e. their general worry about health risks (falling ill) is the most important variable contributing significantly to whether respondents have been afraid of being infected with COVID-19. The contribution is negative, indicating that the more people generally worry about their own health, the less likely they are to be COVID-19 sceptics with regard to probability.

Second, we see that the higher levels of social capital and trust in government information about COVID-19 are related to lower levels of COVID-19 scepticism. The results indicate that respondents who have more social capital (measures of close social relationships, perception of connectedness to their neighbourhood and public authorities combined together into one

Table 4. Bivariate relationships between variables measuring COVID-19 scepticism and influencing factors.

Themes	Variables	Not afraid of being infected with COVID-19 since March 2020	The virus won't cause me notable harm
Background	Age	n.s.	n.s.
	Sex (Male = 2)	.125**	n.s.
	Immigrant, asylum seeker, without doc. (=2)	n.s.	n.s.
Exposure	Consider yourself a minority (=2)	n.s.	.146**
	Have been infected themselves (Yes = 2)	n.s.	n.s.
	Country COVID-19 exposure (2=high level, 1=lower levels)	-0.252***	-0.146**
Living arrangements	Living on street or temp. arr. (=2, other = 1)	.119*	n.s.
	Living in facility or centre (=2, other = 1)	n.s.	n.s.
	Living in own home (=2, other = 1)	-0.119**	n.s.
Psych. and phys. health	Health assessment	n.s.	n.s.
	Physical diseases (risk group)	n.s.	n.s.
	Psychological diseases	n.s.	n.s.
	Health worries	-0.356**	n.s.
Social capital	Bonding social capital	-0.228***	-0.178***
	Bridging social capital	-0.127**	n.s.
	Linking social capital	-0.245***	n.s.
Trust in government info	Trust in government's COVID-19 information	-0.241***	n.s.
Information sources	Television	-0.198***	n.s.
	Radio	n.s.	n.s.
	Newspaper	n.s.	n.s.
	Social media	.117*	n.s.
	Social workers	n.s.	n.s.
	Peers	n.s.	n.s.

Pearson's R coefficients.

measure) are less likely to be COVID-19 sceptics. This is also indicated in Table 4, where we examine the individual relationships between the three social capital aspects and COVID-19 scepticism.

Finally, we see that the country's COVID-19 exposure contributes significantly and negatively in Steps 1-9, indicating that living in a country with a high COVID-19 infection level is related to higher levels of worry about infection than for respondents living in countries with lower levels of infection. The country's COVID-19 exposure ceases to contribute significantly in Step 10, when general worry about health risk is included. This indicates that the two variables are correlated, and that the negative relationship between the country's COVID-19 exposure and low worry about COVID-19 infection is related to general worry about health risk. Thus, these results seem to indicate that respondents who have a general worry about becoming ill are more likely to have their concerns about COVID-19 infection being influenced by national COVID-19 infection levels. This is, however, speculation, which needs to be examined in future research.

The adjusted R² value in Step 10 is .369, indicating that these variables jointly explain 37% of the variation of the dependent variable. We have examined the significance level of the F-changes in the models in Steps 1-10 in Table 5 to assess whether some of the variables added in the steps significantly improved the predictions in each step. The following variables contributed significant changes (p<0.01) in the R-square: Country's COVID-19 exposure (Step 4); Social capital (Step 6); Trust in government information about COVID-19 (Step 7); and General worry about health risks (Step 10). Thus, these are the most important predictors in the models in Table 5.

4.1.7. Multivariate analysis of factors influencing the belief that the virus won't cause harm

In Table 6 we present linear regression analyses of the dependent variable: 'I don't believe the virus causes me notable harm'.

Table 5. Linear regression. Dependent variable: "Since March 2020, I have not been afraid of being infected with COVID-19".

Variables	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10
Sex	.121*	.123*	.119*	.115*	.087	.074	.071	.062	.062	-0.005
Age		-0.031	-0.036	-0.068	-0.072	-0.030	.007	.019	.020	-0.006
Minority			-0.037	-0.053	-0.058	-0.081	-0.090	-0.083	-0.081	-0.042
Country's COVID-19 exposure				-0.251***	-0.239***	-0.213***	-0.226***	-0.203***	-0.199***	-0.036
Own home (=2)					-0.119*	-0.077	-0.034	-0.039	-0.041	.014
Social capital						-0.214***	-0.195***	-0.191***	-0.189***	-0.144**
Trust in government info							-0.225***	-0.216***	-0.215***	-0.160***
Television as info source								-0.071	-0.070	-0.066
Social media as info source									.013	
Health worries										-0.515***
Adjusted R2	.011	.008	.005	.063	.073	.110	.154	.155	.151	.369

Standardised beta coefficients.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6. Linear regression.

Variables	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10
Sex	.064	.066	.082	.080	.079	.070	.069	.069	.069	.046
Age		-0.044	-0.026	-0.040	-0.040	-0.013	.002	.003	.002	-0.007
Minority			.150**	.143**	.142**	.128**	.124*	.125*	.123*	.136*
Country's COVID-19 exposure				-0.111*	-0.110*	-0.093	-0.098	-0.096	-0.101	-0.044
Own home (=2)					-0.004	.022	.039	.039	.041	.060
Social capital						-0.137**	-0.130*	-0.130*	-0.131*	-0.116*
Trust in government info							-0.087	-0.086	-0.087	-0.068
Television as info source								-0.006	-0.008	-0.007
Social media as info source									-0.015	-0.022
Health worries										-0.178**
Adjusted R2	.000	-0.002	.016	.024	.020	.033	.030	.032	.028	.050

Dependent variable: "I don't believe the virus causes me notable harm".

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6 shows that respondents' health worries, i.e. their general worry about health risks (falling ill) is the most important variable contributing significantly to the respondents' contention that the COVID-19 virus won't make them harm. The contribution is negative, indicating that the more people worry generally about their own health and falling ill, the less likely they are to answer that the virus won't cause them harm.

Second, respondents with higher levels of social capital (measures of close social relationships, perception of a high level of connectedness to their neighbourhood and public authorities combined together into one measure) have lower levels of COVID-19 scepticism. This result indicates that respondents who have more close social relationships with friends and neighbours and more trust in authorities are less likely to be COVID-19 sceptics when it comes to perceived consequences of the disease.

Third, we see that being a minority is related to higher levels of COVID-19 scepticism when it comes to assessing negative health consequences of the pandemic.

The adjusted R^2 value in Table 6 is .05, indicating that these variables jointly explain 7% of the variation in the dependent variable. This is low and indicates that we have been far less successful in explaining the factors influencing COVID-19 scepticism related to perceived consequences of the disease. We have examined the significance level of the F-changes in the models in Steps 1-10 in Table 6 to assess whether some of the variables added in the steps significantly improved the predictions in each step. The following variables contributed significant changes in the R^2 ($p < 0.05$): Minority (Step 3); Social capital (Step 6); and General worry about health risks (Step 10). Thus, these are the most important predictors in the models in Table 6.

4.2. Qualitative data

4.2.1. COVID-19 scepticism

For gaining a deeper understanding on the beliefs and risk perception of socially marginalised individuals, we conducted interviews and workshops with the staff of care organisations. In general, participants highlighted that misbeliefs and misinformation are widespread among socially marginalised groups. Examples illustrating attribution scepticism (acknowledging the existence of the virus, but questioning its origin) included, for example, that the government has developed the virus to use fear politics to enforce new regulations (Hungarian workshop, 20.09.2021) or to remove elderly people (Norwegian report, 2020), or that it comes from Russia (with president Putin possessing the cure) (Hungarian workshop, 20.09.2021). In line with trend scepticism (denying that there is a pandemic or virus at all), our results revealed beliefs that the virus is fake and the pandemic a hoax to pursue political and economic agendas aimed to strip citizens of their freedoms or to earn money (Workshops in Hungary, 20.09.2021; Norway, 29.06.2021; Belgium, 30.09.2021).

Underestimation of the threats posed by COVID-19 and comparing it with seasonal flu or the common cold (i.e. impact scepticism) was very common. Several clients believed that they are immune to the virus. Taking alternative hot-cold showers, eating garlic, antibiotics, and, in particular, drinking alcohol were believed to decrease both the risk of getting infected and suffering severe consequences of the virus. Beliefs about measures to reduce the probability of getting infected included drinking water with one-minute intervals ('to wash down the virus from the throat'), spraying alcohol and chlorine over the body, and UV light exposure. Testing procedure for COVID-19 was also seen as having protective effects, and some clients believed that smoking protects against the virus (Norwegian report, 2020; workshops in Hungary, 20.09.2021; Norway, 29.06.2021; Estonia, 15.06.2021 and 25.08.2021).

4.2.2. Factors influencing COVID-19 scepticism

Socio-demographic factors: While no gender differences were identified in relation to the pandemic, the elderly clients of soup kitchens and day centres that lived at home were described as being very afraid of getting infected. 'No pensioners came to us from week one of the pandemic' (Estonian interview, 08.06.2020).

Migrant communities were characterised as particularly sceptical of the seriousness and even the reality of the disease. For example, Roma and Polish communities in Norway had expressed concern that there were hidden purposes behind the pandemic like someone's financial interests or a desire to control people's movement (Norwegian workshop, 29.06.2021). The Italian case study pointed out that compared to previous hazards faced by migrants, such as a trip involving risk to life, coronavirus seem less risky. Therefore, migrants seemed to take precautions more as a formality to guarantee access to the centres (Italian report, 2020). The experience of reaching migrants with information was somewhat the opposite to other countries in Finland, where messages spread better through the 'grapevine' in small and close Roman communities than among native vulnerable people (Finnish report, 2020).

Migrant communities were described as having suffered stigmatisation as the spreaders of the virus and becoming increasingly invisible, as if they were not worthy of the attention of national policies. They present low trust in authorities, and low levels of integration and knowledge of the local language (Reports from Italy, 2020; Estonia, 2020; workshops in Norway, 29.06.2021; Belgium, 30.09.2021).

Language barriers were stressed in Belgium and in Estonia, where a large proportion of people speak different languages. Especially in Estonia, the low level of awareness among Russian-speaking people was of concern. Interviewees assumed one reason was low interest in Estonian news (the staff noticed that clients began to take the risk of coronavirus more seriously when Russian media reported it) and the spread of false information in Russian-language social media (Estonian report, 2020; workshops in Belgium 30.09.2021; Estonia 25.08.2021).

Among clients with different living arrangements, worries among homeless people living on the street and in short-term shelters were characterised as the weakest. They were described as difficult to reach (Hungarian workshop, 20.09.2021), not necessarily believing in COVID-19 regardless of their age and background (Belgian workshop, 30.09.2021) and in general seeming not concerned at all (Estonian report, 2020). Most of the workshops pointed out that people who were in touch with social workers seemed more likely to believe in the pandemic and, as a result, were more likely to participate in preventative measures (e.g. handwashing).

Health aspects: Individuals with mental health issues were prone to misinformation and had difficulties comprehending the situation, leading to an underestimation of the risks in some cases and, conversely, anxiety and panic in others (Reports from Lithuania, 2020; Estonia, 2020; Norway, 2020; workshops in Belgium, 30.09.2021; Estonia 15.06.2021). Similarly, it was highlighted that clients' alcohol and drug addictions hindered understanding of the situation and made it more difficult for social workers to reach their clients with official information and promote health protecting behaviours (Norwegian report, 2020; workshops in Estonia 15.06.2021; Norway, 29.06.2021).

Psycho-social factors: It was pointed out that low trust in government authorities impeded awareness of the situation (Norwegian report, 2020; Norwegian workshop, 29.06.2021). In the Belgian workshop it was hypothesised that the way the government handled the pandemic was confusing, and this may have aggravated generalised distrust (Belgian workshop, 30.09.2021).

Socio-structural factors: Representatives of care organisations repeatedly described those clients who rely on social media as their main source of information as being prone to misbeliefs and misperceptions (Norwegian report, 2020; workshops in Estonia, 15.06.2021 and 25.08.2021; Hungary, 20.09.2021; Belgium, 30.09.2021). National TV was emphasised as being the most effective or major source of information and news, supporting staff's efforts to explain the situation to their clients (Reports from Lithuania, 2020; Estonia, 2020; Belgian workshop,

30.09.2021). However, interviewees said that their clients might misunderstand what they see or spread what they understood among each other inaccurately (Reports from Norway, 2020; Estonia, 2020). Some clients seemed to be reluctant to receive any kind of information (Estonian workshop, 25.08.2021).

Exposure and experience-related factors: Rumours about the mild cases of COVID-19 significantly decreased concern about the infection among the clients and demotivated use of protective measures. Conversely, when clients communicated about getting infected or quarantined, fear and anxiety replaced their initial disbelief (Reports from Estonia, 2020; Finland, 2020; Estonian workshop, 15.06.2021). In the words of a social worker: 'In these communities, real life examples have the strongest impact' (Estonian workshop, 25.08.2021). In Hungary, differences in clients' risk perception were associated with the infection rate of the area: while in the highly infected Budapest clients sometimes even panicked, in the countryside with low infection rates, people did not comprehend the severity of the situation (Hungarian report, 2020; Hungarian workshop, 20.09.2021).

5. Discussion

5.1. The prevalence of COVID-19 scepticism

As there is very little information on homeless people's needs and motivations in responding to COVID-19, the first aim of the study was to explore the COVID-19 risk perception of socially marginalised individuals, focusing on their assessment of the probability of getting infected with the virus and the perceived harmful consequences of the disease. Our results indicate that 49% of the respondents can be labelled COVID-19 sceptics with regard to probability of infection and 38% with regard to consequences of the disease.

Misbeliefs, widespread among the socially marginalised individuals studied, represent all three types of scepticism proposed by Küppers et al. (2021): trend sceptics deny the reality of the pandemic; attribution sceptics question the origin of the virus; and impact sceptics believe that the virus is harmless and that getting infected and serious consequences can be avoided by, for example, UV or cigarette smoke exposure or drinking alcohol. In alignment with Hansson and colleagues' (2021) typology about harmful information about the pandemic, our interviews and workshops describe the messages that reject the adoption of appropriate preventive behaviours recommended by health authorities, while encouraging the use of false or potentially harmful remedies. Misrepresentations of the transmission mechanisms of the virus and immunity to it, as well as downplaying the risks related to the pandemic, also emerged strongly from our results. While scams were irrelevant with regard to our studied group, the harassment of the alleged spreaders of the virus was an acute problem, especially for migrants and for the homeless in general. In addition to the above categories also raised in Hansson et al. (2021), our results point out the need for sensitive communication to avoid harming the information recipients by ridiculing their pre-existing beliefs. For example, the dangers of disrespectful communication were emphasised in the Estonian workshop: 'When people are insulted due to their beliefs (e.g. called "foolish" in the media) or pressured with aggressive vaccination campaigns, they "entrench themselves" and close themselves even more to the official channels they are not so used to (25.08.2021)'.

5.2. Factors influencing COVID-19 scepticism

The second aim of the study was to examine the factors influencing the COVID-19 risk beliefs of socially marginalised individuals. The results of the multivariate analyses of the survey data did not support Hypothesis 1 on higher numbers of COVID-19 sceptics among men (Brown, Coventry, and Pepper 2021; Entradas 2022; Giordani et al. 2022; He et al. 2021; Wang et al. 2021).

We did find, however, a bivariate relationship between sex and 'not being afraid of being infected with COVID-19 since March 2020', indicating higher levels of COVID-19 sceptics among male respondents. This relationship was not maintained in the multivariate analyses, indicating that other variables were more important. More specifically, sex ceased to contribute significantly to 'not being afraid of being infected with COVID-19 since March 2020' when the variable 'living in your own home' variable was included in Step 5 in Table 5. This indicates that the bivariate relationship between sex and COVID-19 scepticism in Table 4 could be due to sex differences in living arrangements, which is a more important variable predicting COVID-19 scepticism in our data. Among the respondents, there are more women living in their own home, and respondents living in their own home were generally less sceptic of COVID-19.

Moreover, the results of the survey data, both from bivariate or multivariate analyses, failed to support Hypothesis 2 on higher higher numbers of COVID-19 sceptics among younger respondents (cf. Brown, Coventry, and Pepper 2021; Entradas 2022; Giordani et al. 2022; He et al. 2021; Wang et al. 2021; Latkin et al. 2022). However, our qualitative data indicate high level of worry about the virus among the elderly clients living at home, which may be explained by isolation from support and interaction with the staff of soup kitchens and day centres as they were described as feeling very lonely and afraid (Orru et al. 2021).

The assumed mechanism behind the hypothesised relationship between age and COVID-19 risk perception was that younger respondents would have fewer physical health issues than older respondents and thus higher levels of COVID-19 scepticism. While poorer physical health as a precondition of recognising the dangers of the pandemic (cf. Romer and Jamieson 2020; Rothmund et al. 2020) did not prove relevant in the survey results (neither from bivariate nor multivariate analyses), mental health issues were highlighted in many countries' interviews as a factor influencing how the clients of care organisations perceived the risks posed by the coronavirus. This effect was described both as reducing risk perception and as aggravating anxiety and even panic. The contradiction between the qualitative and quantitative data concerning physical and mental health condition as a factor influencing risk perception stresses the value of addressing the situation of socially marginalised individuals from both the social workers' and the clients' own perspective for a more nuanced understanding.

Regarding Hypothesis 3 on the higher levels of health worries (fear of becoming ill) predicting higher perceived risk of COVID-19 (cf. Mertens et al. 2020), our findings from the multivariate regression analysis support both risk perception related to the probability of becoming infected and its consequences. Also, in the qualitative data, we obtained several accounts of people with high health risk perception that had isolated them totally.

Our findings from the multivariate regression analysis support Hypothesis 4 on minority groups having higher levels of COVID-19 scepticism regarding the consequences of the virus when we look at the variable: 'I don't believe the virus causes me notable harm'. The qualitative data strongly supported migrant communities' scepticism towards the seriousness of the coronavirus. This is in accordance with previous research, indicating that racial and ethnic minorities are more susceptible to conspiracy beliefs about the pandemic (Bavel et al. 2020; Romer and Jamieson 2020). Our finding on migrants being stigmatised as the spreaders of the virus is in accordance with existing results indicating that individual factors such as the lack of particular communication skills and limited social power can make individuals more likely to become a subject of harassment or hate speech in a health crisis (Hansson et al. 2021). In the data from our interviews and workshops, an increase in the invisibility of the socially marginalised groups, low trust in the authorities, and low levels of integration and language barriers were described as challenges in communicating the risks of COVID-19 to migrants.

In accordance with Hypothesis 5, our multivariate analyses, confirmed also by qualitative data, indicate that higher levels of trust in government information about COVID-19 are related to lower levels of COVID-19 scepticism (measured as probability of being infected). Social workers also pointed out that distrust in governments and official information influenced their clients'

understanding of the pandemic. This is in line with the existing literature on the high level of trust in government information downplaying the beliefs of COVID-19 being no worse than the flu (Küppers et al. 2021) and indicating more health fears (Siegrist, Luchsinger, and Bearth 2021). However, when it comes to other types of social capital than linking social capital and trust in authorities, the results from the interviews and workshops indicate that conspiracy theories and misinformation is spread within social groups, for example those of clients, indicating the 'dark side' of social capital (cf. Morsut et al. 2022). Thus, social networks are not always used to communicate in benefit of the users. Moreover, the social workers underlined that they spent a lot of energy and time in countering misperceptions and fighting conspiracy theories among their clients. However, misperceptions among the staff of social care organisations were also noted in the interviews. The dark side of social capital and how to mitigate its effects on misperceptions is an important area for future research.

Our results partly support Hypothesis 6. We see a bivariate correlation between television as a source of information and fear of being infected. However, we do not see a strong independent contribution of television as a source of information to the perceived risk in the multivariate analyses. This could be due to the fact that television as a source of information is correlated with social capital (Pearson's $R: .161, p < 0.01$) and trust (Pearson's $R: .111, p < 0.1$) in our analysis. Existing studies indicate that reliance on television as a source of information was unambiguously linked to perceived severity of pandemic-related risks (Entradas 2022; He et al. 2021; Romer and Jamieson 2020; Rothmund et al. 2020). The qualitative data also indicate a relationship between the use of television as a source of information and lower levels of scepticism. This was particularly highlighted for clients living in facilities, where they have access to television.

While obtaining information from multiple sources has been linked to a higher risk perception in the general population (e.g. Wang et al. 2021; Curtis et al. 2022), results from the qualitative data revealed that socially marginalised individuals sometimes do not know where to get information from (Belgian workshop, 30.09.2021) or have no interest in seeking it (Estonian workshop, 25.08.2021). These factors have been associated with denial of risk (Wang et al. 2021).

In contrast to Hypothesis 6, we do not see a significant effect of social media in the multivariate analyses (although we did see a weak correlation in the bivariate analyses, which was only significant at the 10% level). In our interviews and workshops, however, social media was repeatedly linked with misperception of COVID-19 risks (Belgian workshop, 30.09.2021; Hungarian workshop, 20.09.2021; Estonian workshop, 15.06.2021; Norwegian report, 2020). This is in accordance with research on pandemic-related communication (e.g. Hansson et al. 2021; Allington et al. 2021; Torpan et al. 2021), where social media is often referred to as spreading misbeliefs and misinformation and promoting COVID-19 scepticism. The dynamics of COVID-19 scepticism among socially marginalised individuals is in line with the framework of communicative vulnerability proposed by Hansson et al. (2021) and indicates that information disorder as a situational factor of social vulnerability can adversely affect people's coping capacity during a pandemic. The contrasting results from the quantitative and the qualitative data indicate that this is an important area for future research.

Our study uniquely tested the associations between social capital and the pandemic-related risk perception. Hypothesis 7 was supported by results from the bivariate correlation analyses in Table 4 regarding all types of social capital being negatively correlated with COVID scepticism. The respondents who have more close social relationships and who perceive that they have a high level of connectedness to their neighbourhood are less likely to be COVID-19 sceptics. The most important social capital in terms of protecting against false beliefs regarding the pandemic virus is, however, linking social capital, followed by bonding social capital. Existing studies have found that general trust in other people is associated with less perceived COVID-19-related health risk (Siegrist, Luchsinger, and Bearth 2021). The three types of social capital were combined into one general sum score, which contributed significantly to both our measures of COVID-19 scepticism in the two multivariate analyses (cf. Table 5 and 6).

Finally, we hypothesised that COVID-19 scepticism among vulnerable people is negatively correlated with the infection rate in the country (Hypothesis 8) and personal exposure to the virus (Hypothesis 9). Our results are to some extent in accordance with Hypothesis 8. In the bivariate correlation analyses in [Table 4](#), living in a country with a high infection rate is related to lower levels of COVID-19 scepticism. In the first multivariate analysis ([Table 5](#)), living in a country with a high infection rate contributes significantly in Steps 4-9, until general health worry is included. In the second multivariate analysis ([Table 6](#)), living in a country with a high infection rate contributes significantly in Steps 4-5, until social capital is included. We have no reason to believe that the country infection rate is correlated with these two different variables (health worry and social capital). Thus, the fact that the country infection rate ceases to contribute when health worry or social care are included might also reflect that the contribution of country infection rate was rather weak to begin with (only statistically significant at the 10% level).

Infection rate in the area has previously been strongly correlated with a higher level of perceived risk of COVID-19 (Shiina et al. 2021; Shahin and Hussien 2020; Küppers et al. 2021). Even though our interviewees could only reflect on their experience within their country, significant differences in the clients' risk perception in association with the infection rate of the area of the country (densely populated urban versus countryside) was pointed out.

The results of our survey did not significantly relate personal exposure to COVID-19 scepticism, thus not supporting Hypothesis 9. This could, however, be due to the relatively low levels of direct exposure (i.e. personal COVID-19 infection). Still, qualitative data from Estonia and Finland indicate a relationship between experience with the virus among acquaintances and how the clients of care organisations perceived corona-related risks.

5.3. Methodological limitations

5.3.1. Few respondents in some countries and differing country samples

An important methodological weakness of the present study is the relatively small sample of respondents, the fact that there are few respondents in some of the studied countries and that the sizes of the country samples are different. The small samples in some of the countries can be explained by the fact that we had to postpone data collection over long periods of time, due to COVID-19 restrictions on social contact in the participating countries. It is also important to include small country samples, as the study includes respondents who are hard to reach and who are seldom included in surveys through the pandemic. It is also important to note that the sample sizes differ in the countries, as a result of the challenges related to data collection and low numbers in some countries. Additionally, the distribution of people living under different living arrangements is also different in the countries that we recruited respondents from. For these reasons, we do not compare countries in the present study, but rather different categories of socially marginalised groups across the studied countries (i.e. marginalised people living in their homes, in facilities and on the street or under temporary conditions). Future studies should include larger samples of socially marginalised people, as well as people that are not marginalised so as to establish robust conclusions.

5.3.2. Representativeness

Another potential challenge related to the small sample is the issue of the respondents' representativeness of marginalised people living in their homes, in facilities and on the street in the studied countries. With the low number of respondents, it is reasonable to ask whether they are actually representative of their different groups. Unfortunately, it is impossible to calculate response rates due to the method of survey distribution. Some of the limitations of the quantitative study may have been overcome by the rich qualitative material from interviews and workshops with the staff of care organisations.

5.3.3. Predicting probability or consequences of infection

In this study, we use two key variables to measure COVID-19 scepticism: one related to probability of infection ('have not feared infection') and another related to consequences of infection ('the virus won't do harm'). Our multivariate analyses show that the analyses examining factors predicting probability of infection were far more successful in explaining variation in the dependent variable (37%) than the analyses examining factors predicting consequences of infection (5%). The independent variables included were relatively similar in both analyses. This difference between the explained variations in the two variables could be due to: 1) The fact that it is easier to explain differences in respondents' fear of being infected; or 2) The fact that the variables used to measure probability and consequence were of differing quality. The latter would imply that the variable measuring COVID-19 scepticism related to consequences of infection was poorly constructed (and not that it is more difficult to predict variation in this). The importance of these two potential explanations should be examined in future research.

6. Conclusion

Among the socially marginalised individuals studied, 49% can be labelled COVID-19 sceptics with regard to probability of getting infected and 38% with regard to harmful consequences of the disease. COVID-19 scepticism is related to lower levels of all types of social capital, lower trust in authorities' information about COVID-19, general worry about health risks and belonging to a minority. Qualitative data also indicate that mental health has a conflicting impact on the pandemic risk perception of individuals in vulnerable situations, in some cases downplaying its severity, while often fuelling panic and anxiety. COVID-19 scepticism is fed by lack of knowledge of where to get relevant information on the virus and social media dominating an individual's sources of information. The limited communication skills of the migrants make individuals particularly susceptible to the negative effects of false claims about COVID-19. Reliance on TV, which is more accessible for those living in the facility, seems to have a protective influence against this.

Our results suggest that overcoming the barriers (e.g. exclusive disaster management measures, poorly accessible crisis information) for integration of socially marginalised people and building trustful relationships with, for example, social workers in care organisations can help to reduce scepticism regarding the pandemic or other health risks. Making good use of long-term trustful relations in organisations providing daily care to their clients has great potential for reaching socially marginalised individuals with official crisis (as well as risk) information. Particular attention needs to be paid to the marginalised individuals with limited communication skills, such as migrants and the psychologically fragile, but also to the level of informedness of the social care organisations' staff.

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Appendix

Table A1. List of country reports.

No	Country	Date
1	Czech Republic	29.07.2020
2	Estonia	29.07.2020
3	Finland	25.06.2020
4	Germany	29.07.2020
5	Hungary	29.07.2020
6	Italy	06.08.2020
7	Lithuania	29.07.2020
8	Netherlands	29.07.2020
9	Norway	20.11.2020
10	Portugal	28.05.2021

Table A2. List of interviews for country reports.

No	Place	Time	Institution/organisation
1	Prague, Czech Republic	29.05.2020	The Salvation Army (TSA), national director of social services
2	Prague, Czech Republic	24.06.2020	TSA social services centre
3	Tallinn, Estonia	29.05.2020	TSA alcohol rehabilitation centre
4	Tallinn, Estonia	08.06.2020	TSA day centre
5	Tallinn, Estonia	16.06.2020	Department of social welfare, one of Tallinn district governments
6	Tallinn, Estonia	17.06.2020	Welfare Centre, night shelter and resocialisation unit
7	Tallinn, Estonia	30.06.2020	Tallinn Social Work Centre, resocialisation accommodation
8	Helsinki, Finland	09.06.2020	TSA temporary housing for homeless
9	Helsinki, Finland	01.06.2020	TSA social service centre, social counselling
10	Tampere, Finland	28.05.2020	TSA day centre for economic and social support
11	Cologne, Germany	08.06.2020	TSA, Territorial Social Programme
12	Hamburg, Germany	19.06.2020	TSA homeless shelter
13	Hamburg, Germany	26.06.2020	German Red Cross facility
14	Hamburg, Germany	03.07.2020	German Red Cross
15	Budapest Hungary	24.06.2020	TSA, temporary shelter, rehabilitation hostel, day centre
16	Budapest, Hungary	25.06.2020.	The Budapest Methodological Centre of Social Policy and Its Institutions (BMSZKI), homeless service provider
17	Budapest, Hungary	19.06.2020	Hungarian Red Cross, Department of Disaster Management
18	Budapest, Hungary	01.07.2020	The Hungarian Charity Service of the Order of Malta, Central Hungary
19	Rome, Italy	05.06.2020	TSA homeless shelter
20	Rome, Italy	16.07.2020	Day centre and reception services "Binario 95"
21	Bolzano, Italy	16.07.2020	Day care centre "La Sosta der Halt"
22	Rome, Italy	23.07.2020	24-h reception centres "Gardenie" and "Primavera"
23	Klaipėda, Lithuania	28.05.2020	TSA day centre for homeless
24	Klaipėda, Lithuania	30.06.2020	Social Workers Association
25	Vilnius, Lithuania	08.07.2020	Food bank, collects and distributes food aid
26	Oslo, Norway	09.06.2020	TSA housing facility for 20 homeless people with drug or alcohol addiction
27	Oslo, Norway	11.06.2020	TSA day centre for active users of drugs or alcohol
28	Oslo, Norway	12.06.2020	Substance abuse care
29	Colares, Portugal	31.03.2021	TSA, residential centre for materially disadvantaged
30	Lisbon, Portugal	14.04.2021	TSA, Centre for Homeless People
31	Lisbon, Portugal	14.04.2021	TSA, Centre for Families and Needy People
32	Groningen, The Netherlands	13.07.2020	TSA day centre for homeless

Table A3. List of workshops.

No	Country	Date
1	Belgium	30.09.2021
2	Estonia	15.06.2021
3	Estonia	25.08.2021
4	Hungary	20.09.2021
5	Norway	29.06.2021