

8 Abstract

Logical fallacies are a common problem associated with constructing arguments and reasoning. Their presence, in informal contexts, as well as in the media and academia, significantly affects the quality of discourse and the content and interpretations that are created as a result of it. The issue has been known since the time of Aristotle and is gaining popularity again in academic circles, especially in the context of the philosophy of scientific skepticism and the reliability of science. Despite this, both the classification of logical fallacies and their influence on the increasingly common phenomenon of misinformation are not sufficiently well-researched topics.

The COVID-19 pandemic revealed numerous dangerous pseudoscientific tendencies, with a significant role played by mass media, particularly online platforms. Although epidemics have been common occurrences throughout human history, and despite significant scientific advancements in recent decades, the COVID-19 pandemic proved to be an incomprehensible shock for many people, leading to far-reaching consequences associated with flawed reasoning processes. The underlying cause was the need to ‘explain the seemingly unprecedented situation. This process echoes historical patterns typical for earlier pandemics, closely linked with widespread misinformation, primarily stemming from logical fallacies and cognitive biases, notably confirmation bias. From the point of view of public health, the main consequence of the aforementioned phenomena is their real impact on decisions made by individuals and institutions, and thus on people’s health and lives.

This study attempts to determine the connections between logical fallacies, pseudoscientific, denialist, and conspiratorial theories, and the process of disinformation, based on the analysis of 400 articles published on Polish- and English-language Internet portals during the COVID-19 pandemic. A total of 200 articles were analysed in each language, categorized into 4 levels of reliability and 5 publication periods, covering the span of the pandemic, regarding the presence of logical fallacies and disinformation parameters. The harmfulness level of each article was also assessed. An original classification of logical fallacies into 4 groups was devised, based on their characteristic features related to information processing processes that lead to the commission of specific fallacies.

Relationships and correlations between individual logical fallacies and their groups, as well as parameters related to misinformation and characteristics of the articles were determined,

mainly the level of reliability, harmfulness, language, or publication period. An analysis of pseudoscientific content appearing in the articles was conducted, as well as of the quality of attribution of the source material.

The analysis showed significant relationships between logical fallacies, parameters related to misinformation, and the studied parameters of the articles published during the COVID-19 pandemic, most of which were found to be independent of the article's language and publication period. Relationships were demonstrated between logical fallacies and the level of reliability and harmfulness of articles, with their strength and type depending primarily on the specific group of fallacies. This result indicates that the proposed classification of logical fallacies may be both valid and practically useful, especially in the context of a deeper analysis of connections between logical fallacies and the overall quality of published content. The aforementioned relationships, as well as the proposed classification of logical fallacies, make it possible to better understand the role of fallacies in the context of medicine and public health. It must be emphasized that errors in reasoning are sources of medical misdiagnoses and incorrect therapeutic decisions, in the areas of prevention and intervention, of which neither the public nor the scientists are sufficiently aware.

Furthermore, pseudoscientific, denialist, and conspiracy theories disseminated during the COVID-19 pandemic were identified, both those based on previous concepts and novel ones. Their diversity and popularity proved unprecedented, while the phenomenon of the popularity of pseudoscience and conspiracy theories in a period of considerable existential uncertainty connected with a threat to health and life in itself cannot be considered new. The importance of the role of science and communication on the science-media-society line was emphasized as a crucial issue in preventing or at least minimizing such tendencies in the future.

It has also been demonstrated that both logical fallacies and content exhibiting characteristics of misinformation are highly prevalent in online media. A similar situation occurs regarding the attribution of source material, with the level exhibited by portals in this area being exceptionally low. The main problem lies in the inability to determine the source of the presented information due to the lack of appropriate citations. These are phenomena that unequivocally point to a generally low standard of journalistic reliability and the discrepancy existing between the world of science, especially medicine, and the sphere of communication with society in general, with the problem lying with the media (who are sure of their high

competences in the area of working with scientific publications) as well as science (struggling with its inadequacy in the area of communicating ideas and discoveries to society).

The phenomenon of logical fallacies in the area of science, particularly health sciences, medicine and related sciences, should certainly be the subject of further intensified research. First of all, it is necessary to precisely determine its connection with other cognitive and social processes that lead to widespread misinformation and the discrepancies at the science-society line of communication. Currently, a greater emphasis is placed on topics such as fake news (mainly in the sphere of politics), social media, or the generally low-quality of journalism, with less attention devoted to the underlying processes, in particular in the context of reliable presentation and interpretation of scientific discoveries. Logical fallacies, however, underpin most of the processes that result in what is collectively referred to as 'post-truth', and thus – similarly to any other basic principle – they require thorough understanding and categorization and, ultimately, grounding within the broader context of propagation of scientific knowledge. Only reliable, error-free, and fact-based work with scientific evidence makes it possible to make correct decisions concerning public health, especially in times of crisis, such as pandemics.