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A Corpus Analysis of Metaphorical Expressions in Covid-19 Open Research Dataset (CORD19)

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Abstract

Metaphors play a significant role in shaping our thoughts and processes of communication. They are extensively used in everyday language and hence are an indispensable part of shaping human thought and language structures. Therefore, amid the current situation of Covid-19, this paper investigated variation in language use particularly focusing on metaphors to describe this pandemic. Adhering to a mixed-method, the corpora of Covid-19 Open Research Dataset (CORD-19) were selected since it was openly available in the Sketch Engine database. Quantitatively, the analysis of metaphorical expressions was carried out with the help of corpus tools. Furthermore, the concordances of the selected metaphors were discussed with a critical lens. The findings of the current work showed that people made use of metaphorical expressions from the domains of war, crime, and calamity to highlight the gravity of the pandemic. Moreover, the results also showed that these metaphors denote aspects of real war, crime, and catastrophe and hence demand urgent action in an emergency. They also brought to light that the use of such metaphors inflicted damage on the thinking processes of the people.

1. Introduction

Language provides the ways to construct social reality which certainly reflects in the prevalent discourses of that certain societal set up (Fairclough, 2001; Hymes, 1972; Said, 1978). Similarly, language is perceived not only as a tool for communication but also as an instrument of power and a vehicle to construct identity (Bourdieu, 1977; Fairclough, 1993; 2015). These discursive and figurative arrangements in discourses draw the attention of not only linguists but also critical discourse analysts. So the focus of critical discourse analysis (CDA) is to reveal hidden perspectives of certain ideological structures produced through using various strategies of language (van Dijk, 1993). So, metaphor is just such a pattern in language use (Hart, 2008).

In daily life, metaphors play a substantial part in human imagination and understanding since they are employed to create societal, psychological, and ethnic reality (Daneback, 2017; Sun, 2010). Furthermore, metaphors are ideological since they —define in significant part what one takes as reality (Lakoff & Chilton, 1995, p. 56). Since metaphors are an important tool for reality formation, therefore they aid in demystifying the underlying realities in discourses. Hence they hold a significant position in CDA (Charteris-Black, 2004). Since metaphors are found in the everyday use of language (Lakoff and Johnson, 1980), therefore they are also employed to describe the extent and level of diseases and pandemics in health discourses (Craig, 2020; Hanne, 2016; Sun, 2010). Corpus linguistics (CL) has facilitated the study of language patterns and functions by

providing computerized real-life data or corpora (Meyer, 2002). In addition, CL also offers computer software to analyze various textual, grammatical, and figurative aspects of language use (Mahmood, Parveen, Shah, & Batool, 2013). Both corpus linguists and critical discourse analysts undertake real life data to explore social concerns, therefore their perspectives are grouped under corpus-assisted discourse-studies (CADS) as proposed by Partington (2008).

Therefore, the present paper examined a health discourse CORD-19 which is a corpus database on COVID-19, a pandemic spread around the world in 2020. By undertaking CORD-19, this work investigated the patterns of language use particularly focusing on metaphorical expressions which were employed to describe the severity of this outbreak. This study is quite significant since it explored (a) how the cruelty of COVID-19 has been discussed in published research around the globe and (b) it provides a comprehensive understanding of the language which is used to talk about this pandemic. The subsequent section provides a compressive overview of COVID-19.

1.1. Background of COVID-19

Initially, the pneumonia cases were reported to the World Health Organization (WHO) from Wuhan in Hubei province in China on 31st December, 2019 (Wicke, Bolognesi, 2020). The sellers or dealers in the Huanan seafood market displayed pneumonia-like symptoms. This disease was named 2019-nCoV at first but later it was replaced with Covid-19. A virus named SARS-CoV-2 is responsible for this disease. This pandemic influenced all the domains of the personal and social life of the global community (Wicke, Bolognesi, 2020). Most countries have implemented lockdowns, promoted quarantines, advised social distancing, and occasionally forced people to stay indoors to sidestep the spread of the virus (Craig, 2020). This disease has killed millions of people in almost all the countries of the world particularly in 2020 (Wicke & Bolognesi, 2020). Therefore, it becomes important to study how people perceive this large-scale disastrous pandemic and how they talked about it. The next section outlines the reasons to carry out this research on Covid-19.

1.2. Problem statement

Up till now millions of citizens all over the world are meeting the global contagion for the first time in their whole lives. There are certain matters relating to the pandemic that is being debated every day through several means of language regarding the pandemic (Craig, 2020). Amongst these questions and concerns, the conversation about the cure and suppression of the Virus is certainly a significant subject. Therefore, the researchers attempted to examine how language is exploited to denote Covid-19, its victims, treatments, and other aspects of this pandemic. They also focused to highlight the discursive patterns of discourse on Covid-19 which played a crucial role in affecting people's thinking and mental processes. For this, the researchers explored a corpus of published research on Covid-19 named CORD-19 which is freely available on a corpus database as well as analysis software the sketch engine (SkE). In CORD-19, the focus is on metaphorical expressions as these figurative patterns are inherited in language use (Hart, 2008). So, it becomes important to explore how the discourse on a pandemic like Covid-19 is framed. This type of analysis of a new discourse would highlight significant structures and designs of language use. So, people can better understand the pandemic, its severity as well as its effects on their lives by understanding such expressions. Thus, the current research is carried out with specific objectives which are outlined in the following section.

1.3. Objectives

- a) To explore what metaphors are used and with what frequency in the corpus of COVID-19
- b) To compare the usage of these metaphors in their relevant figurative domains
- c) To explore how ideological patterns are inscribed in COVID-19

1.4. Limitations

This work is limited to the dataset of COVID-19 by focusing on metaphors only. Moreover, it explores metaphorical expressions by adopting corpus-assisted discourse analysis.

2. Literature Review

First, this section situates the current work in relevant theory and outlines a detailed discussion on theoretical aspects including metaphor theory employed in the current work. Secondly, it provides previous research and studies done on metaphors. Lastly, it presents how this study fills a gap among the existing works.

2.1. Theoretical backgrounds: conceptual metaphors

Metaphors have been delineated as conceptual occurrence that essentially narrates what transpires in the mind in the cognitive linguistic (Deignan, 2012). Lakoff (1993) suggests that metaphors serve as cross-domain symbols in conceptual scheme where one object is understood as of something else. This shows that conceptual metaphors indicate two domains (a) source and (b) target (Kövecses, 2010, p. 4). The first domain which is source helps in understanding another conceptual domain whereas target domain is comprehended through source domain. In daily life, people talk of target domains such as life, disagreement, affection, ideas, a public organization utilizing employing expedition, warfare, edifice, foodstuff, and flowers as the source domain. For example, —his criticisms were right on target (Lakoff & Johnson, 2008, p. 9).

Furthermore, metaphor is not perceived as something as momentary to any theory of meaning but as prime means to comprehend the corporeal, communal, and the internal world through mapping conceptual constructions from impartially acquainted source domain onto an abstract or target domain (Lakoff & Johnson 1980). Lakoff (1993, p. 208) suggests the mapping is a static and immobile fragment of the conceptual scheme of the system. These are mappings. amid a source and a target domain that assist individuals to apprehend one domain in terms of the other (Kövecses, 2010).

The above-mentioned discussion implies that metaphors as substantial, even dominant cognitive device ties the research inclinations of critical discourse analysis to an enormous degree. This figurative feature of speech is discussed with relevance to critical discourse analysis in the next section.

2.2. Metaphor and critical discourse analysis (CDA)

From a CDA perspective, metaphor provides its consumers with the argumentative lead that they need to (dis-)qualify radical and political developments, social crowds, or even people as intimidating the uniqueness or sustained reality of a nation state. As a substitute of painstakingly taking to prove and back up their prerogatives with shreds of evidence, which could be analytically verified and confronted, the speaker/writer offers the hearer/reader to grasp information about the

unwillingness of sickness and the requirement for treatment by discussing to commonly famous diseases and causes of sickness. Hence, a constant brook of cognitively angled CDA research analyses of metaphors has been put out over the previous few decades (Lakoff, 1993; Musolff, 2012; Sime, 1996; Wicke & Bolognesi, 2020).

2.3. Metaphor and corpus linguistics (CL)

Lakoff & Johnson's (1980) discern that metaphors are extremely recurrent hit to a major chord with lexicographers employed in the 1980s, when corpora had newly developed as a necessary tool, substituting hand-composed collections of supplementary dictionaries into computerized forms as the key source of data (Baker, 2012). The field of corpus linguistics (CL here) aims at exploring the structure, nature, and use of languages specifically the matters of language acquisition, change, and variation (Meyer, 2002). Related to metaphors, CL sees the occurrence of metaphor from the angle of concordance lines moderately than the reading of the uninterrupted text (Baker, 2012). Whereas the study of the constant, naturally happening text will nearly instantly indicate that a high share of words is employed with metaphorical connotations. Since metaphors are quite rich in language, that is why they have been investigated frequently by many researchers from various fields. But the current study considered the previous research on health discourses.

For example, Sime (1996) examined media and medical narratives to explore metaphorical expressions which are used to denote the disease of AIDS. Similarly, Hanne (2016) highlighted that the person suffering from illness of AIDS is considered a criminal and hence stated that the domains of illness and crime are used metaphorically. The disease of cancer is also described as a crime metaphorically as shown by the work of Sharpless & DePinho (2005). Furthermore, several researchers investigated the phenomenon of metaphors from the ideological perspective (Sontag, 2001; Sun, 2010) in health discourses.

This widespread crisis of COVID-19 inspires the researchers around the globe to investigate the ways in which people used language to discuss this disease. In line with this, Wicke & Bolognesi (2020) investigated tweets to explore how language has been employed by people on this form of social media. They brought forth that metaphors from war territory have been employed to describe the outbreak of COVID-19. Similarly, Craig (2020) brought forth how New York Times used metaphorical terms to delineate victims of COVID-19 in the United States. Although the scholarship on COVID-19 exists, yet there is a significant dearth of research regarding this pandemic. Moreover, the discourses on Covid-19 are least explored in the context of Pakistan. Therefore, the current work is quite significant as (a) it is undertaken in the Pakistani context, (b) it analyses the corpus of published research on Covid-19 and (c) it provides both statistical and descriptive outputs from COVID-19. In addition, this research is also innovative as it used and analyzed corpus with the latest software: the sketch engine. Further, the subsequent section outlines the methods in this paper.

3. Methodology

This method section includes information about the research methods and design, data collection and operationalization, tools, and research questions, focused on in this paper. The mixed method is adopted since it is a well-suited approach to come up with the complete comprehension of the issue as it involved techniques of both quantitative and qualitative methods (Creswell, 2013). In this study, quantitative procedures are implemented in selecting COVID-19

because the quantitative approach involves manipulating pre-existing data with computational techniques (Babbie, 2020). Moreover, the data has been analyzed statistically and then moved for qualitative or descriptive interpretations adhering to grounded theory (Creswell, 2013). Therefore, this study combines techniques and methodologies of both critical discourse analysis and corpus linguistics under the umbrella term known as corpus-assisted discourse studies (Partington, 2008). By doing so, the researcher attempted to explore the functions of metaphors in Covid-19 database and to highlight the ways language is exploited to accelerate the gravity of the Covid-19 situation which in turn created chaos among people.

3.1. Research methods

As mentioned above, this study adopted CADS to obtain more reliable and complete results since Partington (2008, p. 26) states that CADS uncovers a discourse type by exploring —a *non-obvious meaning*, that is, meaning which might not be readily available to naked-eye perusal. The researchers in CADS take interest in discovering the language patterns which are salient in the real-life data or corpus. For instance, they explore the wordlists, frequency, or study concordances to acquaint the discourse type under study as much as possible (Partington, 2008). This blend of corpus research with critical discourse analysis has been employed in a wide array of studies (Baker, Gabrielatos & McEnery, 2013; Edward & Millani, 2014; Mulderrig, 2012). Baker, Gabrielatos & McEnery (2013) employed the CADS approach to explore keywords about Muslims in a corpus of newspaper articles and found how this word was discursively used in the media discourse of the United Kingdom. This shows that electronically available corpora along with computer-based software could be more helpful since it helps the researchers in CDA to get more meaningful insights by exploring discursive strategies more evidently (Baker, 2008). Since CL offers systematic ways to explore variation in real-life data, therefore, the researchers adopted CL to examine metaphors in COVID-19. The researchers (Jalilifar, Ghoreishi & Emam Roodband, 2016; Villanueva, Dolom & Belen, 2018; Yoon, Kang, Han, Maeng, Lee & Kim, 2015; Yusuf, 2010) in corpus linguistics considered it a method due to its empirical nature and its computer-based tools for the analysis of natural data or corpus. Another reason to choose corpus methods in this paper is the contribution CL has added in the study of metaphors (Baker, 2006). Many corpus linguists (Charteris-Black, 2004; Deignan, 2012) have explored the metaphors in various corpora such as business newspapers and political party manifestoes.

Likewise, CDA intends to demystify how texts are shaped ideologically by powerful groups. It also reveals the opaque relationships between discourse(s), institution(s) and social pattern(s) by offering open understandings and explanations by relying on systematic processes (Fairclough, 2015). Moreover, CDA also plays a vital role in uncovering the societal problems by highlighting social values and norms, (re)presented and maintained through discourses (Fairclough & Wodak, 1997). Baker (2008) states that the linguistic analysis of corpus can —reveal something about societies or —identity groups in a way that would not be possible had we only examined a small sample of text (Baker, 2008, p. 76).

Therefore, this paper incorporated Fairclough's (2015) three-dimensional framework for descriptive analysis of the most frequent concordances. This model functions at three levels: description, interpretation and explanation. It investigates the salient language patterns in the texts along with their relation with the discursive practices as well as wider social contexts ranging from first to last stage (Fairclough, 2015). Among the features of speech, the researcher undertook metaphors to explore in the selected corpus.

3.2. Data

This paper undertakes a corpus of different published research during the outbreak of Covid-19. The name of the corpus is the Open Research dataset (CORD-19) which is available openly in the sketch engine software (<https://pages.semanticscholar.org/coronavirus-research>). CORD-19 is updated on regular basis with peer reviewed research archives. For the current research, this dataset has been used from November 1, 2020, to November 15, 2020. The general information on CORD-19 has been enumerated in the subsequent Table 1 and Figure 1.

Table 1

General information of CORD-19

Sr.no	Description	Quantity
1	Words	224,061,570
2	Documents	50,754
3	POS tags	64
Sub corpus sizes		
4	Only abstracts	6,946,594
5	Only back matters	2,878,755
6	Only main matters	270,936,823

Figure 1

Basic facts of CORD-19 (SkE, Concordance, p.1)



3.3. Analysis tool: Sketch engine

The corpus under this investigation has been accessed and processed through computer software named sketch engine. SkE is a corpus database as well as an analyzing tool that has been employed by corpus linguists for the last ten years (Kunilovskaya & Koviiazina, 2017). It has been started by Lexical Computing limited company and the system in the software was created by British corpus linguists and lexicographers. SkE has five hundred readymade corpora of more than 90 languages. It is a leading tool of analysis in CL nowadays since the core functions provide

fascinating insights into the corpora. SkE proffers statistical methods to calculate frequencies of lexical items, to explore recurring patterns, to produce wordlists and concordances. It also allows for keyword, multiword, and text type analysis (Kunilovskaya & Koviiazina, 2017).

3.4. Data processing

In this paper, the metaphors were explored by studying the concordances of the selected nominal lemma in *CORD-19*. Nominal lemmas refer to the base form of selected nouns both in singular and plural forms. The concordance refers to all instances of a target word in the search line of software which also displays the contexts of the word on both right and left sides (Baker, 2010). As mentioned in Table 3.1, *CORD-19* is tagged with parts of speech (POS) tagging by default. In addition, SkE is also tagged with a POS tagger. For concordances, I opted advanced settings of concordance in SkE in which I selected noun lemmas of each target word.

The in-depth examination helped to identify the metaphors in the corpus under investigation. After identifying the lexical items which were used metaphorically, the researchers employed a web service named relatedwords.org to obtain a list of related words for a target word. Then they prepared a list of obtained lexical units. Furthermore, the researchers used the web service known as Metaphor Magnet (<http://bonnat.ucd.ie/metaphor-magnetacl>) to validate the source domain of the metaphors (Veale, 2014). Then the frequency of these expressions was explored in SkE. The frequency indicates the instances of a word in a corpus (Baker, 2010). For instance, the concordances of the attack show that it occurred with 14, 641 frequency in the Cord-19 dataset as illustrated in Fig 2.

Figure 2

Frequency of a metaphorical expression (SkE, Concordance)

The screenshot displays the SkE Concordance interface. At the top, the word 'CONCORDANCE' is visible, followed by a search bar containing 'Covid-19'. Below the search bar, the word 'attack' is highlighted in red, with a frequency of 14,641 (52.15 per million) shown next to it. The interface includes various navigation and tool icons. Below the search bar, there are tabs for 'Details', 'Left context', 'KWIC', and 'Right context'. The main area shows 13 concordance lines, each starting with a checkbox and a small icon, followed by the word 'attack' in red. The concordance lines are numbered 1 to 13 and show the word 'attack' in various contexts.

Line	Context	Target Word	Context
1	doi.org same constant in all subpopulations, it is predictable that the epidemic	attack	rates as well as evolution profiles in different areas are similar, as one
2	doi.org mathematical models of YF transmission, we calculate the 29 infection	attack	rate (IAR, the proportion of population infected over the course of an e
3	doi.org because vaccination sessions 155 will be large. 156	attack	rate 157 We use IAR as the outcome measure for evaluating the impa
4	doi.org 3-fold fractional-dose vaccination (dashed curves). B Infection	attack	rate 488 (IAR) under standard-dose vaccination and five-fold fractional
5	doi.org ntually the phage lyse releases infective particles to find new hosts to	attack	. The activation and movement of a prophage from one host ti
6	doi.org ssing small intestinal epithelium cells might be are more vulnerable to	attack	by 2019-nCoV and clinicians should be careful when their patients con
7	doi.org RS-CoV-2, along with related coronaviruses, used mutations to evade	attack	from the human immune system. Overall, we present an immi
8	doi.org up (or oxyanion) of the thiohemiketal that is formed by the nucleophilic	attack	of the activesite cysteine residue onto the a-keto carbon, can accept o
9	doi.org ly impact the timing and size of the epidemic peak, as well as the total	attack	rate. We provide initial estimates of the potential course of Co
10	doi.org ted in a difference in peak timing of +/-10 days (figure 2). The	attack	rate for best-guess parameters had a median of 45799874 (81.67% ra
11	doi.org ssion has a large impact on epidemic timing, peak incidence, and final	attack	rates. Assuming no difference in transmission rate during the
12	doi.org mission the epidemic is smaller and peaks later, reducing the overall	attack	rate by 20%. A 50% reduction in transmission results in a sme
13	doi.org followed by a resurgence in cases in the following winter. The	attack	rate is 10% less than a non-seasonal epidemic. A 75% reduct

Furthermore, the usage of obtained metaphors and their relevant domains has been compared. In addition to quantification, concordance lines of the selected metaphors were discussed at length with a critical lens to uncover the hidden ideological perspectives of obtained metaphors and their uses. This data processing is in line with the research questions which are described in next section.

3.5. Research Questions

This research paper seeks the answers of the following questions:

1. What is the frequency of more significant metaphors in *the CORD-19* dataset?
2. How these metaphors are different from each other in their usage?
3. What ideological purposes do these metaphors serve in *CORD-19*?

4. Data analysis

This section outlines the findings of this paper, extracted from both quantitative and qualitative methods. The results of both types of analysis brought to light interesting tendencies in CORD-19. The statistical measures of frequencies along with per million hits of the most significant metaphors in CORD-19 have been presented in Section 4. 1 and the concordances of selected metaphors have been discussed at length with a critical lens in Section 4. 2.

4.1. Results from quantitative analysis

In this section, the researchers enumerate the most frequent metaphors with their number of occurrences and per million hits in CORD-19. The lexical items used as metaphors in the selected corpus came from different domains. These metaphors were grouped in three categories based on their similar roots in the same domain. Therefore, they have been grouped in their relevant domains: war, crime, and calamity. The statistical measures of these obtained items have been discussed under their relevant domain in the following sections.

4.1.1. War/military domain

The first group of selected metaphors in *CORD-19* came from the source domain of war or military.

Table 2

War metaphors in CORD-19

Words	Frequency	Per million	Words	Frequency	Per million
Threat	23,036	82.05	Shield	2837	10.1
Attack	14,641	52.15	Weapon	2244	7.99
Infiltrate	14,522	51.72	Beat	1786	6.36
Invasion	10,398	37.03	Army	1384	4.93
Destroy	4917	17.51	Confinement	972	3.46
Forces	4829	17.19	Battle	787	2.8
Combat	4593	16.36	Enemy	373	1.33
War	4205	14.98	Defeat	328	1.17
Blockade	4201	14.96	Rocket	79	0.28
Fight	3375	12.02	Barricade	18	0.06

The dictionary meaning of the term war denotes a situation of armed conflict between groups or countries over a time (Turnbull, Lea, Parkinson, Phillips, Francis, Webb, Ashby, 2010). The existing research (Craig, 2020; Semino et al., 2017; Sime, 1996; Wicke & Bolognesi, 2020) on metaphors and health has highlighted that war metaphors have been employed for diseases such as AIDS, cancer, and COVID-19. In *the CORD-19* dataset, the researchers identified warlike terms such as *an attack, fight, enemy, army*, etc., used metaphorically to describe the pandemic as shown in table 4.1.

The statistical measures from SkE in Table 4.1 show that the most frequent metaphor is a threat. It occurs 23,036 times with 82.05 per million hits in Cord-19 as exemplified in Figure 3.

Figure 3
Concordances of threat (SkE, p.1)



4.1.2. Crime domain

According to the Oxford dictionary, crime refers to the activities that involve breaching law (Turnbull et al., 2010). The in-depth study of *the CORD-19* dataset brings to light the metaphorical use of crime terms such as *surveillance, suspect, violation*, etc. The most significant metaphors from the source domain of crime, used in the *CORD-19* dataset have been presented in Table 4.

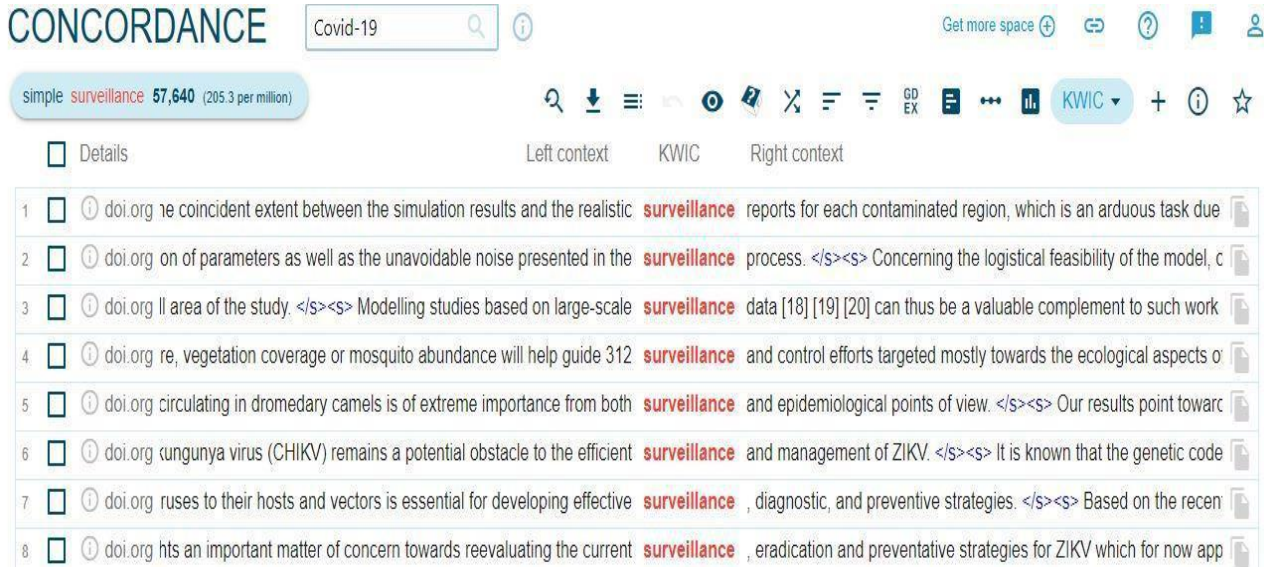
Table 4
Crime metaphors in CORD-19

Words	Frequency	Per million	Words	Frequency	Per million
Surveillance	57,640	205.3	Killer	3982	14.18
Suspect	14,505	51.66	Violation	760	2.71
Warning	4187	14.91	Breech	60	0.21

Table 4 exhibited that the highest frequency of the term surveillance. It happened 57,640 times with 205.3 per million hits in the dataset of *CORD-19*. Figure 4.2 presented this frequency of surveillance.

Foucault (1995) also described the exercise of punishing prisoners in his book *Discipline and Punish*. This practice has been substituted by close surveillance using cameras which incorporated the prison rules. Section 4.2 describes the detailed analysis of the instances of selected metaphors.

Figure 4
Concordances of surveillance (SkE, p.1)



4.1.3. Calamity domain

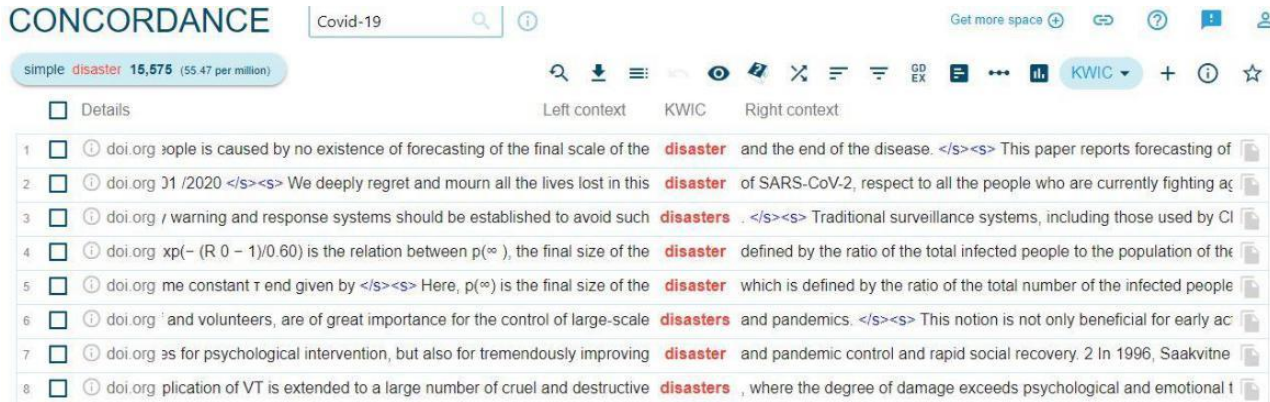
A word calamity is an event that causes damage to the lives of people on a larger scale such as flood, tsunami, earthquake, etc. (Turnbull et al., 2010). The terms from the natural disaster domain were also found during the identification process of metaphors in *CORD-19*.

Table 5
Calamity metaphors in CORD-19

Words	Frequency	Per million	Words	Frequency	Per million
Disaster	15,575	55.47	Catastrophe	634	2.26
Destroy	4917	17.51	Adversity	344	1.23
Danger	2940	10.47	Tragedy	225	0.8
Storm	2816	10.03	Evil	138	0.49
Flood	1775	6.32	Curse	93	0.33
Tsunami	637	2.27			

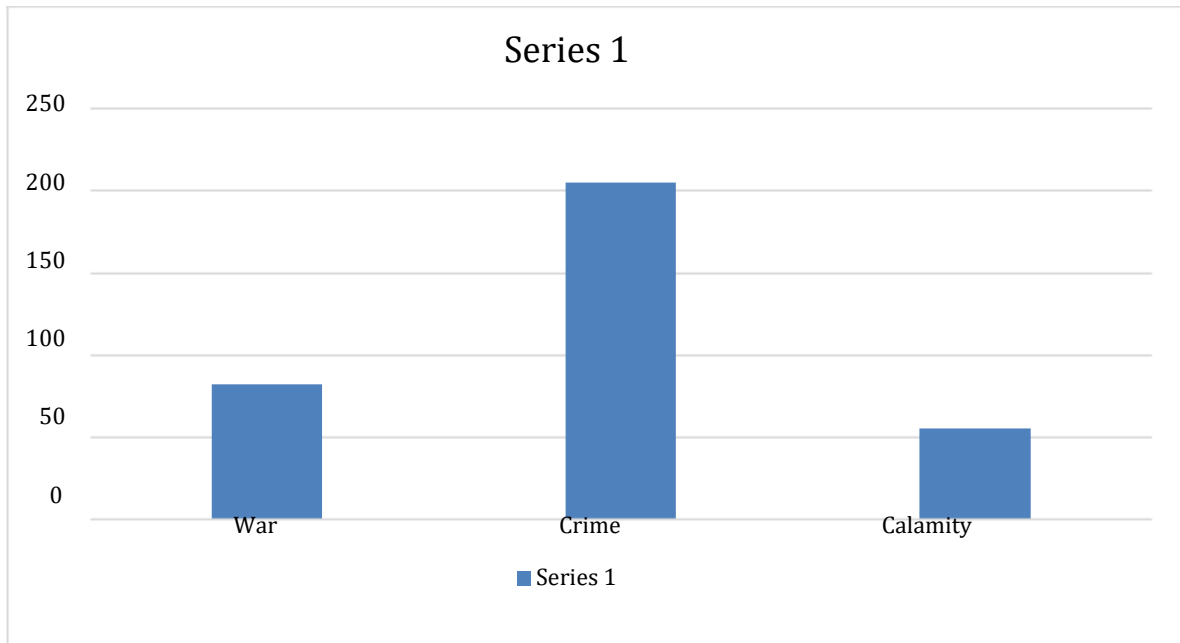
In the calamity domain, the word disaster marked the highest frequency as demonstrated in Table 5. It turned out with 15, 575 with 55.47 per million hits as displayed in Figure 5.

Figure 5
Concordances of disaster (SkE, p.1)



In addition to frequency, the per million hits of obtained metaphors have been compared further to determine the density of their domains. This is illustrated in the following graph which brought forth that the domain of crime is denser for containing metaphors in CORD-19.

Figure 6
Comparing frame occurrence in CORD-19



Furthermore, the concordance lines of these metaphorical expressions have been further interpreted in the light of theoretical perspectives, focused in the current paper. Section 4.2 provides this interpretation of selected instances of concordances of obtained metaphors from Cord-19.

4.2. Results from qualitative analysis

The concordances of these metaphors from each domain were selected to interpret them at length with a critical lens. The alternative uses of these metaphors have been explored with Metaphor Magnet to provide a nuanced understanding of concordances of these terms and to validate their source domains (<http://bonnat.ucd.ie/metaphor-magnet-acl/index.jsp>). The threshold to these metaphors is their common usage in the source domain. These source metaphors have been presented in table 4.4 (see Appendix A for full list).

Table 6

Source metaphors in CORD-19

Sr.no	Source metaphor	Alternative uses
1	Surveillance	Indispensable: requirement,
2	Threat	Devastating: terrorist, devastating: war, grim: alarm
3	Disaster	Devastating: catastrophe, threatening: comet,
4	Suspect	Killing: criminal, threatening: terrorist
5	Invasion	Annoying: intrusion, devastating: war, threatening: attack
6	Forces	Devastating: army, strong: soldier, raging: warrior
7	Combat	Devastating: battle, Devastating: war
8	War	Devastating: disaster, raging: storm
9	Blockade	Stressful: siege, unyielding barrier
10	Warning	Threatening: threat, menacing: darkness
11	Killer	Crazed: murderer, gruesome: murder, ruthless: criminal
12	Fight	Grim: conflict, devastating: assault
13	Storm	Menacing: spectre, raging: war
14	Tsunami	Natural: disaster, natural: calamity
15	Violation	Alarming: intrusion, alarming: crime

As shown from Table 4.3, the alternative uses of source metaphors added robustness to the results. Furthermore, the metaphors have been grouped into three domains: crime, war, and calamity (as mentioned in Section 4.1). Therefore, the selected concordances have been discussed within the confines of their relevant domains. This interpretation of concordances revealed the underlying ideologies in the discourses which in turn shed light on hidden agendas of powerful groups (Baker, 2008). It also highlighted how the discourse during pandemic inflicted the minds of the people.

4.2.1. Concordances of metaphors from war domain

The concordances of *threat*, *combat*, *war*, *fight* have been selected for the detailed analysis since they are frequently employed in their source domain of war. Metaphor Magnet showed that threat denotes the notions of war, terror, and devastating; combat signifies battle with armed conflict; war refers to devastating: disaster and raging monster; fight means tackling with grim conflict, ragging battle, and damaging clash (<http://bonnat.ucd.ie/metaphor-magnet-acl/index.jsp>).

Hence, these lines imply that COVID-19 is considered a threat in terms of literal danger as shown in example 1 and the devastating virus poses a real threat to the health of people. With the use of such warfare terms, a wave of fear is inflicted in the minds of people and they take COVID-19 situation as literal war (Wicke & Bolognesi, 2020). The people posit that the real war was going on between the virus and the army of people. It is presupposed in these concordances that people fought like soldiers with this devastating pandemic.

Figure 7*War metaphors*

1. A newly identified coronavirus, 2019-nCoV, has been posing significant threats to public health since December 2019. (CORD-19)
2. To combat the 2019-nCoV outbreak, authorities in China have implemented several preventive measures. (CORD-19)
3. However, it is unknown whether the war against viruses is fought by a 6 "professional" army of specifically antiviral proteins (CORD-19)
4. So far, there have been over 11,000 non-local healthcare professionals, mobilized by the public health authorities from other parts of China, fighting against the epidemic in Wuhan (CORD-19)

4.2.2. Concordances of metaphors from the crime domain

The second group of metaphors in this study is the crime domain. Three instances from the war domain: *surveillance*, *killer*, and *warning* have been taken into account keeping in view the word limits of the current work. As displayed in Table 4.3, *surveillance* denotes indispensable requirements; *killer* shows crazed: murderer and *warning* refer to menacing: darkness. In some societies, disease like crime is considered a 'form of social deviance' (Hanne, 2016, p.1). The existing studies (Hanne, 2016; Semino et al., 2017; Sharpless & DePinho, 2005) illustrate the relevance of crime terms with health discourse. Sharpless & DePinho (2005) elaborates on how human cells use "exile, execution, and lifetime imprisonment" as strategies to prevent mutant cells from turning into fully fledged cancers. In a similar vein, the concordance lines in the crime domain highlight that the people, during COVID-19 have been put into surveillance like prisoners. They felt that they have committed a crime if they have been infected with COVID-19. Sontag (2011) states that the assigning of criminal connotations to ailments or illnesses tends to undermine the patients. Moreover, there is an inclination for the belief of culpability to be relocated from the illness to the patient.

Figure 8*Crime metaphors*

1. Infectious disease surveillance and control measures remain limited, so much like the SARS epidemic in 2003 (CORD-19)
2. The **killer** virus is a satellite RNA of L-A and is dependent on 231 L-A proteins for replication.
3. Tuberculosis is still a major **killer** worldwide, causing an estimated 2-3 million deaths per year
4. meaningful respiratory symptoms were enrolled into COVID-19 early **warning** score (COVID-19 EWS). (CORD-19)

4.7 Concordances of metaphors from calamity domain

The metaphors in *CORD-19* dataset also belonged to the calamity or catastrophe domain. This group of words implies that the virus is a natural disaster like storms and tsunami which has affected the lives of millions of people (Wicke & Bolognesi, 2020). Furthermore, table 4.3. shows that the pandemic has been considered as a curse on mankind.

Figure 9

Calamity metaphors

1. We deeply regret and mourn all the lives lost in this disaster of SARS-CoV-2 (CORD-19)
2. This virus may destroy the upper respiratory tract and damage the patient's intestines by causing diarrhea
3. These phenomena suggest severe pulmonary inflammation and cytokine storm also exist in 2019-nCoV infection. (CORD-19)

5. Conclusion and Discussion

In this research paper, the researcher studied the *CORD-19* dataset to identify the significant metaphors along with their source domains and hidden meanings in the said discourse. The findings of this research bring to light how the disease of COVID-19 was treated by the people and the metaphorical association attached to this outbreak. Adhering to research question one in this study, the analysis showed that the disease appeared to be described more with war, crime, and calamity related metaphors. Hence, this work aligns with existing research

(Hanne, 2016; Semino et al., 2017; Sime, 1996; Sharpless & DePinho, 2005) on disease related metaphors that the discourse of diseases makes use of metaphors from war and crime domains. Moreover, it also lines up with the studies (Craig, 2020; Wicke & Bolognesi, 2020) on COVID-19 also confirms the use of metaphors from the war domain.

The most significant words in *CORD-19* mention actions and events, such as combat, fight, invade as we (the people) are currently at the height of emergency in this pandemic. The lexical items like a killer, suspect, and warning along with the storm, Tsunami, curse, and evil from crime and calamity also denote the gravity part of the virus. The results bring to light that the lexical items from the crime domain appear with the frequent hits in the corpus as the top lexical item marked 205 hits per million. Hence, the current paper adds value contribution to the existing scholarship by highlighting the use of metaphorical expression from the source domain of natural disaster. Furthermore, these metaphors have been employed to show that being infected with the virus denotes a serious crime or a curse. The people feel scared of being influenced by COVID-19. The words from war, crime, and calamity domains added to the apprehensions and fears of the people and hence not only shaped the public discourse but also affected the ideology of the masses. In this way, the approach implemented in the current work is rooted in practices employed in cognitive linguistics, corpus linguistics, and discourse analysis. Therefore, the results of our research agree with the previous studies in arguing that the metaphors are relatively pervasive in shaping public discourse regarding diseases and pandemics. This predisposition applies to the selected discourse on this outbreak of COVID-19.

Moreover, the descriptive analysis of concordances sheds light that the metaphors from war, crime, and calamity domain are used to denote various characteristics along with its diagnostic and treatment. For example, the doctors and nurses are discussed as army and soldiers as they are fighting on the borders; the virus is symbolized as a killer or murderer and an evil thing as shown in the concordance lines of *CORD-19* (the war against viruses is fought by a 6 "professional" army, The **killer** virus is a satellite RNA of L-A). But they are not employed to discuss other aspects, for instance, the necessity to feel families close to the patients, while experiencing the social distance steps, or the collective efforts to dilute the dispersion of the disease so that intensive care units (ICU) in the hospitals can make efforts efficiently without getting

drenched by new patients. Therefore, future research could be carried out on the systematic investigation of alternate figurative devices employed in the COVID-19 dataset to throw light on various aspects of the outbreak. It could also emphasize the additional domains, which could help people to comprehend and describe the aspects of COVID-19 which are not stated with the metaphors from war, crime, and calamity domains.

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Appendix

Uses of lexical items as metaphors (metaphor magnet)

War domain

Sr.no	Source metaphor	Alternative uses
1	Threat	Devastating: terrorist, devastating: war, grim: alarm
2	Attack	Ragging: terrorist, devastating: assault
3	Invasion	Annoying: intrusion, devastating: war, threatening: attack
4	Destroy	
5	Forces	Devastating: army, strong: soldier, raging: warrior
6	Combat	Devastating: battle, Devastating: war
7	War	Devastating: disaster, raging: storm
8	Blockade	Stressful: siege, unyielding barrier
9	Fight	Grim: conflict, devastating: assault
10	Shield	Strong: tank, shinning: armour
11	Weapon	Threatening: problem, devastating: terrorist
12	Beat	Throbbing: pulse, overwhelming: force
13	Army	Ragging: warrior, fighting: soldier
14	Confinement	Constraining imprisonment
15	Battle	Ragging: fight, burning: outrage
16	Enemy	Crazed: villain, raging: terrorist
17	Defeat	Devastating: disaster, crushing: failure
18	Rocket	Fast: missile, powerful: bomb
19	Barricade	Defensive: castle, strong: soldier

Crime domain

Sr.no	Source metaphor	Alternative uses
1	Surveillance	Indispensable: requirement,
2	Suspect	Killing: criminal, threatening: terrorist
3	Warning	Threatening: threat, menacing: darkness
4	Killer	Crazed: murderer, gruesome: murder, ruthless: criminal
5	Violation	Alarming: intrusion, alarming: crime
6	Breach	Fetal: position

Calamity domain

Sr.no	Source metaphor	Alternative uses
1	Disaster	Devastating: catastrophe, threatening: comet,
3	Danger	Threatening: monster
4	Storm	Menacing: spectre, raging: war
5	Flood	Raging: storm
6	Tsunami	Natural: disaster, catastrophic: event
8	Adversity	Grim: hardship, crushing: misery
9	Tragedy	Devastating: war, devastating: calamity
10	Evil	Threatening: villain, raging: monster
11	Curse	Whispered: threat, withering: abuse