TITLE

COVID-19 Snapshot MONitoring (COSMO): Monitoring knowledge, risk perceptions, preventive behaviours, and public trust in the current coronavirus outbreak

ABSTRACT/STUDY DESCRIPTION

In a crisis such as the current outbreak of the newly emerged coronavirus, it is of utmost importance to monitor public perceptions of risk, protective and preparedness behaviours, public trust, as well as knowledge and misinformation to enable government spokespeople, the media, and health organizations to implement adequate responses (WHO Europe, 2017; World Health Organization, 2017). The purpose of this serial cross-sectional study COSMO is to allow rapid and adaptive monitoring of these variables over time and to assess the relations between risk perceptions, knowledge and misinformation to preparedness and protective behaviour regarding COVID-19 in Germany.

Research questions

The main research questions relate to a) monitoring (describing the status quo of risk perceptions, preparedness and preventive behaviours, knowledge and misinformation at different points in time during the COVID-19 outbreak in Germany), b) finding correlates of preparedness and preventive behaviours, c) evaluating communication measures, and d) exploring the relationship of psychological variables to the outbreak situation. It is important to note that the cross-sectional design will not allow the assessment of actual causal relations and will only be snapshots of a current state of the public perceptions and psychological crisis response.

Study methods

15 minutes online questionnaire in a serial cross-sectional design with 10 data collections. Data collection will start as a weekly monitor, i.e. each Friday starting on March 06, 2020, until ten data sets are collected. Should the development of COVID19 chance unexpectedly as assessed by substantive experts in the field, the time frame between the data collections may change.

INTRODUCTION

During outbreaks such as the currently ongoing COVID-19 outbreak, the public health community needs to communicate accurate information to the public in short time frames. Effective communication is one of the priority areas highlighted in WHO's COVID-19 roadmap (World Health Organization, 2020).

Problem

People receive a constant barrage of information in part due to 24-hour news channels and social media. This information overload is exacerbated during any public health emergency or outbreak. Misinformation is readily circulated, contributing to heightened fear and outrage in the general public. Rumours and misinformation can undermine any public health actions and should be debunked effectively (Schmid & Betsch, 2019). To alleviate this, public health authorities need to provide information that is easily understandable and through accessible channels that the public trust and use (Glik, 2007; Renn, 2008; Reynolds & W. Seeger, 2005; Sandman, 2007). Provision of timely and accurate information can enable the public to make informed choices, take actions to protect themselves better against the health risk and comply with the recommendations of public health agencies (World Health Organization, 2017).

Review of relevant literature

Hence, models of crisis and emergency risk communication (Reynolds & W. Seeger, 2005) suggest that is crucial to understand the risk perception of the population and the sources of information that they trust to enable effective communication and framing key messages. Messaging should be evidence-based and respond to misinformation and induce rational, adaptive and protective behaviour (Rasmussen & Goodman, 2018). However, little is known about the complex interplay of changing epidemiology, media attention, pandemic control measures, risk perception and public health behaviour (Reintjes et al., 2016). A study conducted during the influenza A(H1N1)pdm09 pandemic in 2009/2010 shows an "asynchronicity between media curves and epidemiological curves (...); media attention for influenza A H1N1 in Europe declined long before the epidemic reached its peak, and public risk perceptions and behaviours may have followed media logic, rather than epidemiological logic" (Reintjes et al., 2016). Thus, how people perceive

the risk is not necessarily related to the actual risk. This perceived risk, nevertheless, influences protective behaviours (van der Pligt, 1996). Yet, uncertainty about the situation and perceived exaggeration were associated with a reduced likeliness to implement the recommended protective behaviours during the 2009/10 pandemic (Rubin et al., 2009). Exaggeration of risks often happens on social media, where especially highly emotional and often false information are shared (Vosoughi et al., 2018). While a serial cross sectional study involving over 13,000 participants during the 2009/2010 pandemic (Walter et al., 2012) showed that the internet was significantly less used as a source of information than traditional media, this may well have changed over the last decade. For example, the number of monthly Twitter users multiplied by ten from 30 million in 2009 to 330 million in 2019 (Statista, 2019) and Twitter seems to be seen as an alert tool in times of a crisis and a gateway for information (Eriksson & Olsson, 2016). Thus, knowledge acquired during the last pandemic is only of limited value to guide crisis responses in the current outbreak.

Research questions

In contrast to the influenza A(H1N1)pdm09 pandemic, the coronavirus is new, there is no vaccine or known effective treatment, case fatality rates are still uncertain. Psychologically, this means high uncertainty regarding the likelihood of catching the disease, its potential severity and ability to take control over the process by preventive measure. These perceptions are thus likely to be updated based on changes in epidemiology, media reports, information and misinformation.

As media and communication measures can influence these variables (Reintjes et al., 2016; Walter et al., 2012) and as these are relevant for preparedness and protective behaviour (Carpenter, 2010; Reynolds & W. Seeger, 2005), COSMO aims at monitoring these variables during the current coronavirus outbreak and to feed them into the communication process during the crisis. COSMO also aims at reliably assess changes and shifts of risk perceptions and to identify the drivers and situations that are related to these shifts. What is the role of the media, how closely is risk perception related to actual risk? Further, it is important to understand the dynamics of risk perceptions, fears, misinformation and protective behaviours, understand which of the protective measures are known and which information is lacking. Based on these information it is possible to react to misinformation or suddenly increasing risk perceptions and panics.

The focus of the research is to inform ad hoc crisis communication and to publish lessons learnt for future outbreaks. We will explore the following research questions:

At each data collection we will assess the levels of and changes in risk perceptions, knowledge, used and trusted sources of information, confidence in crisis management, correct knowledge about and uptake of preparedness and protective behaviours.

We assume that risk perceptions change over the course of the crisis. We will explore how changes in risk perceptions relate to characteristics of the outbreak and other psychological variables such as knowledge, affect, and misinformation.

We will explore whether participants report that they are aware of certain communication measures (if they are taken during the crisis) and whether being aware of them influences risk perceptions.

We assume that risk perceptions are positively related to preparedness and protective behaviours. We will explore which other factors are relevant correlates of preparedness and protective behaviours (e.g., knowledge, misinformation, trust).

We will explore knowledge and misinformation about preparedness and preventive measures and whether the level of knowledge is related to certain sources of information.

We will explore the relationship between psychological variables and characteristics of the outbreak situation (i.e. how closely the perceived risk mirrors reported cases, relative import risk, media reports)

We will explore whether it is possible to identify the emergence of certain pieces of misinformation as correlates of risk perceptions.

The research design will allow testing these assumptions and explorations by providing serial cross-sectional data. Currently we plan ten measurements of all relevant variables with varying time-lags, starting with once a week and shortening the time lags when the outbreak worsens.

Partners and Aims
The following partners are responsible for this study:

- Universität Erfurt (UE, Cornelia Betsch)- content, methods, data analysis, data use, Principal Investigator
- Robert Koch Institut (RKI, Lothar Wieler) – content, data use
- Leibniz Institute for Psychology Information (ZPID, Michael Bosnjak) – data collection, data storage, methods
- Bernhard Nocht Instiut for Tropical Medicine (BNITM, Michael Ramharter) – content, data use
- Science Media Center (SMC, Volker Stollorz) – content, data use
- Yale Institute for Global Health (YIGH, Saad Omer) – content, questionnaire,
- and the respective scientific and technical teams of the named entities.

The current data collection aims at providing a strong data basis for timely outbreak responses to health care workers, policy makers, the public and the media. Data will feed into a Yale-based global research project which aims at improving communication around COVID-19. Upon data collection the data is immediately analysed by the principal investigator team and the results will be directly shared with all partners alike. Based on the data, potentially new misinformation can be identified and debunked, certain protective or preparedness measures can be communicated more explicitly (or be debunked), measures to react to sudden increases in risk perceptions (panic) can be undertaken at the right time via the right channels.

During the crisis the data will be directly used to improve communication measures. Data will be published when the scientific article is published; it will be published in shared authorship of all partners, a first draft will be provided by UE. Data will be openly accessible exclusively via a ZPID repository (ZPID; PsychArchives: https://www.psycharchives.org/).

MATERIALS AND METHODS

Sampling Plan / Data collection / Data acquisition

As described above, we will implement a serial cross-sectional design. We plan to have 10 data collections (T1 to T10). At each data collection, we aim to collect 500 complete data sets, and a total of 5,000 participants.

Participants will be recruited via an external study sample provider certified according to ISO 26362, coordinated by ZPID. Participants take part in the survey voluntarily and will receive a renumeration, paid by the data collection company.

Settings and locations where data were collected as well as dates of data collection
Data collection starts early as possible, preferably from Tuesday, 10.03.2020 with pilot data assessed the week before. It will take place weekly with a new, independent sample at each data collection. Participants will be German-speaking respondents living in Germany, the quota sample will match current distributions of in terms of age, gender and residency in a German federal state (Nielsen areas). Data collection takes place online.

10 data collections are currently planned. However, if the outbreak is expected to last a lot longer than the data collection period and more data collections are expected to be valuable, an extended monitoring and its funding will be discussed in the consortium.

In case of a compression of events (e.g. deaths in Germany, incisive decisions of policy makers), an adequate decrease of the collection interval will be implemented after a consortium decision. The data collection company will be asked to provide data within max. two days following the decision.

Agreements and payments made to participants
Participants will be payed according to the standards of the ISO-certified sample provider. Each fielding period will encompass 38 hours (10am until 12pm the following day). Feasibility of the timing will be pretested and adapted if needed.

Institutional Review Board agreements, ethical standards met, and safety monitoring
The research contains negligible risks as there is no more foreseeable risk of harm or discomfort other than potential inconvenience during participation. The study does not include deception and participants will be debriefed at the end of the survey. The study also involves only non-identifiable data about human beings. Ethics approval will be requested from the University of Erfurt review board. Research is also oriented on the ethical standards of AAPOR (https://www.aapor.org/Standards-Ethics/AAPOR-Code-of-Ethics.aspx) and APA (https://www.apa.org/ethics/code/). Thorough debriefing will take place and direct participants to valid information directed at the public about the situation.

Sample size, power and precision
The study will have 10 waves (T1 to T10). As small effects may matter as they are relevant on population level, we chose a large sample size to also detect small effects. To obtain a high level of congruence between the distribution of the demographics in the sample and the German population (regarding age, gender and living area), we chose a sample size of n = 500 per wave.

Participant characteristics
Each data collection with n = 500 participants will be a quota sample, matching the general population in Germany in terms of for age, gender, and residence in a Federal state of Germany (Nielsen areas).

Procedure
Data collection starts early as possible, preferably from Tuesday, 10.03.2020 with pilot data assessed the week before. Initially, it is planned to collect data once a week. Time lags may be shortened as the outbreak speeds up, cases rise quickly, or incisive events occur (deaths, large quarantines, others). At each wave, n = 500 participants will be invited by the data collection company and fill in the questionnaire within the same day. The questionnaire can be found in https://www.psycharchives.org/; updated questionnaires will be published there, too.

Variables will be assessed following the order as described below.

The study follows all required data protection standards; data is collected anonymously. Participants provide informed consent before starting the questionnaire.

Conditions and design
The current study is a monitoring questionnaire without any experimental conditions. As a between-subjects factor we will assess the time of data collection.

Variables (measured variables, details: see attached questionnaire)(*)

- Demographics (Age, Gender, federal state, education)
- Awareness of and knowledge about the coronavirus (*)
- Source of first information regarding the coronavirus
- Feeling of preparedness to avoid an infection with the coronavirus
- Perceived self-efficacy (*)
- Knowledge about effective preventive measures to avoid infection with the coronavirus (*)
- Implementation of preventive measures to avoid infection with the coronavirus (*)
- Risk perceptions regarding the disease (probability, susceptibility, severity) (*)

- Affective measures (feeling of closeness, novelty, threat, fear, and worry regarding the disease) (*)
- Perception of the outbreak as a media hype
- Trust regarding sources of information (*)
- Sources of information used (*)
- Trust in health organizations (*)
- Primary source of official health information (*)
- Perceptions of adequate policies to control the outbreak (*)
- Panic buying behaviour (*)
- Discriminatory behaviour
- Rumours regarding the coronavirus (qualitative data, open text fields)
- Adaptive questions: If certain communication measures have been taken (e.g., large advertisements in newspapers, a social media campaign, debunking myths campaign ...) the questionnaire will assess whether participants have seen it and whether they can remember the content.

Randomization of answer options where suitable (*).

Additionally, we will record:

- Relative import risk of the disease at the time of answering the questionnaire (post-hoc, as provided by http://rocs.hu-berlin.de/corona/#relative-import-riskcontract%20corona)
- Timestamps of events during the period of data collection (such as corona-related deaths in Germany)
- Daily: Number of reported cases of corona

Timing of data collection
Data collection will start as a weekly monitor until ten data sets are collected. Should the development of COVID19 chance unexpectedly as assessed by substantive experts in the field, the time frame between the data collections may change.

ANALYSIS PLAN

Data Inclusions/exclusion criteria
Only completed data sets will be considered in the analysis. Missing values will be treated as missing values.

Tests
Analyses are integrated in a *R Notebook* environment. As all analyses are exploratory and may change based upon requirements of the situation we do not preregister any analyses.

LITERATURE

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