

## **A *STORM* IN PANDEMIC TIMES. THE TERMINOLOGICAL SYNTAGM ‘CYTOKINE STORM’ IN THE SCIENTIFIC DISCOURSE OF POPULARISATION IN ROMANIAN<sup>1</sup>**

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### **ABSTRACT. *A Storm in Pandemic Times. The Terminological Syntagm ‘Cytokine Storm’ in the Scientific Discourse of Popularisation in Romanian.***

The object of this contribution is the occurrence of the terminological syntagm *cytokine storm* (Rom. *furtună de citokine*) in various excerpts of Romanian scientific discourse of popularisation with reference to the Covid-19 pandemic and/or the SARS-CoV-2 virus. The terminological analysis of the syntagm *cytokine storm* is limited to a selection of four fragments which have appeared in recent Romanian mass-media discourse. In these fragments, both physicians and journalists specialised in medical science have been asked to explain the *cytokine storm* anti-inflammatory reaction, which seems to have caused the death of many people during the Covid-19 pandemic. The fragments of popularisation discourse have been selected from interviews broadcast at TV stations or from articles posted on medical websites or in health sections in the online press. As a result of the phenomenon known as *the scientific vulgarisation*, the corresponding discourse is closely linked to the *democratisation of knowledge*, in which both mass-media and education play an important part. Moreover, the discourse of popularisation takes into account not only the addresser, but also the addressee

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<sup>1</sup> The present paper is dedicated to Rodica Zafiu, professor at the Department of Linguistics (Faculty of Letters, University of Bucharest). A renowned specialist in Romanian linguistics, Rodica Zafiu was granted in 2023 the honorary title of *Professor Emeritus*.

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of a certain message. In order to make the layman addressee correctly decode the scientific (and terminological) notions, the specialist needs to render the specialised message in a more simplified and easy-to-understand manner. Therefore, the paper aims to highlight the different linguistic means which have been used by various addressers to deliver the necessary explanations for the *cytokine storm* reaction, so that the non-specialised addressees could understand what the syntagm itself exactly denotes.

**Keywords:** *“cytokine storm” terminological syntagm, scientific discourse of popularisation, medical knowledge, mass-media, linguistic means of scientific vulgarisation*

**REZUMAT. Furtună în vremea pandemiei. Sintagma terminologică furtună de citokine în discursul de vulgarizare științifică din limba română.** Obiectul acestei lucrări este apariția sintagmei terminologice *furtună de citokine* în diverse fragmente din discursul științific românesc de popularizare, cu referire la pandemia de Covid-19 și/sau la virusul SARS-CoV-2. Analiza terminologică a sintagmei *furtună de citokine* se limitează la o selecție de patru fragmente apărute în discursul recent al mass-mediei românești. În aceste fragmente, atât medici, cât și jurnaliști specializați în domeniul medical au încercat să explice reacția antiinflamatoare denumită *furtună de citokine*, care pare să fi cauzat moartea multor persoane în timpul pandemiei de Covid-19. Fragmentele discursive de vulgarizare științifică au fost selectate din interviuri difuzate la posturi de televiziune, precum și din articole postate pe site-uri medicale sau în rubrici de sănătate din presa online. Ca urmare a fenomenului cunoscut sub numele de *vulgarizare științifică*, discursul corespunzător este strâns legat de *democratizarea cunoașterii*, în care mass-media, dar și educația joacă un rol important. În plus, discursul de popularizare ia în considerare nu numai emițătorul, ci și destinatarul unui anumit mesaj. Pentru ca destinatarul profan să decodeze corect noțiuni științifice (și terminologice), specialistul trebuie să redea mesajul specializat într-o manieră mai simplificată și mai ușor de înțeles. Prin urmare, lucrarea își propune să evidențieze diferitele mijloace lingvistice care au fost folosite de o serie de emițători în oferirea de explicații pentru apariția furtunii de citokine, astfel încât destinatarii nespecializați să poată înțelege ce anume denotă sintagma în sine.

**Cuvinte-cheie:** *sintagma terminologică „furtună de citokine”, discurs de vulgarizare științifică, cunoștințe medicale, mass-media, mijloace lingvistice de vulgarizare științifică*

## Introduction

The medical terminology is a specialised lexicon which has been widely analysed in descriptive-terminological studies written both in Romania (Săpoi 2010, 2012, 2013) and abroad (Balliu 2006; Contente 2006; Lino 2006; Trurnit Verbic 2006). Through the different perspectives which have been adopted, these studies have been included in the category of research belonging to the so-called “external” terminology (conventionally labelled  $T_2$ ), a linguistic, descriptive and semasiological approach, undertaken by terminological linguists and opposed to the “internal” terminology ( $T_1$ ), which belongs to specialists in a particular scientific field. Unlike the “internal” terminology, which describes terms as conventional facts, the aim of the “external” terminology is to depict terms as natural facts (Bidu-Vrănceanu 2010, 13).

Continuing the descriptive-linguistic studies above-mentioned, the present paper deals with the occurrence of the terminological syntagm *furtună de citokine* (“cytokine storm”) in the scientific discourse of popularisation encountered in the Romanian media and related to the Covid-19 pandemic and/or the SARS-CoV-2 virus. As it will be detailed in the analysis (see section 3 below), the syntagm in question refers to a certain violent antiinflammatory reaction of the human body, designed to counteract the actions of the SARS-CoV-2 virus, which is responsible for the emergence of Covid-19.

Given the context of the Covid-19 pandemic, the main objective of the paper is to analyse four discursive fragments of scientific popularisation, based on the phrase *furtună de citokine* (“cytokine storm”). Broadcast in the media since the early months of the Covid-19 pandemic, these fragments have been excerpted from various pieces of information given either by physicians or journalists specialised in medical science. Another objective of the paper is to comment on the degree of terminological consistency that is specific to any scientific discourse, hence the one of popularisation as well.

The first premise of the research is the outbreak of the Covid-19 pandemic, namely, an extralinguistic event. Through the complications which developed over time, this pandemic led to many deaths, including those among young people. In the early stages of the pandemic, the cause of these deaths was thought to be the cytokine storm. The second premise of the research concerns the terminological analysis of various aspects of the Covid-19 pandemic. It is thus a continuation of a previous research on meteorological metaphors in medicine, in general, and on metaphors based on the meteorological term *storm*, in particular (see Grigore (in press)). The last premise of this paper is based on a personal interest in the linguistic study of terminologies, particularly, the weather terminology. This interest materialised in the doctoral studies followed at the

University of Bucharest and finalised with the publication of a doctoral thesis which takes into account aspects of the weather terminology (Grigore 2019).

As far as the structure of the paper is concerned, the introductory part is followed by a presentation of theoretical issues related to the phenomenon of *scientific popularisation* and, implicitly, to its corresponding discourse. The third section examines various occurrences of the syntagm *cytokine storm* in fragments of medical popularisation discourse, while the final part brings together the observations drawn from the analysis.

### 1. Theoretical issues<sup>3</sup>

The movement of *the specialised vocabulary* towards *the general vocabulary* becomes an essential aspect within the limits of the “external” terminology (T<sub>2</sub>) (Bidu-Vrănceanu 2007, 155–177). The reason for this movement is represented by the current situation in the modern society, in which science and technology hold a special position (Cabré 1998, 23). This position has resulted in a connection established between scientific and common knowledge (Bidu-Vrănceanu 2007, 16), as the modern society is considered a society of knowledge or *société du savoir* (Meyer and Mackintosh 2000, 201), in which the general public, formed of non-specialists, must have access to the widest possible range of scientific fields.

Education and media have contributed to bringing closer the two types of knowledge, thus making it possible to disseminate specialised terms to the non-specialist public (Cabré 1998, 25–26; Béjoint and Thoiron 2000, 14–16; Meyer and Mackintosh 2000, 198, 208). The new social realities imposed by education and media have resulted in an “opening” of technical and scientific fields, through the lifting of knowledge barriers, a process which has been designated as “the secularisation of the sciences” (Rastier 1995, 45), or the “democratisation” or “socialisation of knowledge” (Gaudin 2003, 133–142).

From a terminological point of view, the relationship between the general vocabulary and specialised vocabulary results in a semantic evolution, due to lexical and semantic effects (caused by *determinologisation* and *banalisation* of terms) or to linguistic processes which characterise the extension of *scientific popularisation/vulgarisation* (Bidu-Vrănceanu 2007, 155–177).

In a broad interpretation, *scientific vulgarisation* has been defined as a mere transfer of knowledge (Gaudin 1992). Later on, vulgarisation has been interpreted as a deliberate, conscious and organised dissemination of scientific concepts and knowledge. This action is carried out by specialists or semi-

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<sup>3</sup> The theoretical aspects mentioned in this section have been largely discussed in Grigore (2019, 17–18, 59–72, 80–84).

specialists and is necessarily addressed to non-specialists or laymen (Bidu-Vrănceanu 2007, 162; see also below).

Some studies have pointed out that scientific vulgarisation makes the term gain both in frequency and meaning, through the multitude of discourses in which it appears (Alexandru and Gaudin 2006, 60). The newly-gained frequency and meanings trigger a lexicographical effect, because scientific vulgarisation can provide general dictionaries with examples that are as relevant as those taken from basic scientific discourse. Nevertheless, the examples derived from scientific popularisation are much more accessible to the general public and therefore much clearer in illustrating how the term really works (Mortureux 1994, 72). Despite all these benefits rendered by scientific popularisation, one major drawback has been noted in the literature, namely, the fact that the term loses its precision or scientific rigour throughout vulgarisation (Alexandru and Gaudin 2006, 60).

Other studies have focused on the role of the person who properly carries out the popularisation process, whose approach has been compared to that of a translator. The similarity between the two persons is based on the fact that both have to rewrite scientific information, usually resorting to linguistic means of everyday communication (Jacobi 1994, 89). These linguistic means include elements of reformulation (Fr. *reformulants*), elements indicating an accessible definition given to specialised terms (Fr. *definissants*), nominal substitutions and anaphors, as well as metadiscursive markers (e.g., *that is...*, *in other words...*). All these linguistic mechanisms correspond to paraphrasing and, together with synonyms, are organised around the term under scrutiny, in order to allow the global understanding of a popularisation discourse. A special category of vulgarisation mechanisms is represented by analogies, explicit comparisons and metaphors (Jacobi 1994, 85–87; Bidu-Vrănceanu 2007, 165–176).

The different types of discourse have been classified by various researchers, according to predefined sets of criteria (Cabr  2000; Desmet 2006; Mejri 2006). In Cabr 's view (2000, 29), there are three main discursive types: (1) scientific discourse, (2) didactic discourse, and (3) popularisation discourse. This classification has been adopted by Mejri (2006, 705–706), who has adjusted it depending on the specialisation of the participants involved in a discursive situation. Consequently, the three discursive types have been redefined as: (1) specialised discourse (the sender and the receiver are both specialists); (2) semi-specialised and heterogeneous discourse (the sender is a specialist, while the receiver is unidentified); (3) general discourse (the sender is a specialist and the receiver is undoubtedly a non-specialist).

However, other studies have refined the basic classification earlier proposed by Cabr  and have suggested more accurate discursive types. This has

been the case of Desmet's classification (2006, 237), which has taken into consideration four criteria: a) the degree of abstraction encountered in a certain terminology; b) the natural or artificial manner of expressing concepts; c) the type of specialisation; d) the participants. The criteria listed above have led to a more rigorous stratification of discourses into: (1) specialised scientific discourse (in specialised textbooks or scientific journals); (2) official scientific discourse (in texts of law); (3) pedagogical/didactic scientific discourse (in university textbooks); (4) semi-scientific popularisation discourse (in specialised journals for an initiated audience); (5) scientific popularisation discourse (in specialised sections of the general press).

In addition, it is worth mentioning that the higher the conceptual consistency of a discourse, the more specialised that discourse is. In fact, a particular feature of the specialised discourse is its *terminological consistency*, an aspect which has been proved by several terminological analyses. In other words, if a text (especially one belonging to the general discourse) has a small number of specialised terms, the corresponding concepts undergo the so-called *dissolution* in discourse (Mejri 2006, 707).

In spite of the interesting aspects previously presented, some studies have argued that the scientific vulgarisation is a limited process, since it depends on extralinguistic, variable and complex factors. Because of this, the effect of scientific popularisation on general language is only accidental and cannot always be easily predicted (Bidu-Vrănceanu 2007, 177).

## **2. The terminological syntagm *cytokine storm* in Romanian popularisation discourse**

To begin with, the term *storm* (Rom. *furtună*) is frequently used in medical terminology to denote a severe pathological response that an organism has either when it is infected or due to an immunotherapy treatment. This response is closely linked to a certain degree of violence or aggressiveness which occurs very quickly and characterises a medical condition or illness. Apart from the *cytokine storm*, examples discussed in the medical literature include: *adrenergic storm* (Rom. *furtună adrenergică*, which designates an increased level of catecholamines, i.e., hormones such as dopamine or epinephrine/adrenaline, made by adrenal glands; our emphasis), *paroxysmal sympathetic storm* (or *paroxysmal sympathetic hyperactivity*, Rom. *furtună paroxismală simpatică*, a nervous system disorder that affects 15 to 35% of people who have sustained a severe traumatic brain injury; our emphasis) and *thyroid storm* (or *thyrotoxic crisis*, Rom. *furtună tiroidiană*, a life-threatening

health condition that is related to untreated or undertreated hyperthyroidism; our emphasis).

According to the *Oxford English Dictionary/OED* (see example (1)), the origin of these specialised syntagms can be traced back to the 16th century. More specifically, it seems that around 1540 the weather term *storm* was given a meaning associated with pathology, probably due to the similarities that this medical reaction has with its meteorological counterpart (namely, rapidity and violence in manifestation)<sup>4</sup>:

- (1) *storm* (n.) = (1.) a *violent* disturbance of the atmosphere, manifested by *high winds*, often accompanied by *heavy falls* of rain, hail, or snow, by thunder and lightning, and at sea by *turbulence of the waves* [...]. (4. pathology) a paroxysm, *violent* access (of pain or disease) (OED, s.v. *storm*; our emphasis).

On the other hand, the syntagm *cytokine storm* itself was attested in English only in 1993, so as to describe the engraftment syndrome of acute graft-versus-host disease after allogeneic hematopoietic stem-cell transplantation (Fajgenbaum and June 2020).

In Romanian, the medical construction *furtună de citokine* has been undoubtedly accepted due to the correspondence with the weather terminology (see subsection 5.3. in Grigore (in press)). The syntagm has been used more frequently starting with the year 2020, which marked the outbreak of the Covid-19 pandemic in Romania. During the autumn of 2020, some doctors singled out the cytokine storm reaction as the cause of death for numerous Covid-19 patients in Romanian hospitals (see example (2)). Being an immune response, the cytokine storm is not a serious medical reaction, but a normal one, representing a manner of defence that an organism has against an infection. Nonetheless, when the cytokine storm becomes too aggressive, corroborated with the rapidity of its occurrence, it determines dramatic health changes and is potentially life-threatening for the patient, irrespective of the medication which might be prescribed to him.

- (2) În acest sens, organismul eliberează o *cantitate foarte mare* de citokine proinflamatorii, determinând o adevărată *furtună de citokine*. Iar această furtună de citokine determină la unii bolnavi o *hiperinflamație*, care, încercând să distrugă virusul, distruge, de fapt, și țesuturile pulmonare.

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<sup>4</sup> See also the conceptual and cultural metaphor *STORM IS AGGRESSIVE (PATHOLOGICAL) RESPONSE*, whose occurrence was due to the influence of English and which was thoroughly discussed in section 4. in Grigore (in press).

Iar această reacție inflamatorie supradimensionată nu prea poate fi stăpânită cu niciun fel de medicamente antiinflamatorii (Restian 2020; our emphasis)<sup>5</sup>.

Taking into account the seriousness of this reaction, and the significant number of Covid-19 fatalities in Romanian hospitals, several doctors were asked to explain in the media what the cytokine storm consisted of and what negative consequences it could have for the health of a person who had been infected with the SARS-CoV-2 virus. As a matter of fact, since the early stages of the Covid-19 pandemic, well-known physicians with different specialties were invited to TV stations with the purpose of giving interviews which were broadcast in prime time. Other doctors chose to write informative materials for websites belonging to medical clinics. Their example was soon followed by journalists specialised in medical science, who wrote significant articles either for medical websites or the health pages in the general online press.

One of the first doctors to address the public and explain what the cytokine storm represents was Virgil Musta, a reputed infectious disease doctor and head of the Infectious Diseases Department of the “Dr. Victor Babeș” Hospital in Timișoara (example (3)). In an informative material written in early 2020 for the Profilaxis Medical Clinic, doctor Musta emphasised that the cytokine storm occurred in an advanced phase of the Sars-CoV-2 infection (namely, the third), when severe reactions appeared in a sick organism. These reactions led to the destruction of internal organs, starting with the lungs, and resulted in a number of complications, some of them being life-threatening.

(3) Faza III [...]. În organism poate apărea o hiperreacție imună ce produce o *furtună de citokine*, cu distrucție rapidă și severă a aproape tuturor organelor. La nivelul plămânilor nu se mai pot face schimburile de gaze, iar oxigenul nu mai ajunge la celulele din diferite organe, acestea mor, afectând organul respectiv. Se instalează insuficiența multiplă de organ sau apar complicații ca infarctul miocardic, accidentul vascular cerebral, tromboze, hemoragii masive sau alte complicații majore, care duc la decesul pacientului (Musta 2020, 4; our emphasis)<sup>6</sup>.

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<sup>5</sup> “Thus, the body releases a very large amount of proinflammatory cytokines, causing a real *cytokine storm*. And this cytokine storm causes hyperinflammation in some patients, which, by trying to destroy the virus, actually destroys the lung tissues. And this oversized inflammatory reaction can hardly be controlled with any antiinflammatory drugs” (Restian 2020; our translation).

<sup>6</sup> “Phase III [...]. An immune hyperreaction can occur in the body producing a *cytokine storm* with rapid and severe destruction of almost all organs. The lungs can no longer exchange gases and oxygen can no longer reach the cells in the various organs, and they die, damaging the organ. Multiple organ failure sets in or there can occur complications such as myocardial infarction, stroke, thrombosis, massive haemorrhages or other major complications, leading to the patient’s death” (Musta 2020, 4; our translation).



In this first illustration of scientific popularisation discourse, the doctor focused on explaining the negative effects of Sars-CoV-2 infection instead of providing a proper definition of the *cytokine storm*. Though the physician could have easily indicated what the *cytokine storm* exactly means, he did not launch into very complicated explanations that could have induced more panic among the population who was already frightened by the high death toll in the first months of the pandemic.

In fact, doctor Musta used the phrase *cytokine storm* to draw his readers’ attention to the serious complications caused by Covid-19, some of them (for instance, irreversible lung damage, risk of heart attack or stroke, haemorrhages) being consequences of other diseases as well. These complications, and implicitly the terms that denote them are familiar to the majority of Romanian-speaking people who possess an average level of education. It is likely that, among these people, one can identify those who have visited the medical clinic’s website to find out more about the causes and consequences of the Covid-19 disease. This aspect triggers an important feature concerning the low level of terminological consistency. Even if the excerpt contains medical terms, due to their well-known significance, they do not hinder an adequate decoding of the entire message.

Unlike doctor Musta, Radu Țincu, a famous Romanian anaesthetist who works at the Intensive Care Unit of the Clinical Emergency Hospital in Bucharest, chose to give a rather simplified definition of the syntagm *furtună de citokine* (“cytokine storm”, see example (4)). Being invited in October 2020 on the set of Digi 24 TV station, Țincu not only explained what the cytokine storm reaction represented, but also gave the reasons for which the lungs were the first to be affected in a long line of organ inflammations in the human body.

(4) *Furtuna de citokine* – adică acea hiperreacție a sistemului nostru imunitar – apare undeva la 7–8–10 zile de la momentul infectării, când organismul începe să producă în exces, în încercarea de a elimina virusul, aceste molecule proinflamatorii. Ele nu afectează doar plămânil. Plămânil este primul punct de afectare, pentru că acolo se produce lupta primară între organism și virus. În momentul în care acest răspuns inflamator sistemic cuprinde întreg organismul, discutăm de o inflamare la nivelul inimii (miocardită), o inflamare a vaselor de sânge, cu riscul de formare a acelor cheaguri de sânge, cu producerea unor infarcturi în diferite zone, accidente vasculare cerebrale. Sunt foarte mulți pacienți care dezvoltă chiar și o afectare renală, din cauza acestor molecule proinflamatorii și a obstrucționării vaselor renale cu cheaguri (Țincu 2020; our emphasis)<sup>7</sup>.

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<sup>7</sup> “The *cytokine storm* – namely, that overreaction of our immune system – occurs around 7–8–10 days after the infection, when the body starts to overproduce these proinflammatory molecules in an attempt to eliminate the virus. They do not just affect the lung. The lung is the first point of the damage, because that is where the primary battle between the body and the virus takes place.

From a terminological perspective, the accessible definition offered by doctor Țincu (*acea hiperreacție a sistemului nostru imunitar* “[the cytokine storm is] that hyperreaction of our immune system”, our translation) constitutes a linguistic mechanism of scientific popularisation (see section 2 above). This mechanism is doubled by the metadiscursive marker *adică* (“namely, that is”), used by the physician to signal in a clear manner the definition of a severe pathological reaction.

Similarly to his colleague Musta, the anaesthetist insisted on details that are essentially medical, but of great interest to society (for example, the approximate time when the cytokine storm can set in, the reasons for this reaction, why the lungs are the first to suffer from the cytokine storm and how other organs are affected). The presence of these medical pieces of information leads to a linguistic consequence, that is, the dissolution of concepts in the context or, once again, the low level of terminological consistency.

The third example of vulgarisation discourse which will be discussed in this paper marks a fundamental change concerning the addresser (example (5)). More precisely, the source of the popularisation discourse is no longer a doctor, but a journalist specialised in medical issues. This is the case of Bogdan Păcurar, a contributor to the news portal related to the Romanian TV station Digi 24. The portal contains a Health section, which often provides explanations for the occurrence and treatment of certain diseases. In October 2020, when little was known about the unexpected evolution of Covid-19, Bogdan Păcurar wrote an article about the work of some American researchers at Temple University in Philadelphia. These researchers were involved in the discovery of chemical markers that could help identify patients who might be predisposed to severe forms of Covid-19 and, therefore, might suffer from the cytokine storm reaction.

- (5) O parte dintre pacienții care dezvoltă forme grave de COVID-19 se confruntă cu apariția unei inflamații periculoase și sistemice, declanșate de un răspuns imunitar hiperactiv, care poartă denumirea [de] *furtună de citokine* [...]. Citokinele, cauza suspectată ale acestor furtuni inflamatorii, joacă totuși un rol esențial în lupta contra bolilor infecțioase. Ele reprezintă niște semnale de alarmă chimice, care declanșează alte componente ale sistemului imunitar (Păcurar 2020)<sup>8</sup>.

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When this systemic inflammatory response involves the whole body, we are talking about inflammation of the heart (myocarditis), inflammation of the blood vessels, with the risk of those blood clots forming, with infarctions occurring in different areas, or strokes. There are many patients who even develop kidney damage due to these proinflammatory molecules and to the clotting of the renal vessels” (Țincu 2020; our translation).

<sup>8</sup> “A proportion of the patients who develop severe forms of COVID-19 experience the occurrence of dangerous, systemic inflammation triggered by an overactive immune response, which is

In describing the work of the American researchers, the journalist opted to define the cytokine storm reaction as an overactive immune response that triggered dangerous and systemic inflammation. Interestingly enough, the journalist’s comment contained the specific phrase *care poartă denumirea [de]* (“which is called”), whose function was to signal the presence of a definition.

The journalist also included in his description a brief explanation of cytokines as the cause of this inflammatory storm, and their role in the fight against infections. Although the article was aimed at an unknown and generally non-specialised audience, the selected excerpt contained a number of scientific details which were interesting mostly to doctors. However, by pointing out that cytokines were chemical signals, without providing too much information on this matter, the scientific details were kept within certain limits. Thus, the message was delivered in a manner that was accessible and easy-to-understand by non-specialists. From a terminological standpoint, this fact contributed to a low level of terminological consistency, as the conceptual details underwent a certain degree the dissolution in discourse.

In order to avoid repeating the phrase *furtună de citokine* (“cytokine storm”), the journalist uses the construction *furtună inflamatorie* (“inflammatory storm”) in the selected passage. In other words, the journalist establishes a contextual synonymy between *furtună de citokine* and *furtună inflamatorie*. It is worth noting the partial character of this synonymy, since the occurrence of an inflammation does not solely characterise the cytokine storm. Therefore, from a linguistic point of view, the relationship between the two syntagms is one of hyponymy: *furtună inflamatorie* is the hyperonym, while *furtună de citokine* has the status of hyponym.

The last example of popularisation discourse to be analysed in this paper belongs once again to a journalist specialised in the medical domain. This time, the journalist is Paula Rotaru, who writes articles for the medical website *csid.ro*, where *csid* stands for the question *Ce se întâmplă, doctore?* (literally, “What is happening, doctor?”). The analysed excerpt was taken from Rotaru’s article which was meant to describe a smart device that could detect early infection with the Sars-CoV-2 virus. In her article, the journalist took into consideration a few interesting details for the terminological analysis of the *cytokine storm* syntagm.

(6) *Furtuna de citokine* apărută în cadrul bolii COVID-19 poate fi depistată din timp, înainte să facă ravagii în organism, cu ajutorul unui device

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called [a] *cytokine storm* [...]. Nonetheless, cytokines, the suspected cause of these inflammatory storms, play an essential role in the fight against infectious diseases. They are chemical alarm signals that trigger other components of the immune system” (Păcurar 2020; our translation).

inteligent care seamăna cu un ceas de mână. Acest dispozitiv este dotat cu un senzor de transpirație ce poate identifica precoce *furtuna de citokine*, adică nivelul crescut de proteine imune proinflamatorii din organism. În cazul formelor grave de COVID-19, furtuna de citokine este un proces care, odată declanșat, poate leza grav organele (Rotaru 2021; our emphasis)<sup>9</sup>.

The interesting details mentioned above refer to a brief but comprehensive definition of the *cytokine storm*, introduced by a metadiscursive marker (*adică nivelul crescut de proteine imune proinflamatorii din organism* “namely, the increased level of proinflammatory immune proteins in the body”). Although the author did not provide further explanation of what those proinflammatory immune proteins were, she decided to inform her audience about the dramatic consequences of the Sars-CoV-2 infection. Implicitly, the journalist brought to the attention of her readers the fact that, in severe forms of Covid-19, the *cytokine storm* could lead to serious organ damage. However, she failed to list which parts of the human body were mainly affected by the disease.

Aside from the fact that the subject of the article was different from describing the Covid-19 pandemic, one possible explanation for this lack of additional information may be that the article was written in May 2021, more than a year after the World Health Organisation declared the Covid-19 pandemic. It can therefore easily be assumed that no further details were needed, as society was already well acquainted with accurate information about the subject of Covid-19.

Bearing in mind this possible situational context, it is not surprising that the level of terminological consistency is yet again low. The syntagm *furtună de citokine* (“cytokine storm”) is surrounded both by easy-to-decode medical terms (such as *formă severă* “severe form”, *organ* “organ”, *transpirație* “sweat”), and by terms belonging to other specialised languages, in particular the technical one, which are frequently used nowadays (*device inteligent* “smart device”, *senzor* “sensor”).

## Conclusions

This paper analysed from a terminological perspective the occurrence of the syntagm *furtună de citokine* (“cytokine storm”) in four excerpts of scientific

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<sup>9</sup> “The COVID-19 *cytokine storm* can be detected early, before it wreaks havoc on the body, with a smart device that looks like a wristwatch. This device is equipped with a sweat sensor that can identify early the cytokine storm, namely, the increased level of proinflammatory immune proteins in the body. In severe forms of COVID-19, the cytokine storm is a process that, once triggered, can severely damage organs” (Rotaru 2021; our translation).

discourse of popularisation or vulgarisation written in Romanian. The respective popularisation discourse referred to a recent extralinguistic event, that is, the Covid-19 pandemic, and aimed to offer clear and easy-to-understand explanations for society, in general, irrespective of their knowledge of medical matters.

These explanations and, most of all, the manner in which they were delivered, are of interest to Romanian society as a whole, as they shed light on the *cytokine storm*, an extremely aggressive inflammatory reaction that tens of millions of people around the world have faced, and because of which millions more lost their lives during the Covid-19 pandemic. The explanations are also of interest to linguists (particularly, terminologists), since the former contain various linguistic means used to correctly understand a specialised syntagm belonging to the very complex medical terminology.

A key element in the terminological analysis was given by the four sources used to exemplify the scientific vulgarisation process. These sources were carefully chosen so as to offer a variety of specialised addressers, as well as different temporal contexts of information dissemination.

With respect to the addressers, the analysis took into account not only two renowned doctors (an infectious disease physician and an anaesthetist who works in an intensive care unit), but also two journalists who have a fairly good knowledge of the medical field and terminology. The reason behind the choice of these four addressers was to illustrate the manner in which people with a higher or lower degree of specialisation in the medical field relate to the scientific information and deliver it to the general public.

However, the analysis showed a common strategy of the addressers, who tended to focus on the effects of the medical reaction instead of offering complicated details, which would have undoubtedly induced more panic among the people. Furthermore, it should be noted the use of other medical terms, with which the general audience was already familiarised to some extent. These terms denote both severe complications (*infarct* "infarction", *accident vascular cerebral* "stroke", *hemoragie* "haemorrhage"), and notions which are easily decoded by laymen (*organ* "organ", *plămân* "lung", *transpirație* "sweat"). The result was a dissolution of the medical concepts in the linguistic context, which contributed to a reduction in the degree of specialisation of the vulgarisation discourse. In other words, all four fragments had a low degree of terminological consistency, which is an important feature of the scientific vulgarisation.

The temporal contexts in which the four fragments occurred ranged from the early stages of the Covid-19 pandemic in Romania (that is, the year 2020) to May 2021, when the subsequent research on the Sars-CoV-2 virus brought significant details about its cause, effects and treatment. This fact triggered another linguistic consequence, since the fragments dating back to the outbreak

of Covid-19 pandemic relied on a short but comprehensive definition, introduced by the metadiscursive marker *adică* (“namely”) or the specific phrase *care poartă denumirea [de]* (“which is called”), unlike to the 2021-excerpt, which did not contain any definition whatsoever. Together with the use of the contextual (yet partial!) synonym *furtună inflamatorie* (“inflammatory storm”), these fragments pointed out other linguistic means which resulted in the scientific vulgarisation process.

Given the analysis undertaken in this paper, it should be considered that all the different linguistic mechanisms of scientific vulgarisation (the dissolution of medical concepts, marked by the use of well-known medical terms, the presence of brief definitions, and the occurrence of contextual synonyms) were meant to help non-specialist addressees correctly decode the meaning of the scientific (complicated) phrase *cytokine storm*.

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