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Use and perception of information sources on COVID-19 measures by citizens of Belgium

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Background: The effectiveness of adherence to COVID-19 infection prevention and control (IPC) measures depends on effective risk communication. This study assessed use and perception of COVID-19 information sources and channels in Belgium, and the relationship with adherence to measures.

Methods: Data were collected through an online questionnaire among a sample of 2008 respondents, representative for citizens of Belgium in terms of gender, age, socio-economic status, and region. Potential information sources named in the questionnaire were politicians, experts, journalists, and close contacts.

Results: Overall, experts contributed most to informing people on COVID-19 measures, and their information was considered clearest and most trustworthy, while politicians scored lowest for information clarity. All information channels were used by large proportions of respondents, namely television 80.2%, (online) newspapers 56.5%, radio 35.7% and social media 27.7%. Factors that contributed significantly to adherence in a multivariate model included use and perception of information from experts, which had a positive association, and relying on social media as an information channel, for which the relationship was negative.

Conclusions: It is important to achieve clear and trustworthy risk communication, as this contributes to overall adherence to IPC measures on COVID-19. Furthermore, attention should be given to the fact that for people who rely on social media as an information channel, their adherence can be adversely affected.

KEYWORDS

COVID-19, risk communication, adherence, information sources, information channels, infection prevention

Introduction

Since the start of the COVID-19 pandemic in February 2020, the Belgian government has implemented infection prevention and control (IPC) measures to contain the further spread of the SARS-CoV-2 virus and the disease. Based on a continuous monitoring of the prevalence of infections in the population and their impact on the health care system,

the measures have been adjusted over time. Updates and changes are communicated by the federal government through press conferences and relayed to the public by other actors, including scientific experts (epidemiologists, medical doctors, public health specialists) and journalists. As Belgium is a multilingual country, the communication takes place in the two main languages, namely Dutch and French, representing 55 and 39% of the population, respectively.[1]

As the way in which the public perceives and responds to risks is critically important, communication about the disease and preventive measures is critical. While experience with the response to environmental disasters and pollution events in the late twentieth century has provided important insights in the main principles of risk communication, in recent years the scope of risk communication has expanded to include communication strategies which better address ongoing public health challenges, including global pandemics (Varghese et al., 2020; Zhang et al., 2020). Since the late 80s, it has been realized that peoples' perceptions of risk are not only defined by the actual threats faced, but also by the acceptability of those threats (Malecki et al., 2021). Scholars of risk analysis and communication make a distinction between *hazards* (i.e., situations that have the potential to cause an adverse effect on health) and *risks* (i.e., the number of people who are exposed to the hazard, are infected, and fall ill; Lofstedt, 2011; Maxim et al., 2021). While risk can be defined in terms of the statistical likelihood or probability of ill consequences (objective risk), the term is often used as a synonym for danger or threat (subjective risk), referring to a subjective assessment of the consequences in relation to certain reference values. This is also the case in the framework proposed by Sandman (1987), according to which risk is a function of hazard and outrage, whereby *hazard* refers to the assessed risk and *outrage* to what the public is worried about. According to this framework, the public is more likely to accept the risk—and therefore feels less outraged—if it is voluntary, natural, familiar, not something they hold a negative past experience of, not dreaded, chronic, knowable, controlled by the person, fair, morally irrelevant, and derives from a trustful source which interacts in a responsive manner with concerned citizens. In contrast, the public feels more outraged if the risk affects vulnerable populations such as children, has immediate effects or long-term effects which harm future generations, if the victim is identifiable, if action is not taken to remove the risk, if the risks outweigh the benefits, and if it is amplified by the media or when other people are outraged as well. As such, both the perception of and the response to risks are shaped by social and cultural factors, immediacy, uncertainty, familiarity, personal control, scientific uncertainty, and trust in institutions and media. This interplay of hazard and outrage along with the cultural and economic context is likely to shape adherence to, and overall acceptance of, protective behavior against COVID-19 (Malecki et al., 2021).

An important factor in this process is the role of media, and in particular social media. While social media offer an opportunity for experts to quickly convey information about hazards, they also allow for the spread of misinformation and exacerbate outrage. Ineffective risk communication may increase morbidity and mortality, lead to a loss of trust in public health officials, and damage the economy (Varghese et al., 2020; World Health Organization, 2020). Zhang, Li, and Chen describe how the lack of open communication about the risks for contagion following the COVID-19 outbreak in Wuhan, China gave rise to conspiracy theories and rumors, which impaired the government's credibility, undermined trust in risk communication and hampered the public's self-protection (Zhang et al., 2020). It is therefore important to know how the public perceives information about the pandemic coming from different information sources.

The present study assessed: (1) which information sources are used by the Belgian population to gather information about COVID-19, and whether these sources are perceived as providers of clear and trustworthy information; we hypothesize that people consider experts as a main information source, and that information from experts is considered as the most clear and trustworthy; (2) whether these perceptions are the same for the two main language communities of Belgium; we hypothesize that there is no difference between the two groups; (3) which information channels are preferred to obtain information on IPC measures; we expect that traditional media (such as television, radio, and newspapers) were mainly used by people to inform themselves; and (4) which of the aforementioned factors are predictors of past and future adherence to IPC measures; we hypothesize a positive correlation between trust in different types of stakeholders and past and future adherence.

Materials and methods

A sample of 2,008 participants [1,135 (56.5%) in Dutch and 873 (43.5%) in French] was drawn from an online panel, representative for the Belgian population in terms of gender, age, socio-economic status and region. Data were collected *via* a market research and opinion poll company in September 2020. Questionnaires of participants were accepted when they fitted within the pre-defined demographic and socio-economic quotas, when they were complete, and when they passed quality controls. Representativeness of the sample for the Belgian adult population (aged 18–75 years) was ensured by the pre-defined quotas, and the final selection matched the Belgian population well in terms of demographic and socio-economic characteristics (Aujoulat et al., 2021). All participants were proficient in Dutch and/or French. The data collection methodology is detailed in another

1 *Languages of Belgium 2021*. Available online at: https://en.wikipedia.org/wiki/Languages_of_Belgium (cited May 18, 2021).

publication of the research team (van Loenhout et al., 2021).

Among other items, the survey included three questions regarding information sources: (1) "To what extent have the groups listed hereafter contributed to informing you about the current COVID-19 measures?" (2) "To what extent do you consider the information about the current COVID-19 measures provided by these groups to be clear?", and (3) "To what extent do you consider the information about the current COVID-19 measures provided by these groups as trustworthy?". The groups referred to were politicians, experts, journalists, close contacts and "other" (open text field). Responses were scored on 5-point Likert scales (0 = "not at all", 5 = "very much"), with an option "not applicable". Participants were also asked which information channel they preferred to use to access information on COVID-19 measures, to what extent they adhered to current COVID-19 IPC measures (past adherence), and to what extent they intended to adhere to these measures in the future (future adherence).

Average scores and standard deviations were calculated for the responses to the different questions. The scores of the Dutch- and French-speaking respondents were compared using independent-samples *t*-tests. Multivariable linear regression analyses were performed to assess the relationship between perception of information sources, use of channels and language on the one hand, and past and future adherence on the other hand. A *p*-value of <0.05 was considered to be statistically significant, based on two-sided tests. All statistical analyses were performed using IBM SPSS Statistics 27.

Results

Of the different groups listed, experts received the highest score for contribution to the public's information gathering about COVID-19 IPC measures. Their information was also considered the clearest and most trustworthy (Table 1). Politicians received the lowest score for clarity of information, with journalists scoring in between. Close contacts contributed the least to informing the population, but scored higher than politicians for information clarity and trustworthiness. Among the other information sources that were mentioned, the most often used ones were Facebook and other social media.

When comparing the perceptions of the two language communities, politicians received higher scores from French speaking respondents for all three questions, while experts scored systematically higher among Dutch speakers. Journalists also received higher scores from Dutch speakers for providing clear and trustworthy information compared to French speakers. For close contacts there was only a small difference in terms of information trustworthiness (also higher score from Dutch speakers).

The majority of the respondents preferred to receive information on COVID-19 measures through television (80.2%), followed by newspapers and news-sites (56.5%), radio (35.7%) and social media (27.7%). A small group of respondents (2.9%) indicated that they do not use any channel to obtain information on COVID-19 measures.

As appeared from the multivariate regression analyses, there was a highly significant ($p < 0.001$) positive relationship between the clarity and trustworthiness of experts as a source of COVID-19 information and both past and future adherence (Table 2). The extent to which experts were used as an information source on COVID-19 measures was significantly associated with future ($p = 0.001$), but not with past adherence ($p = 0.085$). For the other information sources (politicians, journalists, close contacts), there were no consistent relationships with either past or future adherence. Participants who relied on social media as an information channel had significantly lower past and future adherence to IPC measures than those who did not use social media as an information channel ($p < 0.001$). There was no significant effect of language in the multivariate analyses.

TABLE 1 Respondents' perception of different information sources on COVID-19 measures.

Source	Contributed in informing		Clear information		Trustworthy information	
	Dutch	French	Dutch	French	Dutch	French
	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)
Politicians	2.81 (1.13)	3.09 (1.16)**	2.65 (1.10)	2.84 (1.26)**	2.86 (1.15)	2.98 (1.26)*
Experts	3.78 (1.05)	3.60 (1.08)**	3.84 (1.01)	3.42 (1.18)**	3.99 (1.05)	3.70 (1.14)**
Journalists	2.98 (1.07)	3.01 (1.12)	3.28 (0.98)	3.00 (1.17)**	3.18 (1.01)	2.87 (1.15)**
Close contacts	2.67 (1.01)	2.70 (1.12)	3.20 (0.85)	3.16 (1.05)	3.19 (0.85)	3.09 (1.05)*

**Significant difference between Dutch and French respondents at the 0.01 level. *Significant difference between Dutch and French respondents at the 0.05 level.

TABLE 2 Perception of information sources and use of channels associated with past and future adherence to IPC measures.

	Past adherence		Future adherence	
	B-value (CI)	*p*-value	*B*-value (CI)	*p*-value
Contributed to informing				
Politicians	0.04 (0.00;0.09)	0.034	0.03 (−0.02;0.07)	0.250
Experts	0.04 (−0.01;0.09)	0.085	0.09 (0.04;0.14)	0.001
Journalists	0.00 (−0.04;0.05)	0.906	0.01 (−0.04;0.06)	0.732
Close contacts	−0.04 (−0.09;0.00)	0.032	−0.04 (−0.08;0.01)	0.118
Providing clear information				
Politicians	−0.06 (−0.10;−0.01)	0.018	−0.04 (−0.09;0.01)	0.084
Experts	0.12 (0.07;0.17)	<0.001	0.14 (0.09;0.20)	<0.001
Journalists	0.00 (−0.06;0.06)	0.981	0.01 (−0.05;0.07)	0.769
Close contacts	0.03 (−0.02;0.09)	0.220	0.01 (−0.05;0.06)	0.867
Providing trustworthy information				
Politicians	0.00 (−0.05;0.05)	0.937	0.01 (−0.04;0.06)	0.714
Experts	0.11 (0.07;0.16)	<0.001	0.12 (0.07;0.17)	<0.001
Journalists	−0.01 (−0.06;0.05)	0.819	−0.01 (−0.07;0.05)	0.851
Close contacts	0.02 (−0.03;0.07)	0.501	0.04 (−0.02;0.09)	0.186
Channel				
Television (yes vs. no)	0.09 (0.00;0.17)	0.056	0.08 (−0.01;0.18)	0.091
Radio (yes vs. no)	0.03 (−0.04;0.10)	0.378	0.03 (−0.04;0.11)	0.407
Newspapers, also online (yes vs. no)	0.06 (−0.01;0.12)	0.107	0.05 (−0.02;0.12)	0.170
Social media (yes vs. no)	−0.14 (−0.21;−0.06)	<0.001	−0.15 (−0.23;−0.07)	<0.001
Language (French vs. Dutch)	−0.01 (−0.08;0.06)	0.716	0.01 (−0.07;0.08)	0.906

Past adherence: $R^2 = 0.160$; adjusted $R^2 = 0.152$. Future adherence: $R^2 = 0.206$; adjusted $R^2 = 0.198$. The shaded values had a statistically significant contribution to the model.

Discussion

This study investigated the use, perceived clarity and trustworthiness of different information sources that contribute to informing the Belgian population with regard to COVID-19 IPC measures. The results show that of the different sources, experts contributed most to the public's knowledge about the disease and prevention measures, and that the information they provide was considered as clearer and more trustworthy than that coming from other sources. It should be noted that the term "expert" is used broadly, and comprises epidemiologists and other public health experts as well as medical specialists like family doctors. This concurs with a study from Taiwan showing that following academic courses (organized by experts from the Taiwan Centers for Disease Control) helped in lowering worry on COVID-19 by the population (Ho et al., 2020).

In contrast, information from politicians contributed less to the Belgian public's opinion about the pandemic and to the adherence to protective measures, and was perceived as less clear and trustworthy. This may reflect the overall decline of political trust that has been observed over the past decades, and which manifests itself in an increasingly critical attitude toward politicians and a loss of trust in basic democratic institutions and procedures (Marien and Hooghe, 2011). This lack of trust may have been acerbated by the contradicting views on the IPC measures that were expressed by politicians from different political parties during the pandemic. Scientific experts, on the other hand, were generally more consensual in their messages. Political trust is generally considered as an important determinant of compliance with governmental demands and regulations (Levi and Stoker, 2000), especially in times of crisis, when restrictions are imposed on individual rights and freedoms. On the other hand, collective fear, as well as swift and concerted action in response to a crisis, can also *increase* political trust, which is known as the "rally around the flag" phenomenon (Schraff, 2020). Research has shown that rapid and effective responses to the COVID-19 crisis have been rewarded with increased trust and support for political institutions (Bol et al., 2020). As such, it is important that communication by politicians is as consistent as possible, and preferably informed by and in accordance with the views of experts on the topic. As shown earlier, risk communication should focus on increasing people's perceived usefulness of the measures and their perceived ability to adhere to them, more than on increasing fear (van Loenhout et al., 2021).

Our study also revealed that citizens who rely more on experts for knowledge on COVID-19 and who consider the information from experts as clearer and as more trustworthy show higher levels of adherence to IPC measures, as well as an intention to adhere to these measures in the future. These relationships do not exist for the other information sources. This further corroborates the importance of experts as an information source for COVID-19 IPC measures.

Information by politicians received comparatively higher scores for use, clarity and trustworthiness from French-speaking than from Dutch-speaking citizens of Belgium, with the latter consistently giving higher scores to experts. This may reflect a difference between the two communities in terms of overall political trust, but could also be due to the fact that communication about the pandemic is covered by separate media for Dutch- and French-speakers, or due to cultural differences between the two language communities. A Belgian study which focused on government trust in relation to vaccination intentions found that in April 2021, French-speaking Belgians showed lower levels of government trust than Dutch-speaking Belgians (Van Oost et al., 2022). This seems contrasting with our results, but it is important to mention that the Belgian government composition changed in between the two studies, which might have impacted these findings.

The difference in perceived clarity and trustworthiness may also be due to the different way in which the information is framed by the media that serve the two language groups. This is plausible in the light of the importance of traditional media as the channel for retrieving information on COVID-19 IPC measures, with more than 80% of the respondents mentioning television as their preferred information channel, and more than 50% mentioning newspapers. As mentioned in the introduction, outrage as a key factor for the perception of and the response to risks are shaped by media. The media coverage of COVID-19 was high in both languages, but what matters is not only what was said in the media but also how it was said. This generally known as *media framing*. A study of the global media framing of COVID-19 showed that the dominant frames employed by the media to report on the pandemic were human interest, fear/scaremongering, hope in fighting the pandemic, and economic consequences (Ogbodo et al., 2020). While specific data on media framing for Belgium are not available, the nature of media framing of the pandemic may have been different, and accentuated the public's fear and reduced the trust in politicians differently for the two language groups.

The role of digital information sources is not insignificant either, with more than one out of four respondents preferring to use social media as a main, and perhaps only, source to obtain information on the pandemic. While social media (such as Facebook, Instagram, LinkedIn, or Twitter) can be helpful to spread information rapidly, they also add to the "infodemic" that accompanies the COVID pandemic by diffusing information that is often incomplete and confusing, and sometimes inadequate or misleading. False information may thus be taken for truth and reinforced by the false consensus that is created through the "echo chamber" effect of social media. This also appears to be the case in our study, in the sense that those who relied on social media as an information channel had lower adherence to IPC measures past and lower intended adherence in the future than those who do not use social media to obtain information on COVID-19 measures. Our results are reinforced by a recent US study, which showed a negative association with trust in social media on the one hand, and knowledge and adherence to social distancing on the other hand (Fridman et al., 2020). These challenges should be seriously addressed when engaging in risk communication, as they could have adverse consequences for public health (Bavel et al., 2020). In contrast, existing channels of good scientific quality should be used in aiding the transfer of important information (Ali and Bhatti, 2020).

Conclusions

In conclusion, our study showed that citizens of Belgium in general mostly rely on public health and medical experts for information on COVID-19 measures. However, Dutch speaking Belgians make more use of experts as an information source, and consider the information of experts as clear and trustworthy to a larger extent than French speakers. Furthermore, there is a strong positive relationship between perception of experts as an information source and past and future adherence to IPC measures. Finally, those who rely on social media as an information channel for COVID-19 measures score lower for both past and future adherence than those who do not use social media for this purpose. This study shows important insights that can be used by policy makers in future risk communication campaigns on COVID-19 or other IPC measures.

Data availability statement

The datasets presented in this study can be accessed through the UCLouvain Dataverse, using the following https://doi.org/10.14428/DVN/VJUPXI.

Ethics statement

Ethical review and approval was not required for the current study in accordance with the local legislation and institutional requirements. The ethical review board of UCLouvain indicated that ethical clearance was not necessary for this study, as it was considered an opinion poll among the Belgian population and not a patient survey. The respondents provided their written informed consent to the survey company to participate in this study. A short introduction on the study was provided,

from which respondents could decide to participate or not. Respondents could withdraw from the study at any time during the completion of the questionnaire.

Author contributions

JL developed the study idea and study questionnaire, with input from SV and IA, cleaned and analyzed the data, and drafted the manuscript, with input from the other authors. JL and IA collected the data, with the input of a survey company. All authors contributed to the interpretation of the analyses. All authors read and approved the final manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

Ali, M. Y., and Bhatti, R. (2020). COVID-19 (Coronavirus) pandemic: information sources channels for the public health awareness. *Asia Pac. J. Public Health* 32, 168–169. doi: 10.1177/1010539520927261

Aujoulat, I., Scheen, B., Vanderplanken, K., Van den Broucke, S., and van Loenhout, J. (2021). *Tackling the COVID-19 Outbreak: Assessing the Public's Risk Perceptions and Adherence to Measures (TACOM).* Université Catholique de Louvain.

Bavel, J. J. V., Baicker, K., Boggio, P. S., Capraro, V., Cichocka, A., Cikara, M., et al. (2020). Using social and behavioural science to support COVID-19 pandemic response. *Nat. Hum. Behav.* 4, 460–471. doi: 10.1038/s41562-020-0884-z

Bol, D., Giani, M., Blais, A., and Loewen, P. J. (2020). The effect of COVID-19 lockdowns on political support: some good news for democracy? *Eur. J. Polit. Res.* 60, 497–505. doi: 10.1111/1475-6765.12401

Fridman, I., Lucas, N., Henke, D., and Zigler, C. K. (2020). Association between public knowledge about COVID-19, trust in information sources, and adherence to social distancing: cross-sectional survey. *JMIR Public Health Surv.* 6, e22060. doi: 10.2196/22060

Ho, H. Y., Chen, Y. L., and Yen, C. F. (2020). Different impacts of COVID-19-related information sources on public worry: an online survey through social media. *Internet Intervent.* 22, 100350. doi: 10.1016/j.invent.2020.100350

Levi, M., and Stoker, L. (2000). Political trust and trustworthiness. *Annu. Rev. Polit. Sci.* 3, 475–507. doi: 10.1146/annurev.polisci.3.1.475

Lofstedt, R. E. (2011). Risk versus hazard - how to regulate in the 21st century. *Eur. J. Risk Regul.* 2, 149–168. doi: 10.1017/S1867299X00001033

Malecki, K. M., Keating, J. A., and Safdar, N. (2021). Crisis communication and public perception of COVID-19 risk in the era of social media. *Clin. Infect. Dis.* 72, 697–702 doi: 10.1093/cid/ciaa758

Marien, S., and Hooghe, M. (2011). Does political trust matter? An empirical investigation into the relation between political trust and support for law compliance. *Eur. J. Polit. Res.* 50, 267–291. doi: 10.1111/j.1475-6765.2010.01930.x

Maxim, L., Mazzocchi, M., Van den Broucke, S., Zollo, F., Robinson, T., Rogers, C., et al. (2021). Technical assistance in the field of risk communication. *Eur. Food Saf. Authority J.* 19, 6574. doi: 10.2903/j.efsa.2021.6574

Ogbodo, J. N., Onwe, E. C., Chukwu, J., Nwasum, C. J., Nwakpu, E. S., Nwankwo, S. U., et al. (2020). Communicating health crisis: a content analysis of global media framing of COVID-19. *Health Promot. Perspect.* 10, 257–269. doi: 10.34172/hpp.2020.40

Sandman, P. M. (1987). Risk communication: facing public outrage. *EPA J.* 13, 21–22.

Schraff, D. (2020). Political trust during the COVID-19 pandemic: rally around the flag or lockdown effects? *Eur. J. Polit. Res.* 60, 1007–1017. doi: 10.1111/1475-6765.12425

van Loenhout, J. A. F., Vanderplanken, K., Scheen, B., Van den Broucke, S., and Aujoulat, I. (2021). Determinants of adherence to COVID-19 measures among the Belgian population: an application of the protection motivation theory. *Arch Public Health* 79, 74. doi: 10.1186/s13690-021-00565-9

Van Oost, P., Yzerbyt, V., Schmitz, M., Vansteenkiste, M., Luminet, O., Morbée, S., et al. (2022). The relation between conspiracism, government trust, and COVID-19 vaccination intentions: the key role of motivation. *Soc. Sci. Med.* 301:114926. doi: 10.1016/j.socscimed.2022.114926

Varghese, N. E., Sabat, I., Neuman-Böhme, S., Schreyögg, J., Stargardt, T., Torbica, A., et al. (2020). *Europeans Know and Act on WHO Recommendations During COVID-19*. VoxEU and CEPR.

World Health Organization (2020). *COVID-19 Global Risk Communication and Community Engagement Strategy*.

Zhang, L., Li, H., and Chen, K. (2020). Effective risk communication for public health emergency: reflection on the COVID-19 (2019-nCoV) outbreak in Wuhan, China. *Healthcare* 8, 64. doi: 10.3390/healthcare8010064