

**AN EXPLORATION OF METADISCOURSE MARKERS IN
MEDICAL RESEARCH ARTICLES ON COVID-19: A
CORPUS-BASED STUDY**

BY

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ABSTRACT

Title: An Exploration of Metadiscourse Markers in Medical Research Articles on Covid-19: A Corpus-Based Study

The term "metadiscourse" describes the language strategies and components used in a text that direct the reader's comprehension of the subject content besides demonstrating the author's attitude, engagement and organization. This dissertation focuses on the Metadiscourse Markers used by the authors in hundred Covid-19 articles published in the well-known medical research journals. It is a Corpus-based study and uses Antconc Software to analyze the frequencies of metadiscourse markers and the concordance feature is being used in order to highlight the intended meanings. This research is based on Hyland Model of Metadiscourse Markers (2005) which is used to explore the two broad categories of Metadiscourse Markers i.e., Interactive and Interactional Markers and their sub-categories. This is an attempt to comprehend the language and discourse of the Covid articles, with roots in Hyland's Metadiscourse model. The research reveals that authors of the medical research journals prefer interactive markers in their writings. Within the subcategories, transitions (frequency; 18,483) are the most preferred and engagement markers (frequency; 26) are the least preferred metadiscourse markers. This research reveals how the language used by the authors in medical research journals conveys their intentions and how language is a bridge between the reader and the author. In order to effectively transmit meaning and engage readers, medical research journal authors focus more on creating logical links within the text. Additionally, these markers aid authors in appropriately conveying their viewpoints, beliefs, and ideas. The analysis of the concordance lines reveal that authors use metadiscourse markers to structure and organize the text, simplify the content, highlight essential points, link ideas, interact with readers and express the degree of certainty and ambiguity in the medical research journals.

Keywords: Hyland Model, Interactional marker, Interactive marker, Metadiscourse, Covid-19, Corpus, Antconc Software.

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LIST OF ABBREVIATIONS

NIA	Number of Inappropriate Adjectives
NIN	Number of Inappropriate Nouns
SS	Social Sciences
NS	Natural Sciences

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CHAPTER 01

INTRODUCTION:

The corpus-based research work presented in this dissertation explores a) the frequency of interactive and interactional metadiscourse markers b), whether the writers of Covid-19 articles prefer interactive or interactional metadiscourse markers, and c) the function of metadiscourse markers in medical research articles. The study explores the use of Metadiscourse markers in the research articles related to covid-19 published in the selected medical research journals. Covid-19 also known as the corona-virus disease is one of the fatal diseases in the present-day world. The goal is to learn more about the metadiscourse indicators utilized in Covid-19 publications that are disseminated in recognized medical research journals. Since there has been a lot of information regarding Covid-19 published in medical research journals recently, the aim of the study is to acquire a full understanding of how the viewpoints and opinions are presented by researchers in well-known medical journals.

It evaluates the metadiscourse markers used in Covid-19 publications to better comprehend and acquire a sense of the researchers' intended meanings, viewpoints, perspectives, and attitudes. Because the language of medical research journals differs substantially from that of other types of literary and non-literary writing, this study helps us better understand how medical professionals transmit their thoughts and discoveries using a range of linguistic forms. The purpose is to highlight the importance of metadiscourse markers in medical research papers.

The study used Corpus Linguistics methodology since it uses a large amount of linguistic data. Corpus methodology is very commonly used in various fields of research to deal with large data and medical field is no exception (see the work of Gholamit and Ilghamit 2015, Gillaerts and Velde 2010, Dastjerdi and Shirzad 2010). Ghadyani and Tahririyani (2015) study the Interactive Markers in Medical Research Articles Written by Iranian and Native Authors of ISI and Non-ISI Medical Journals tends to explain the explicit writing styles of Iranian. Estaji and Vafaeimehr (2014) studies the comparative analysis of interactional metadiscourse markers in the Introduction and Conclusion sections of mechanical and electrical engineering research papers and they find out great differences in the abstract and conclusion sections.

Additionally, there are studies that look into the various metadiscourse markers and how they are employed in various fields, languages, and articles. The usage of interpersonal metadiscourse markers in the social sciences (SS) and natural sciences (NS) was examined in

a study by Abdi (2002) to show the authors' identities and their decisions in the use of these markers. Abdi researched three markers known as "attitude markers," "emphatics," and "hedges" in order to examine interpersonal metadiscourse. It was discovered through analysis that SS writers utilized interpersonal metadiscourse markers more frequently than NS writers. The findings revealed that there were only little differences in the usage of hedges and attitude markers between the two majors, despite their being a large disparity in their utilization.

Hong Kong research students' usage of metadiscourse in their PhD theses was investigated by Bunton (1999). He claimed that the level of metatext reference is largely influenced by scope and distance. He compared two different types of metatexts—higher level references, which are found in more texts, and lower-level references, which are found in fewer texts—used in the theses and came to the conclusion that higher level references were used more frequently to make the text more cohesive and coherent than their lower -level counterparts. Now, this corpus-based research is an attempt to investigate whether writers of medical research journals preferred interactive or interactional markers in Covid-19 articles and how the metadiscourse performs different functions in medical research articles using Hyland Model (2005). This research mainly focuses on the metadiscourse markers used in the Covid articles published in the medical research journals. This study solely focuses on the language of the medical research journals and as far as no noticeable study related to metadiscourse markers in covid-19 articles is conducted before. Also, this research puts emphasis on the functions of metadiscourse markers used in medical research journals and for this purpose Hyland Model (2005) is used which makes this study quite different from others.

1.1 Academic Research:

As discussed above, this research mainly focuses on the metadiscourse analysis of the articles published in medical research journals using corpus linguistic tools and hence becomes academic research. Academic research means that it involves the logical and precise research of a problem or an event with the purpose of exploring the facts and ideas that aid the researcher in interpreting and analyzing the situation or problem and at the end will lead to a logical conclusion. Academic research is required in order to initiate or establish facts and knowledge and to gather contemporary and recent information. In this study, using the corpus tool “Antconc Software” Anthony (2004) analysis of the language used in the Covid related research articles is done by studying metadiscourse markers. This study applies Hyland Model (2005) of Metadiscourse Markers to the Covid related articles to get an insight into the degree

and types of Metadiscourse markers in the synthesis of medical discourse published in these medical research journals.

1.2 Corpus and Corpus Tools used in this research:

This academic research involves corpus linguistics tools to analyze the metadiscourse of the hundred Covid related articles published in widely known medical research journals from all over the world. So, the corpus of this research work is hundred Covid related articles from medical research journals. Corpus or text corpus is basically an enormous and conscientious collection of text gathered on electronic media. It helps people in analyzing and interpreting language on a very large scale using different tools and techniques. It helps to analyze language on a very deeper level statistically and analyze and substantiate linguistic rules and regulations of the text. There are different types of a corpus such as monolingual corpus, multilingual corpus, diachronic corpus, comparable corpus, synchronic corpus, etc. This research work involves a monolingual corpus. The monolingual corpus consists of the text written in one language.

The tool or technique to analyze the corpus of this research work which consists of hundred research articles published in medical research journals is “Antconc software”. This toolkit was developed by Laurence Anthony (2004). This corpus analysis toolkit helps its users in analyzing text and finding concordance. It helps the users to analyze the lexical elements of the language and helps to find the words frequency with greater precision and accuracy. Corpus analysis is basically a new term that helps to analyze a large collection of text with greater precision which was impossible to achieve manually. Actually, more precisely corpus analysis is more of a statistical analysis of the language which leads us to a more accurate and precise result. Large samples of language which was almost impossible in the past to be analyzed manually are now done with much ease and satisfaction with the help of corpus tools and techniques.

1.3 Covid-19 articles and Metadiscourse analysis:

The investigation of the text's metadiscourse is the main subject of this study. Additionally, the metadiscourse indicators utilized in the 100 publications that were published in medical research journals were examined. The phrase "metadiscourse analysis," which is relatively new but highly well-liked, generally refers to how the author describes and annotates the text in both written and spoken communication. It is the most well-known and extensively used phrase in speech analysis and language instruction. The primary insight of metadiscourse analysis is that it addresses language as well as information transfer. It helps the audience to

analyze, explore and interpret what the writer or speaker intended to say. In essence, it creates a link between the authors and the audience. As the Covid-19 is the major concern of human beings in the present-day world, so it is very important to understand and interpret information related to it. The metadiscourse analysis of Covid related articles helps the readers to have more organized and appropriate knowledge of the language used in these articles and about Covid because it helps the readers to understand the intended meanings and a deeper level of connection with the author (Abdi, 2002).

1.4 Covid-19 articles and Metadiscourse markers:

The current study proposes to concentrate on the incorporation of metadiscourse markers in the hundred Covid-related research publications that were carefully selected from reputable medical research journals. One hundred research papers on Covid-19 from medical research publications serve as the corpus of this academic study. It primarily involves an extensive analysis of the frequency of the metadiscourse variables in Hyland's model (2005). The question of what constitutes a metadiscourse marker now emerges. Thus, to put it simply, "metadiscourse markers" refer to a word group of words (phrases) that are utilized to put together and frame text. It is one of the most important terminologies in the analysis of discourse and is considered as quite interesting and an innovative concept that explains the synergy between the writer and the text and further establishes a connection between the writer and the target audience. Metadiscourse markers basically serve the purpose of bringing coherence and cohesion in the text which helps the author to relate one idea to another idea in the text.

A text is not simply just the mode of transmitting information and ideas; it also explains the style and stance that the writer takes during the process of writing down his notion, perspective and ideas. In the text metadiscourse markers is a tool that aids the writer in taking up a stance and also a source of constructing interactions. Metadiscourse markers convey and demonstrate the perspectives, ideas, attitude and stance of the author to the audience. These markers serve as an interactive tool or medium between the author and the reader. Metadiscourse markers, in the text holds a great importance because these markers aid in conveying the ideas and perspective with great ease, facilitate the author in taking up a stance in the text and help in building relationship with the audience thus these markers make communication much easier and smoother.

In the discourse analysis of the written texts, the feature of metadiscourse is essential in a way that it is grounded on the notion that language is a source of communication, it presents

one's perspective and ideas to the audience and it focuses on the social aspect of the language. It basically brings into the light the actual intention of the author and how author intends to project himself in the text and in front of the audience. The term 'Metadiscourse' sheds light on the significance of communal feature of the written texts. Interaction is considered as an important feature of speech but with the advancement in the discourse analysis interaction appeared as an important feature of writing too and this is achieved through the emergence of metadiscourse makers in the written text which ensured that the purpose of writing is achieved and the actual idea is conveyed to the audience. Metadiscourse markers within the text, help the reader to understand and comprehend the arguments that the author has established in the text. So, it can be concluded that metadiscourse along with the interactional aspect also has a propositional aspect as well.

There is a concern whether metadiscourse is functional or syntactic in nature and even some linguists believe that it is even both. Syntactic feature of metadiscourse defines it as an aspect of language which is concerned with the structural development of the text. As syntax works at the level of the sentence construction, metadiscourse is much broader aspect of the written text. As far as the functional aspect of the metadiscourse is concerned, it focuses on how the actual purpose of communication is achieved. Functional analysis of metadiscourse identifies that the detailed and logical description of text must give attention towards the usage of language in the development of the text and also should focus on the purpose that the writer intends to achieve to create text as a whole. So, it can be inferred that metadiscourse focuses more on the intended meaning instead of the structural construction of the text.

In this dissertation, the discourse of medical research articles is analyzed using Hyland's model of Metadiscourse markers. Hyland model of metadiscourse markers proposed in 2005 divides the markers into two distinct categories on the basis of the function they performed. Those categories are;

1. Interactive Markers
2. Interactional Markers

The objective of interactive markers is to provide readers a path and depth through the usage of text. Based on the purpose they serve; interactive markers are further divided into five different kinds. Logic connectives, sometimes referred to as transitions, frame markers, code glasses, evidentials, and endophoric metadiscourse markers, are the five types. Contrarily, interactional metadiscourse markers are essentially words or phrases that draw the reader further into the text. Additionally, they are separated into five different groups according to the

role they play in the text. The five types are self-mentions, attitude markers, engagement markers, hedges, and boosters.

In this dissertation, the frequency of various types of metadiscourse markers used in hundreds of research papers gathered from medical research publications is examined using the Hyland Model (2005) of metadiscourse markers. The preferred forms of metadiscourse markers used by writers in COVID-related publications that were published in reputable medical journals are also taken into account in this study. This research study makes use of the 'Antconc' program to determine the frequency of the metadiscourse markers. This software aids us in this study in determining and evaluating the precise frequency of the various types of metadiscourse markers employed. This study's primary goal is to comprehend the language used in COVID-related publications that are published in medical research journals so that readers may better grasp the perspective, attitude, and ideas of the author about Covid-19. This will help the readers to have a clearer concept of different functions of metadiscourse markers. To be more specific about the purpose of this academic research, then the major concern is to analyze the language (metadiscourse markers) of research articles published in medical research journals.

1.5 Delimitation:

This academic research is delimited to Covid-19 articles. The corpus of this academic research consists of one hundred Covid related articles taken from prominent and widely-known medical research journals from all over the world. The data collected for this dissertation is taken from the following medical research journals that are mentioned below;

1. *Brazilian Journal of Medical and Biological Research*
2. *International Journal of Translational Medical Research and Public Health*
3. *Journal of eClinical Medicine*
4. *Journal of Arthroscopy and Joint Surgery*
5. *Journal of American Society of Cytopathology*
6. *Journal of Health Policy and Technology*
7. *International Journal of Multiple Sclerosis and Related Disorders*
8. *Journals of Epilepsy and Behavior*
9. *International Journal of Infectious Diseases*
10. *Journal of the Society for Cardiovascular Pathology*
11. *International Journal of progress in Neuropsychopharmacology and Biological Psychiatry*

12. *American Journal of Emergency Medicine*
13. *American Journal of Roentgenology and Radiology*
14. *China Journal (Chinese Medical Journal)*
15. *UK Journal*
16. *European Journal of Medical Research Journal*
17. *Indian Journal of Medical Sciences*
18. *Langenbeck's Archives of Surgery Journal*
19. *Journal of Material Research*
20. *Journal of Medical Internet Research (Canada)*
21. *American Journal of the Medical Sciences*
22. *Research on Biomedical Engineering Journal*
23. *BMC Medical Research Methodology*
24. *Journal of General Internal Medicine*
25. *Journal of Scientometric Research*
26. *Irish Journal of Medical Science*
27. *Canadian Journal of Public Health*
28. *Journal of Current Medical Research and Opinion*
29. *Pakistan Journal of Medical Research Journal*
30. *Technium BioChem Med: Journal of Multidisciplinary Research, Biology, Chemistry and Medicine*

1.6 Research Objectives:

Following are the research objectives of this study:

- To highlight the importance of metadiscourse markers used in medical research papers
- To understand and interpret the discourse of Covid related articles published in medical research papers
- To explore the functions of metadiscourse markers in medical research journals
- To highlight what types of metadiscourse markers are preferred by authors in medical research papers
- To get an insight into the frequencies of metadiscourse markers used by authors in Covid related articles published in medical research journals

1.7 Research Questions:

Following are the research questions of this study:

Question No. 01:

Which category of metadiscourse markers are preferred by authors in Covid-19 articles published in medical research journals?

Question No. 02:

What are the frequency distributions of Interactive and Interactional Metadiscourse Markers in Covid-19 articles published in medical research journals?

Question No. 03:

What are the functions of metadiscourse markers in Covid related medical research articles?

1.8 Significance & Rationale of Study:

The world is very concerned about Covid-19, which has killed millions of people worldwide and is currently the deadliest and severe global health crisis. To raise awareness of the deadly condition known as Covid-19, numerous studies relating to it have been published in medical academic publications. To better understand the discourse surrounding Covid-19, this study primarily focuses on the metadiscourse analysis of the discourse of publications published in medical research journals. Understanding and determining the functions of metadiscourse markers is crucial if you want to have a clearer understanding of the Covid-19 issue. The metadiscourse indicators employed in the Covid articles that were published in the medical research journals are the main topic of this study. This study is unique in that it focuses entirely on the language used in medical research publications and is the first to be aware of metadiscourse signals in Covid-19 articles. Additionally, this study differs from others in that it emphasizes the metadiscourse markers used in medical research publications and does so using the Hyland Model (2005).

This study is significant because it reveals what the authors of the articles chosen from reputable medical research journals intended to convey to their readers and how they interact with them. It also helps readers stay informed about the severity of this fatal disease. In order to help readers, explore, interpret, and analyze information related to Covid-19, a fatal disease, on a deeper level and in an insidious way, metadiscourse analysis and the detailed study of metadiscourse markers (interactive and interactional) of the articles using corpus tools are important in this regard. The medical community's response to Covid-19, which is at the top of the list of current global issues, must be highlighted. Additionally, it assists readers in examining the language used in the chosen articles and how doing so will enable them to gain a greater understanding of the perspectives, attitude, and ideas of the author. In essence, this

study emphasizes how crucial language is in expressing attitudes and worldviews. Since language is the most significant means of communication, it is crucial to examine it thoroughly because doing so will improve our understanding of an idea or body of knowledge. Therefore, the main goal of this dissertation is to better comprehend Covid by attempting to grasp the discourse of publications that are relevant to it.

CHAPTER 02:

LITERATURE REVIEW:

2.1 Corpus and Metadiscourse:

With regards to corpus linguistics, metadiscourse markers are frequently of interest since they uncover how authors or speakers lay out their presence inside the talk, express their perspectives, oversee data stream, and draw in with the crowd. Breaking down metadiscourse markers in corpora can prompt bits of knowledge about the manners by which various kinds, registers, or societies utilize these markers to accomplish explicit open objectives. For instance, in scholastic composition, analysts could break down how writers use metadiscourse markers, for example, "this study means," "all in all," or "it means a lot to note" to structure their contentions and guide readers through their examination discoveries. In conversational information, metadiscourse markers like "you know," "I mean," or "coincidentally" can furnish data about the speaker's commitment with the audience, the speaker's understanding of the data being conveyed, or changes in point.

Corpora empower specialists to study metadiscourse markers in an information driven and orderly way. By gathering an enormous volume of texts or spoken discussions, specialists can recognize examples and frequencies of explicit metadiscourse markers across various settings, classes, or dialects. This examination uncovers how these markers add to the association and understanding of talk. In synopsis, the investigation of metadiscourse markers inside the setting of corpus phonetics gives important experiences into how authors and speakers guide and shape the understanding of their talk. This exploration can improve how we might interpret correspondence procedures, kind shows, and the manners in which language is utilized to lay out compatibility and convey meaning.

2.2 Metadiscourse and Corpus: A Convergence

Understanding how metadiscourse operates across various text kinds and genres may be gained by combining corpus linguistics with metadiscourse analysis. The prevalence, distribution, and changes of metadiscourse markers in diverse corpora may be examined using corpus linguistics approaches. This method can assist researchers in comprehending how writers employ metadiscourse to accomplish certain communicative objectives and modify their language for various audiences.

Corpus-based Analysis of Metadiscourse:

1. **Regularity and Distribution:** Corpus linguists may look at how frequently particular metadiscourse indicators occur in various genres, including academic papers, news pieces, or conversational speech. This research might highlight metadiscourse use patterns that are exclusive to a certain genre.
2. **Disparity Across Registers:** Corpus studies can investigate how metadiscourse differs between formal and informal language registers. Researchers might look at whether particular metadiscourse indicators are more prevalent in academic writing than in casual talk.
3. **Cosmopolitan Analysis:** By comparing how metadiscourse markers are employed in various languages and cultures, corpus linguistics may give insight on how cultural norms and customs affect communication.
4. **Stylistic Investigation:** Scholars can examine the stylistic decisions that authors make in relation to metadiscourse. For example, they might look at how authors express their perspective in persuasive texts by using hedging or boosting methods.

2.3 Corpus-based Research on Metadiscourse:

Investigations into the nature of metadiscourse might take many different forms. Hyland (2009) 'metadiscourse expands the definition of interactional resources to include elements like conjunctions, framing techniques, and glosses on content in order to provide a more thorough analysis of interaction in academic debate. Although they are sometimes seen of as only serving to connect texts, they play a crucial part in connecting a text to a community'.

According to certain research' trials, using metadiscourse can improve students' writing Cheng and Steffensen (1996). Other research Kong and Xin (2009) focus on pupils' speaking skills. Some studies Flowerdew and Tauroza (1995) also examine pupils' reading and listening skills. In other research, metadiscourse traits are compared between genres or between native and non-native speakers Crismore, Markkanen and Steffensen (1993); Abdollahzadeh (2003). Consequently, metadiscourse analysis is a crucial component of corpus-based linguistic studies. Both an interactive and an interactional viewpoint should be used to evaluate the distribution pattern of the metadiscourse markers in the corpus under investigation Farahani (2019).

Metadiscourse, according to Cheng and Steffensen (1996) is a construct that is becoming more and more significant in both composition and reading research. First, their research looked at how metadiscourse may help writers better understand their audience's demands, and then it looked at how the use of metadiscourse relates to the caliber of the

writings that students produce. In this quasi-experimental study, process method instruction was combined with metadiscourse instruction for university-level student writers who are enrolled in the experimental class. Those authors in the control class, on the other hand, solely received process-based composing instruction.

The goal of a study by Mina and Biria (2017) was to examine the differences between articles published in the social and medical science fields with regard to the use of Hyland's (2005) interactive and interactional metadiscourse markers in the discussion sections of articles written in English by Persian authors. The answers to the study questions on the impact of metadiscourse markers were found through data analysis. The employment of transitions, frame markers, and evidential, interactive metadiscourse was high in science articles written by a native Persian speaker writing in English, according to the findings and subsequent Chi-square results. However, there was no discernible change when the endophoric markers were used.

The writers of medical science research publications utilized hedges, boosters, self-mentions, and interactional metadiscourse markers more frequently, according to the data. Science texts used the engagement indicators more frequently than life science literature. In both corpora, there was no discernible change in the case of attitude indicators. In line with the findings, authors of texts in the scientific disciplines utilized interactive metadiscourse markers more frequently than authors of writings in the biosciences. The findings of the study by Firoozian, Khajavy and Vahidnia (2012) were consistent with these findings.

2.4 Medical Research Journals:

Medical research publications utilize language that is precise, clear, and objective. Due to the specialized nature of medical research, the language strives to efficiently explain complicated scientific information to a target audience of other researchers, medical professionals, and academics. Here are some major elements of language in medical research journals:

Technical language: Medical research publications employ a specific language that correctly expresses medical ideas, symptoms, procedures, and terminology. This terminology allows clear and accurate communication among the medical and scientific communities.

Formal Tone: The language is distinguished by a formal and scholarly tone that maintains objectivity while avoiding emotive or subjective statements. This tone provides credibility and professionalism in the presenting of study findings. The passive voice is frequently employed

to highlight the research process and conclusions rather than the author's activities. This strategy focuses on the research rather than the individual researchers.

Clarity and Precision: The language aims for clarity and precision, eliminating ambiguity and ambiguous statements. Authors frequently rely on precise measurements, data, and statistics to back up their assertions and results.

Objective Reporting: Authors report their study findings objectively, omitting personal comments or guesswork. The language is centered on reporting outcomes, evaluating data, and developing evidence-based conclusions.

Meta-Discourse: As previously stated, metadiscourse markers are employed to direct readers, indicate authorial attitude, and organize discourse. These signals help to retain clarity in medical research writing, especially when explaining difficult data or suggesting interpretations.

Impersonal Language: Authors frequently employ impersonal language, referring to the research as "the study," "the experiment," or "the analysis," rather than using personal pronouns. This method improves impartiality while reducing the author's presence in the text.

Overall, the language employed in medical research publications seeks to correctly, objectively, and effectively explain complicated scientific knowledge. It strikes a balance between scientific rigor and clear communication in order to ease comprehension among researchers and medical practitioners.

2.5 Metadiscourse:

The key term metadiscourse was first proposed by Zellig Harris in 1959 in order to get a better understanding of the use of language, depicting speakers or writer's experiments and trails to direct recipient approach towards the text. This term was further flourished by investigators and writers such as Williams (1981), Vande Kopple (1985), Crismore (1989) and Markkanen and Steffensen (1993) and gathers a group or class of discourse dimensions such as boosters, code glosses, self-mentions etc. and variety of text observation to display the way how speakers and writers introduce unfolding text to affect their conversation partner. Williams (1981) defines metadiscourse as 'writing about writing'.

Authors present 'cues and indicators' in their text and organize the text to make it comprehensive for the readers. These 'cues and indicators' can be described as markers of discourse. These markers help to arrange the content and present reader-friendly text.

Crismore (1989) defines metadiscourse as ‘discourse about discourse’. According to him, it is the writer’s entrance into discourse, either directly or indirectly.

It is a form of text which clearly indicates the author’s attitude towards the content or the reader Hyland (1998). It expresses the notion that conversation is much bigger than the exchange of data, instructions, and goods, but also includes the beliefs, individuality, and attitude of speakers. Language is a result of collaboration between participants which are shared verbally and metadiscourse focuses on the concept that, as we write or speak, we make arguments with others and make a decision about the type of impact we are having on readers and listeners. It also suggests groundwork for understanding conversation as societal commitment among participants. Metadiscourse highlights the pattern of how we indulge ourselves in discourse by showing our behavior, thoughts, and attitude towards both the listeners of text and the content or data. The author not only presents the crucial and dry text but also presents his or her attitude, personality, validity, reliability, audience-sensitivity and connection with the text Hyland (2000).

It is a significant source that includes speaker and writer as the audience in collaboration of mutual acts. The notion of audience is debatable in discourse studies but it is confirmed that to meet the goal successfully audience plays a vital role. The idea of the audience provides a successful result in comprehension of communication and it gives support and desired result. It refers to the distinct approaches regarding context comprehension. Therefore, the audience is a significant part of our language and a considerable factor of our communication in the cycle of setting and genre. Crismore (1989) presented metadiscourse in written form to make it distinct from other disciplines e.g., science, poetry, and biography. Different researches and studies have played a significant role in metadiscourse i.e., casual conversation, oral narratives, school textbook, undergraduate curriculum, science researches, slogans of advertisement, etc. Metadiscourse is an explicit term for the self-analysis and self-reflective manners or expressions used as a negotiator in the text for interactional meanings, and collaborate with author or speaker to express his or her ideas and involve the reader as their society or community member. It is one of the important stylistic or rhetorical elements in the production of discourse.

The most significant characteristic of metadiscourse is explicitness. Moreover, it illustrates the writer’s overt effort and practice to produce a certain effect of discourse. It indicates those factors which authors insert to support the readers to interpret the text or message, understand the author’s point of view or thoughts and consider the norms and rules of that culture. According to Zarei (2011) Academic content involves conversational patterns and aspects like

other genres. Markers of metadiscourse serve a lot in discourse organization portray author's attitude and engage the audience or participants. Markers of metadiscourse can be a single word, a sentence or paragraph. Metadiscourse is a significant component of academic content, which can be effect by the author's culture and social setting (Halliday, 1994). It is a concerned-oriented approach, which notices the connection between reader and writer. According to Hyland & Tse (2004) metadiscourse has three key principles which are following:

1. It indicates the features of a text that manifests reader-writer collaboration and interaction.
2. It focuses only on the internal elements and relations of discourse.
3. The propositional features and aspects of discourse are distinct from metadiscourse.

It is an indicative bond between text and context and highlights the reader's assumptions and expectations towards interaction and collaboration. It focuses on the discourse of character dialogue by emphasizing on writer's information about his or her participants through the selection of words and content used for readers. These beliefs or expectations are mutual, emotional, cognitive, societal, and cultural depends on assumptions of contributors past targets and objectives. Hence, the data or text should be organized, brief, attainable and accessible that represents the explicit information and participant's attitude towards context. The key element of metadiscourse is audience-centeredness which employed in discourse specifically in written discourse Hyland (2005).

2.6 Metadiscourse Markers:

The term was first introduced by American linguist Deborah Schiffrin in her book *Discourse Markers*. Metadiscourse markers are linguistics mechanism and devices that contain a significant role in shaping the way readers grasp and interpret the spoken and written text. These markers go to the farther side of material of the text itself; they supply insight into the writer's attitude, set up a link between different parts of the text, and guide the reader's collaboration with the text. In addition, they present as a navigational aid that intensify the readability and consistency of a piece of communication. In essence, metadiscourse involves the language that remark on the language itself. It aids to regulate the connection between the speaker and writer and the reader and listener, clarifying how the content is organized and how the various concepts in the material are interconnected. By doing so, these markers serve as an effective source of comprehension and communication. These markers provide the cohesion, coherence and flow in the text. They indicate transition between opinions, paragraphs or components, helping the reader to direct the structure of text. Hempel and Degand (2008)

intricate that metadiscourse “concerns the understanding of the ideational meaning and helps to establish the discourse by structuring the propositional content, by presenting sequences or by referring to the source of propositional material”.

Native or non-native speakers use variety of markers across all kinds of text. These markers are also used in both formal and informal discourse. The proficient use of markers specifies a grand level of fluency and capability to produce and comprehend authentic language. Crismore (1983) presents metadiscourse markers as “the author’s incursion into the discourse, either explicitly or non-explicitly, to guide the reader rather than inform”.

In academic and scholarly writing, metadiscourse plays a very important role in directing readers through complicated theories, arguments and statements. These markers help the reader to grasp the importance of research, comprehend its limitation and assessment of validity of their findings. However, it is significant to consider that the effectiveness of markers also based on the contextual and cultural pattern of communication. Multiple writing styles and languages may employ different markers to achieve similar functions. Moreover, by strengthening readability, coherence and overall interpretive experience, it helps to build effective arguments and communication in different contexts.

The two categories of metadiscourse markers (interactive and interactional) are discussed in detail;

2.7 Interactive category:

This category involves the author’s perception about participants or audience and how the audience catches and absorbs the knowledge, learning, transformed capacity, interests and rhetorical expectations. The author focuses on the construction and organization of text to fulfill the needs of readers, layout the content, and would repair the author’s perception, idea and objective. Resources used in this dimension indicate organized discourse instead of experience and expose the construction and structure of text according to the reader’s expectations and needs. It contains five sub-categories which are following:

Transitions:

It can be a phrase or word which exists at the starting point of a sentence to show its connection with the previous sentence. Transition markers are mostly adverbial phrases and conjunctions which assist the audience to explain the pragmatic relationship between the tenets and expressions of communication. It indicates the instrumental, causative, additive and comparative connections in the author’s logics and thinking. The most significant point is that

metadiscourse helps to understand the internal discourse instead of the exterior world.

Transition contains three relations which are following:

1. Addition (It adds up distinct components to an argument and based on different items such as moreover, and, furthermore etc.)
2. Comparison (It compares the text and mark the arguments as either different or similar such as likewise, equally, in contrast, on the other hand etc.)
3. Consequence (It basically highlights the outcome or conclusion of the argument in the text such as in conclusion, thus etc.)

Table 1: Transitions

Relations	Internal function	External function
Addition	Addition of arguments and discussion	Addition of tasks and activities
Comparison	Comparison of arguments and proofs	Comparison of distinct affairs, things and features
Consequence	Outcome or conclusion of arguments	Describe how and why activities and things happen

Frame markers:

It is an instrument used to assemble and organize the text. It contains further functions which are following:

Table 2: Frame Markers

Functions:	Examples:
1. Labeling	Briefly, in addition, to summarize etc.
2. Sequencing	At the same time, firstly, next, last etc.
3. Topic shifting	Let's move to, after that, right, back to etc.
4. Prediction and announcement	I argue, I seek, I wish, I will focus on etc.

Endophoric markers:

It focuses on the instructions and any information of text which was described before. It provides additional information that helps the readers to understand the intended meaning of the author and previous information.

Evidentials:

It refers to the material or information from other sources or data. It directs the audience's analysis and constructs a powerful argument about the subject or topic.

Code glosses:

It provides additive information and instructions by describing, clarifying or rephrasing what was said, to make sure that the audience is capable to comprehend and explore the author's perception and message. It manifests the author's opinion and perceptions about the audience's awareness.

2.8 Interactional category:

This dimension contains the strategies that the authors used for planning and developing interaction by expressing and targeting their perceptions and messages. The objective of the author is to compose and express his or her opinion in a direct and clear way and to engage the participants by using their ideas about the discourse of the text. In this category, metadiscourse is very significant, analytical, interpretative and captivating. It discloses and explains the whole frame that how the author's expressions and task are inter-connected with the audience. It contains further five sub-categories which are as following:

Hedges:

It expresses the author's decision to acknowledge different perceptions and opinions and hold on total agreement with a proposition. It focuses on the subjectivity of setting or position by permitting details and instructions to introduce it as an idea and verdict instead of a fact and unlock that setting for discussion. The author should measure what would be the value and weight for the assertion, examine the level of accuracy, reliability and validity for continuation and claim security for occasions. It suggests that text or statements depends on the author's logic and reasoning instead of specific awareness and thoughts and expresses the degree of certainty for attribution.

Boosters:

It permits authors to shut down the substitutes, prevent opposite ideas and views and present clarity and certainty in their writing. It indicates that the author identifies defined and multiple settings but they are supposed to restrict this diversity instead of extending it and encounter alternatives with an isolated and powerful voice. By folding desirable substitutes, it focuses on certainty and established a link with the subject or topic and audience. It reinforces the arguments and focuses on the shared experiences and events and is supposed to make an

identical result as the author. The use and equity of boosters and hedges in a text express that to what scale the author engages the audience.

Attitude marker:

It suggests the author's emotive and intuitive attitude and approaches towards a proposition. Rather than discussing the details, facts, validity, reliability or truth, it focuses on the agreement, expressions, rapport, functions, commitments, significance etc. Attitude can be present by using punctuations, setting of the text, subordinations, comparatives (degree of adjective), progressive particles, verbs, adjectives and so on.

Self-mentions:

It indicates the scale of the presence of the author in the text by measuring the frequency of possessive pronoun, possessive adjective and first-person pronoun e.g. I, me, mine, our, your, we etc. Authors cannot elude their impression, notion and arguments in the text. The appearance and non-appearance of explicit writer is an intent option by the author to choose a point of view and authorial recognition.

Engagement markers:

It refers to the tools and devices that directly address the audience, either to concentrate on their consciousness or involve these as a discourse audience. Furthermore, in order to create an influence of dominance and authority, nobility, morality and reliability by using markers like self-mentions, boosters, hedges and attitude, authors can either emphasize or foreground the appearance of their audience in the text. It concentrates on audience involvement for two main reasons:

1. Firstly, it admits the necessity, requirement and expectation for the audience, contending them as a contestant in a discussion with readers by using interjections and pronouns.
2. Secondly, it focuses on the rhetorical position, drag the audience into the discourse at an evaluative or interpretative point, speculates desirable objections and directs them for specific evaluation. These tasks are mostly carried out by modals of obligation, directives and questions.

In an informative and communicative setting, it is critical to secure and assure rhetorical and social positions. By using rhetorical devices, metadiscourse provides powerful and mobilizing support, presents collaboration and team-work for the audience and sorts out queries, disputes and problems. The selection of interactive markers refers to audience expectations that discussion would be according to patterns of text and allow the text for

process and organized the target in an appropriate form. On the other hand, the selection of interactional markers emphasizes the participants of an arguments or interaction where the author adopts a desirable image or mask according to the norms and rules of the society. In academic writing, it includes an organized, established and logical system, well-defined, well-mannered and systematic equilibrium of assertion and statements and a strong connection between audience and arguments.

Metadiscourse markers used by the authors of social sciences, medical sciences and so on is one of the hot topics for the linguists and researchers. Mina and Biria (2017) conducted a comparative study which aimed to explore the difference in interactive and interactional metadiscourse markers based on Hyland model (2005) used in the medical and social sciences articles. It is a corpus-based study and the articles chosen for this study are in English language by the Persian writers. The research aimed to highlight which category (i.e., interactive or interactional) of metadiscourse markers is preferred by medical and the social sciences. The results showed that the writers of medical articles prefer interactional markers and the writers of social science articles prefer interactive metadiscourse markers. Similarly, Abdi (2002) conducted contrast research related to interpersonal metadiscourse markers used in social and natural sciences and the results revealed that social science writers used much more interpersonal markers as compared to natural science writers.

Wu (2021) conducted a Corpus-based comparative study related to hedges in medical research articles using Yang's taxonomy (2013). Hedges are considered as multifunctional pragmatic devices which are used in writing to show politeness and to soften the effect of writing. Hedges perform different functions and the most prominent was the use of hedges as modal verbs which were in line with the Hyland model (2005). The research also reveals that the Discussion section of the medical research involved the usage of hedges in the greatest numbers.

The study of assessment hedges in American political editorials was conducted by Hassan and Said (2020). They made an effort to look into how hedges are used pragmatically and formally in editorials in American newspapers. For their study on hedges, they chose 25 editorials using the frameworks of Malaskova (2014), Aertsalaer and Bunce (2011), and Hayland (1998). Following data analysis, conclusions were drawn indicating the significant influence hedges have in influencing readers' perceptions of the truth of the content. The study came to the conclusion that by putting some effort into the truth, hedges open doors for authors.

In a corpus-based study conducted by Cao and Hu (2014) 120 RAs across the fields of education, psychology and applied linguistics were contrasted for their interactive metadiscourse structures the results of which revealed clear paradigmatic differences in the use of transitions and evidences by the writers. The authors, then, attributed the differences to the contrasting epistemological underpinnings differentiating between “qualitative and quantitative paradigms and the different knowledge-knower structure prevailing in the discipline under investigation” (p. 15). In another closely similar study on interactional metadiscourse elements of the disciplines mentioned, Hu and Cao (2015) identified the same cross-paradigmatic and sub disciplinary variations and made the same conclusions as a result.

Allami and Fazilfar (2017) conducted Corpus-based research on identifying the metadiscourse markers used in medical research articles. For this purpose, 160 research articles were selected written by English and the Iranian writers. The aim of the research was to identify the paradigmatic influences in English and Persian. It was observed that English writers used much more self-mentions than the Iranian writers and assert themselves in the writings in a very clear manner. Another finding of the research was the use of hedges in greater numbers by the English writers which shows that English writers mitigate the effect of writing while Iranian writers express their stance more confidently.

To ascertain MMs' function in Pakistani English, Tayyiba and Amana (2019) examined the roles of metadiscourse markers in The News newspaper opinion. The study was corpus-based and included 20,000 words of data. A mixed-method approach comprising both qualitative and quantitative elements was employed for the data analysis. The study's findings demonstrated the usage of metadiscourse markers as coherence tools. It also showed that the data had a high frequency of textural metadiscourse indicators.

Siddique, Mahmood, and Iqbal (2018) assessed how metadiscourse markers (MMs) functioned in editorials published in English-language newspapers in Pakistan. They created a corpus of 1000 editorials for this purpose, sourced from Dawn News, The Frontier, The Express Tribune, and The News, four English-language newspapers in Pakistan. A total of 250 editorials were selected from every newspaper. A thorough model of interpersonal metadiscourse that is divided into interactive and interactional markers has been put forth. The study's conclusions showed that the ratio of interactive to interactional metadiscourse markers was greater. Based on the results, the study came to the conclusion that newspaper editorial writers utilize MMs to structure their discourses and make their points more effective.

According to Hinds (1987) the frequent use of text connectors in English texts reveals Anglo-American authors' interests in producing more cogent texts, which can be a sign of writer-responsible rhetoric. In Persian, however, land markers may be weak, and it is the reader's responsibility to ascertain the logic that ties the discourse together. Contrarily, according to the study's findings of Ghadyani and Tahririyan (2015) Iranian ISI writers exhibit an excessive use of transitions, evidentials, and code glosses. The Iran ISI group may therefore be more concerned in openly establishing the texts and orienting the readers in order to provide them the assistance they need to grasp the material, in line with Shokouhi's (2009) argument. Although the effects of overgeneralization and interference between English and Persian can also be taken into account, Crismore and Abdollezadeh (2010) contend that the primary cause of the overuse of interactive markers is that authors struggle to be accepted by ISI journals because they may need to compete for a research space due to the larger size of the discourse community and the higher likelihood of audience rejection. As a result, authors use interactive markers more frequently.

In this dissertation, I intend to focus on medical research articles solely related to Covid-19 articles published from 2019 to 2022. The study attempts to explore the metadiscourse markers in detail using the Hyland taxonomy (2005). This dissertation focuses on the two major categories (interactive and interactional markers) and their subcategories as proposed by Hyland. This research attempts to find out the frequencies of the metadiscourse markers in Covid-19 articles and through the use of concordance lines which are taken out using Antconc Software will be analyzed for the purpose of understanding the intended and hidden meaning of the writers which they convey through different metadiscourse markers. So, this research being a blend of qualitative and quantitative research methodologies is an attempt to contribute to the field of academic research and to the field of linguistics especially discourse studies.

CHAPTER 03

RESEARCH METHODOLOGY

3.1 Corpus:

A corpus is a collection of writings that can be electronically accessed and used to study language. In the last 20 years, corpus linguistics has gained recognition and developed into a significant method for the study of language (Rundell, 2008). Corpus is employed for the study of language, it is now able to quickly explore a huge text, something that was never possible with manual investigation in the 1950s or before. Additionally, corpus linguistics is used to explore everything from individual word-to-word patterns to semantics to discourse analysis, according to McEnery and Wilson (2001) who identified fourteen different areas where corpora can be employed to do thorough linguistic research.

The two broad categories of "general corpora" and "specialized corpora" are how Gavioli (2005) categorizes corpora depending on their use and purpose. In the past, a sizable portion of linguistic data from many genres and registers was compiled. The capacity to analyses patterns of language use which were frequently hidden and could only be studied through enormous amounts of data, such as semantic prosodies, was made possible by representativeness (Sinclair, 1991). However, because there are so many different kinds of texts in such huge corpora, this might occasionally affect the language used in a particular situation. Even if a linguistic pattern may not be present in both contexts, the corpus as a whole present it as if it was.

Such suppositions paved way for the smaller specialized corpora, such as, interest in corpus of genre has also grown recently (Hyland, 2002). This has enabled the researchers study the language in a specific context and in the restricted disciplines of the study too. Such corpora have also helped study registers, genres, disciplines and their features in detail without overgeneralization because of multiplicity of text types in the larger corpora. Moreover, these specialized corpora have made application of the results easy, as language teachers use the results of the specific corpora to teach language in the classrooms 46 according to the requirement of the students, e.g., English for Specific Purposes and English for Academic Purposes (Gavioli, 2005). Apart from this the specialized corpora have also helped to explore the language of offices, newspapers, recommendation letters, native and no-native English speakers, research articles and doctoral thesis etc.

The corpus is an empirical base that is utilized by researchers to extract linguistic data as evidence to language phenomena without having any prior hypotheses, assumptions, or expectations in the corpus-driven technique, also known as "data-driven learning" (Johns, 1991) (Tognini-Bonelli, 2001). The corpus-driven approach is disparaged for taking a hard line on linguistic evidence, but there are numerous instances where it falls short of offering trustworthy and palatable objective findings that do not require human interpretation. One such instance is that it is unable to describe paradigmatic relations and structures. Such factors make the corpus-based approach effective.

In other words, the text selection criterion should be obvious. Text selection is the decision-making process about the inclusion of the text in the corpus, such as the number of texts, the parts of the text, or how to produce a sample of the text (Biber, Conrad, & Reppen, 1998). Making a choice in the specialized corpus is simple because it is suggested that the entire text be included. The argument that the corpus is representative of the genre as a whole, as well as the validity and dependability of the results when they are generalized, are covered by the elements of representativeness and size of the corpus (Hunston, 2002).

3.2 Antconc Software:

Antconc 3.5.8 (Windows) 2019 is used to calculate frequencies and analysis of text by using concordance tool. It was developed by Laurence Anthony (2007). It is an open-source software and platform independent tool for carrying out corpus-based researches. The text file of the Covid related articles is then opened in Antconc software to analyze and interpret the metadiscourse markers used by authors in medical research journals. To calculate the frequencies of metadiscourse markers in medical research articles, word list feature is being used. This feature provides the accurate frequency of words and order and that order can be inverted as well. To analyze the text of articles, concordance tool is used. This feature manifests the desired search in KWIC (keyword in context) pattern. This tool provides the reliable and consistent results even analyzing data on large scale. Antconc is basically a corpus analysis toolset used for concordance and text analysis. The text file of the Covid related articles is then opened in Antconc software to analyze and interpret the metadiscourse markers used by authors in medical research journals. The Antconc software also helps in finding the exact frequencies of interactional and interactive metadiscourse markers used by authors in selected Covid related articles published in medical research journals.

3.3 Theoretical Framework:

Metadiscourse is a relatively new approach to analyze and interpret the discourse and helps in recognizing what author or writer intended to say and how the writer intended to present himself or herself in front of the audience. So, this study through the metadiscourse analysis of selected articles and use of metadiscourse markers by writers are analyzed and interpreted to comprehend the intended meanings of the discourse and how the use of metadiscourse markers helps the readers to get better idea of the discourse related to Covid-19. Along with this, it also focuses on the functional aspect of metadiscourse markers in medical research journals. In this dissertation, Hyland Model of Metadiscourse Markers (2005) is used and frequencies of variable metadiscourse markers and the concordance lines are analyzed.

Metadiscourse presents sovereignty to authors and speakers to expand their position and place themselves in order for participants (Hyland, 2005). The project gathers types of text to present how authors and speakers indulge into their extended text to affect the addressee's opinion about the text. Generally, metadiscourse can be classified on the means of Halliday's model of the function of language i.e., ideational, textual, and interpersonal. This study focuses on the model proposed by Hyland in 2005. This model is consisting of two dimensions.

1. Interactive Metadiscourse Marker
2. Interactional Metadiscourse Marker

The table below discusses all the metadiscourse markers which are the most crucial aspect of this research.

Table 3: Metadiscourse Markers

Category	Function	Examples
Interactive	It guides and directs the reader by using text.	
Transitions	it describes the connection between independent clauses	hence, so, thus, in addition, accordingly, as well, besides
Frame markers	refers to order, sequence, phases or stages and discourse performance	my goal is, my purpose is, finally, in this section, in this part

Endophoric markers	relates to information and instructions in another section of text	example number, page number, figure no 2, noted
Evidentials	relates to material and information from the other text	claim, said, according to, prove, point out
Code glosses	describes propositional meanings	for example, for instance, that is, known as, called
Interactional	It engages the reader in the text.	
Hedges	withhold author's full agreement to proposition	almost, might be, perhaps, possible, may be, possibly, about to be
Boosters	focuses on close dialogue and certainty	no doubt, prove, conclusively, it is clear that, certainty. clearly
Attitude markers	describe author's approach and attitude to proposition explicitly	I agree, hopefully, surprisingly, Fortunately, disagree
Self-mentions	refers to the writers or authors	my, mine, I, we, our, me
Engagement markers	explicitly make a connection with the reader	you may notice that, note that, you can see that, note and consider,

According to Thompson (2011) interactive and interactional dimensions are significant and purposeful kinds of interaction. These two are two sides of one coin. Hyland's theory is a significant, logical, and systematic framework that serves a promising approach for investigating interpersonal connections by using interactional frames and sources and textual meanings by using interactive aids and sources. (Nan & Liu, 2013)

3.4 Corpus Compilation:

This is academic research and involves both quantitative and qualitative research methodologies. This study uses the tool of Corpus Linguistics (AntConc) to analyze and interpret the metadiscourse markers used in Covid-19 articles published in medical research journals. For this purpose, hundred research articles from widely known and prominent medical

research journals are collected through the internet from different sources e.g., Google scholar, research gate, jstor etc. Some of the well-known research journals are; *Journal of eClinical Medicine*, *Journal of Arthroscopy and Joint Surgery*, *Journal of American Society of Cytopathology*, *Journal of Health Policy and Technology*, *International Journal of Multiple Sclerosis and Related Disorders* and so on. For sample selection criteria, I preferred articles having open access for downloading. Only English based Covid articles are selected for this dissertation, so it's a monolingual corpus.

For collecting sample, simple random sampling technique is used. As a sample size, one hundred research articles from all over the world related to Covid-19 are collected in Portable Document Format (pdf) and after this step, the pdf files are converted into text files. There are several online tools that allows you to upload a pdf file and convert it into plain text. I used Zamzar.com and Smallpdf.com for conversion of text. Cleaning a text file for use in Antconc, a corpus analysis tool, involves preparing the text to ensure accurate and meaningful analysis results and delete any non-text elements like images, tables, headers, footers, and other formatting that can interfere with linguistic analysis. For cleaning of text, I used a text editor i.e., TextEdit (Mac).

Method of analysis:

- Firstly, Antconc only supports plain-text files.
- Secondly, Doc, DocX, and PDF files cannot be read by Antconc. These must be transformed into.txt files. Files saved as.txt files can be read by it.
- Thirdly, the articles are saved on the desktop as a.txt file. It is must to remove the author byline or title and save the document again after performing some additional text cleanup. Keep in mind that text analysis software can and will handle anything you left in the text file.
- Fourthly, I started by selecting File > Open, just like when opening a file elsewhere, except this time we want to open the directory containing all of our files rather than just one. If you're familiar with this idea, AntConc lets you open entire directories. There are 7 tabs across the top. I used 4 options from them i.e., Word list, Keyword list, Concordance and concordance plot
- Lastly, word list and keyword list are used for quantitative analysis and concordance lines are analyzed by concordance and concordance plot.

Frequency Calculator:

To attain these objectives, through the use of ‘Antconc Software’, firstly the frequency tables are drawn for interactive and interactional metadiscourse markers as proposed by Hyland. Through the frequency tables, percentages are calculated and then comparisons are drawn on the basis of those percentages which help in finding the metadiscourse markers preferred by the authors of selected Covid-19 articles published in medical research journals. This refers to the quantitative part of the research.

$$\% \text{Age of marker} = \frac{\text{No. of marker given in the frequency table}}{\text{Total no. of markers in the frequency table}} \times 100$$

For example,

$$\text{Percentage of marker ‘AND’} = \frac{\text{No. of ‘AND’ in the frequency table}}{\text{Total no. of Transitions in the table}} \times 100$$

Secondly, the percentages of the subcategories such as transitions, evidentials, code glasses and so on is calculated through the following method;

$$\% \text{Age of subcategory} = \frac{\text{Total numbers of the markers in the subcategory}}{\text{Total number of interactional/ interactive category}} \times 100$$

For example,

$$\text{Percentage of ‘Self-mentions’} = \frac{\text{Total no. of ‘Self-mentions’}}{\text{Total no. of Interactional Marker}} \times 100$$

And finally, the percentages of two main categories i.e., interactive and interactional metadiscourse markers will be calculated as discussed below;

$$\% \text{Age of ‘interactional/ interactive category’} = \frac{\text{Total no. of category in the frequency tables}}{\text{Total number of Metadiscourse Markers}} \times 100$$

For example,

$$\% \text{Age of ‘Interactive Markers’} = \frac{\text{Total numbers of ‘Interactive Markers’}}{\text{Total number of Metadiscourse Markers}} \times 100$$

Through the comparison of percentages of subcategories and two major categories, we will find the most preferred and least preferred metadiscourse markers.

Both frequencies and percentages are calculated to present the data in an elaborative form and to provide the readers a greater precision and accuracy. I used both frequency and percentages in my study for several reasons such as;

Normalization and Contrast:

The use of percentages enables uniformity and simple comparisons between various groups or variables. Researchers can compare the prevalence or distribution of a specific characteristic

across several categories, regardless of the size of the groupings, by expressing data as a percentage of the total.

Standardization:

The use of percentages in data normalization facilitates the comparison of proportions as opposed to raw counts. When working with datasets of different sizes, this is quite helpful. If two groups are different in size, for instance, comparing the proportion of each attribute in each group may not provide useful information. A more insightful comparison is made when the counts are expressed as percentages.

Analysis and interaction:

Compared to raw frequencies, percentages are frequently easier to understand and convey. They offer a clear picture of the relative size or proportion of a certain category in relation to a broader context. This can facilitate the understanding of findings' relevance by researchers and the broader public.

Reducing Inaccurate Findings:

When working with datasets of various sizes, it is occasionally possible to draw false conclusions by concentrating just on frequencies. In a smaller group than in a larger one, a minor absolute change in frequency may have greater significance. A more realistic depiction of the data is provided by percentages, which also help to account for these variations.

Comparison Across Studies:

Stating results in percentages makes it easier to compare findings when various surveys or studies have different sample sizes. Instead of depending only on raw counts, researchers can compare the proportions of particular outcomes or characteristics.

In conclusion, percentages offer a way to standardize and interpret this data in a more meaningful and comparable way, especially when working with diverse or differently sized groups, while frequencies provide crucial information about the raw count of events or observations.

Concordance Lines:

For the qualitative part of the research, concordance lines are analyzed and interpreted. Concordance lines are selected with the help of 'Antconc Software' and through these lines the functions of metadiscourse markers in Covid articles are analyzed. Concordance lines are selected using the frequency tables drawn in the chapter of data analysis. Metadiscourse marker mentioned in the frequency tables are the main focus of every concordance line selected in this dissertation. Each concordance line contains the particular metadiscourse marker which is the

subject of analysis in this research. For finding out the suitable lines metadiscourse markers are entered in the keyword space and Antconc software shows the concordance lines containing that particular metadiscourse marker. So, for each metadiscourse marker two concordance lines are selected and then analyzed. These lines help the readers to explore the functional aspects of the metadiscourse markers to explore the language of the medical research articles. This research is a blend of quantitative and qualitative methodologies so that the above-mentioned objectives can be achieved.

CHAPTER 04

DATA ANALYSIS:

In this section of the dissertation the metadiscourse markers used in Covid-19 articles from well-known research articles are analyzed according to the work of Hyland “model of metadiscourse” which is based on the various discourse markers. According to this model metadiscourse markers comprised of two main categories i.e., interactive and interactional metadiscourse markers. The study in this section is divided into two main parts. The first part of the analysis is an attempt to find which type of metadiscourse are preferred in medical research journals and second part is concerned with functional aspect of metadiscourse markers in the medical research journals.

In part A, I analyzed the elements of the two above-mentioned categories in detail. Along with that it is a Corpus-based study so this research paper involves the use of Antconc software for finding the exact frequencies of interactive and interactional markers. For analyzing the discourse of medical research journals, tables are drawn for both the interactive and interactional metadiscourse markers. Within the category of interactive markers, the exact frequencies of transitions, frame markers, endophoric markers and code glasses are shown in the table format. For interactional markers, tables are drawn for the sub-categories which include hedges, boosters, attitude markers, self-mentions and engagement marker. Through the frequency tables, percentage of each marker is calculated and this is done to find out which type of metadiscourse markers are preferred by the authors of Covid related articles.

The percentages are calculated in Part A in three different ways. Firstly, percentage of each marker is calculated in the following way;

$$\% \text{Age of marker} = \frac{\text{No. of marker given in the frequency table}}{\text{Total no. of markers in the frequency table}} \times 100$$

For example,

$$\text{Percentage of marker 'AND'} = \frac{\text{No. of 'AND' in the frequency table}}{\text{Total no. of Transitions in the table}} \times 100$$

Secondly, the percentages of the subcategories such as transitions, evidentials, code glasses and so on is calculated through the following method;

$$\% \text{Age of subcategory} = \frac{\text{Total numbers of the markers in the subcategory}}{\text{Total number of interactional/ interactive category}} \times 100$$

For example,

$$\text{Percentage of 'Self-mentions'} = \frac{\text{Total no. of 'Self-mentions'}}{\text{Total no. of Interactional Marker}} \times 100$$

And finally, the percentages of two main categories i.e., interactive and interactional metadiscourse markers will be calculated as discussed below;

$$\% \text{Age of 'interactional/ interactive category'} = \frac{\text{Total no. of category in the frequency tables}}{100} \times$$

Total number of Metadiscourse Markers

For example,

$$\% \text{Age of 'Interactive Markers'} = \frac{\text{Total numbers of 'Interactive Markers'}}{\text{Total number of Metadiscourse Markers}} \times 100$$

Through the comparison of percentages of subcategories and two major categories, we will find the most preferred and least preferred metadiscourse markers.

Part B is an attempt to find the functions of metadiscourse markers and to analyze the language of medical research journals. In this section, again Antconc software is used in order to select concordance lines. Then concordance lines are analyzed in order to get a deep insight into the language of the medical research journals and to understand the stance of the writers. Concordance lines mentioned in this study help the readers to understand the context of Covid-19 articles published in the medical research journals.

Part A:

4.1 Interactive Metadiscourse Markers:

Interactive metadiscourse markers serve the purpose of guiding and directing the readers through the text. Frequency tables are drawn for transitions, frame markers, endophoric markers, evidentials and code glasses. These tables are further analyzed and percentage of each marker is calculated which are also mentioned below. These frequency tables and analysis of these tables shows what are the most preferred and least preferred metadiscourse markers.

Transitions:

Table 1: Transitions

Transitions	Frequency
Hence	74
So	145
Thus	149
in addition	88
Accordingly	26
as well	338
But	484
And	17179

According to the above-mentioned frequency table of transition markers used in one hundred Covid-19 articles from well-known medical research journals, it can be inferred and interpreted that ‘and’ is the most used transition marker and ‘accordingly’ is the least used transition marker. The percentages of the transition markers in Covid-19 articles of medical research journals are as follow; ‘hence’ (0.400%), ‘so’ (0.784%), ‘thus’ (0.806%), ‘in addition’ (0.476%), ‘accordingly’ (0.140%), ‘as well’ (1.828%), ‘but’ (2.618%) and ‘and’ (92.949). The frequencies and percentages of the transition markers show which transition marker is the most common transition marker in the medical research journals. Shahid, Qasim and Hasnain (2020) conducted a research on the use of metadiscourse markers in English and Urdu editorials using Hyland model (2005). The result revealed that transitions are the fourth most used MDMs in English newspapers editorials while the second most used metadiscourse markers in Urdu editorials which does not in line with the current study. However within the category of interactive metadiscourse markers transitions are the most used interactive markers in both English and Urdu editorials.

Ghadiyani and Tahririan (2015) conducted a contrastive study on Interactive Markers in Medical Research Articles written by Iranian and native authors of ISI and non-ISI medical research journals. The result reveals that the transitions are most used metadiscourse markers in the medical research journals and thus are in line with the current study. Out of 3657 Interactive markers 1640 are the transition metadiscourse markers in the previous study. As transitions serve the purpose of connecting two independent clauses in a text so they are used in very great number and transitions are the most common interactive metadiscourse markers.

Frame Markers:

Table 2: Frame Markers

Frame Markers	Frequency
Finally	55
in this section	11
to conclude	2
I argue	3
To suggest	8

According to the above-mentioned frequency table of frame markers used in one hundred Covid-19 articles from well-known medical research journals, it can be inferred and interpreted that ‘finally’ is the most used frame marker and ‘to conclude’ is the least used frame marker. The percentages of the frame markers in the Covid-19 articles are as follow; ‘finally’

(69.620%), ‘in this section’ (13.924%), ‘to conclude’ (2.531%), ‘I argue’ (3.797%) and ‘to suggest’ (10.126). Frame markers perform different functions in the text such as the word ‘I argue’ shows that writer is going to announce something, ‘to conclude’ shows author is going to predict his or her final statement and so on. However, according to the above frequency table, frame markers are the least used interactive markers.

Veronica and Barli (2020) metadiscourse marker study reveals that code glosses are the least used interactive markers in scientific research journals and thus stands in contrast to the current study. Another important study conducted by Javad and Roghayeh (2016) focuses on the comparative study of metadiscourse markers in biological research articles. The results revealed that both Iranian and Americans writers do not prefer the use of frame markers in the research articles. Thus, this study favors the findings of the current study and therefore frame markers are the least used interactive markers.

Endophoric Markers:

Table 3: Endophoric Markers

Endophoric Markers	Frequency
example	100
page number	36
figure number	437
Noted	51
In this chapter	8
table number	3
discussed below	2

According to the above-mentioned frequency table of endophoric markers used in one hundred Covid-19 articles from well-known medical research journals, it can be inferred and interpreted that ‘figure number’ is the most used endophoric marker and ‘discussed below’ is the least used endophoric marker. The percentages of the endophoric markers are as follow; ‘example’ (15.698%), ‘page number’ (5.65%), ‘figure number’ (68.602%), ‘noted’ (8.006%), ‘in this chapter’ (1.255%), ‘table number’ (0.470%) and ‘discussed below’ (0.313%). Roka (2020) study of metadiscourse markers in academic writing is in concordance with the current study with respect to markers ‘figure’ and ‘example’ as the first and second most preferred markers with in the subcategory of Endophoric Markers.

The basic function of the endophoric marker is to give additional information about the previous or the next statement made by author in the text. It can be inferred that medical research authors give additional information about the particular statement using a lot of figures and diagrams and it is evident through the frequency of word ‘Figure number’. Also, authors rely on examples to further explain their statements. As a whole, authors use good number of endophoric markers in Covid-19 articles published in reputable medical research journals. Veronica and Barli (2020) study of metadiscourse markers in scientific journals reveals that Endophoric Markers stand third on the scale of preference in the category of Interactive Markers which shows complete synchronization with the current study.

Evidentials:

Table 4: Evidentials

Evidentials	Frequency
Claim	1
Said	13
according to	161
Prove	9
Says	4
Argue	3
Suggest	78
Found that	124
Show	108

According to the above-mentioned frequency table of evidentials used in one hundred Covid-19 articles from well-known medical research journals, it can be inferred and interpreted that ‘according to’ is the most used evidential and ‘claim’ is the least used evidential. The percentages of the evidentials are as follow; ‘claim’ (0.254%), ‘said’ (3.307%), ‘according to’ (40.966%), ‘prove’ (2.290%), ‘says’ (2.290%), ‘argue’ (0.763%), ‘suggest’ (19.847%), ‘found that’ (31.552%) and ‘show’ (27.480%). Roka (2020) study of metadiscourse markers reveals that the marker ‘show’ is on the second place in evidentials while in the current study the marker ‘show’ stands on the third on the scale of preference in evidentials in the current study.

Javad and Roghayeh (2016) focuses on the comparative study of metadiscourse markers in biological research articles. The results revealed that both Iranian and Americans writers preferred evidentials and these are the most used metadiscourse markers in the research articles and journals impact factor. Thus, it can be concluded that the current study does not in line

with the biological research journals. Evidentials, as the name suggests play the role of providing the evidence and these markers make the statement authentic and reliable. Through these markers, authors encapsulate the work of the other authors into his own work to make it believable and trustworthy. The frequency of word ‘according to’ shows that authors use considerable amount of evidentials in their works with the sole purpose of making it more reliable. However, if we notice the frequency of the word ‘claim’, it is used only one time in hundred Covid-19 articles which shows that authors do not make claims at all and do not declare or assert something rather simply state their opinions and ideas which are open to criticism and their ideas can be rejected as well.

Code Glosses:

Table 5: Code Glosses

Code Glosses	Frequency
i.e.	127
e.g.	144
known as	11
called	26
in fact	16
such as	519
defined as	70
In other words	5

According to the above-mentioned frequency table of code glosses used in one hundred Covid-19 articles from well-known medical research journals, it can be inferred and interpreted that ‘such as’ is the most used code glass and ‘in other words’ is the least used code glass. The percentages of the code glosses are as follow; ‘i.e.,’ (13.834), ‘e.g.,’ (15.686%), ‘known as’ (1.198%), ‘called’ (2.832%), ‘in fact’ (1.742%), ‘such as’ (56.535%), ‘defined as’ (7.625%) and ‘in other words’ (0.544%). Roka (2020) study of the metadiscourse markers in the academic writing shows concordance with the current study with reference to the marker ‘such as’ as it is the most preferred code gloss in both the studies. Shahid, Qasim and Hasnain (2020) conducted a comparative research on English and Urdu newspaper editorials and the results revealed that code glosses are used in considerable amount as it is also clear in the current study as well.

Code glasses perform the function of explaining, restating and reaffirming the ideas and opinions of the author for the readers in order to reveal the intended meaning of the writer. The

word ‘such as’ is used a lot by the authors which means author is providing the additional information for the reader by giving the explanation of his previous statement. However, authors have not much preferred to provide the additional information by using the marker, ‘in other words.’ So, it can be inferred that the element of providing information through restating the fact or opinion is almost negligible.

4.2 Interactional Category:

Interactional Metadiscourse Markers, as the name indicates serve the purpose of creating a sort of connection between the text and reader. These markers put forward the opinions and ideas of the author before the readers using interactional techniques. Given below are the frequency tables for the subcategories of Interactional markers i.e., hedges, boosters, attitude markers, self-mentions and engagement markers and the detailed analysis.

Hedges:

Table 6: Hedges

Hedges	Frequency
Almost	51
might be	65
Perhaps	9
Possible	172
may be	217
Possibly	25
about to	1
Likely	165
Largely	31
Indicates	33
Unclear	13
Usually	32

According to the above-mentioned frequency table of hedges used in one hundred Covid-19 articles from well-known medical research journals, it can be inferred and interpreted that ‘may be’ is the most used hedge and ‘about to’ is the least used hedge. The percentages of the hedges used in Covid-19 articles are as follow; ‘almost’ (6.265%), ‘might be’ (7.985%), ‘perhaps’ (1.105%), ‘possible’ (21.130%), ‘may be’ (26.658%), ‘possibly’ (3.071%), ‘about

to' (0.122%), 'likely' (20.270%), 'largely' (3.808%), 'indicates' (4.054%), 'unclear' (1.597%) and 'usually' (3.931%). Roka (2020) conducted Corpus-based research which explores metadiscourse markers in the academic writing. The study shows that within the subcategory of hedges, 'may' is the most used metadiscourse marker which also is the most preferred hedge in the current study. Javad and Roghayeh (2016) focuses on the comparative study of metadiscourse markers in biological research articles. The results revealed that both Iranian and Americans writers use hedges as the second most preferred metadiscourse marker in the research articles. Shahid, Qasim and Hasnain (2020) conducted a comparative research on English and Urdu newspaper editorials and the results revealed that hedges are the second most used interactional markers. Both the studies revealed that they are in line with the current study as well.

Hedges serve the purpose of presenting the statement of the author as an idea and opinion rather than stating it as fact. The use of hedges indicates how much importance author wants to give to a particular statement. It shows to the readers how much confidence does the author hold in a particular statement. It reveals before the readers the authenticity of the particular statements. The marker 'may be' has the highest frequency and according to the degrees of possibility, it shows that the possibility of accuracy of the statement is very less. Comparing the frequency of 'may be' with 'might' shows might is used very few times and the use of might shows that possibility of statement's accuracy is relatively high. So, it can be inferred that authors in the COVID-19 articles use hedges which have low degree of accuracy and their statements are more of their ideas and perspectives rather than the facts and truths.

Boosters:

Table 7: Boosters

Boosters	Frequency
Prove	9
It is clear that	3
Certainly	12
Clearly	17
Actually	12
Always	30
Definitely	2
Essentially	6
know that	6

well-known	4
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According to the above-mentioned frequency table of boosters used in one hundred Covid-19 articles from well-known medical research journals, it can be inferred and interpreted that ‘always’ is the most used booster and ‘definitely’ is the least used booster. The percentages of the boosters are as follow; ‘prove’ (8.910%), ‘it is clear that’ (2.970%), ‘certainly’ (11.881%), ‘clearly’ (16.831%), ‘actually’ (11.881%), ‘always’ (29.702%), ‘definitely’ (1.980%), ‘essentially’ (5.940%), ‘know that’ (5.940%) and ‘well-known’ (3.960%). Boosters intend to clarify the statement and establish certainty. It serves the purpose of restricting the readers to a specific idea. It basically strengthens a particular idea or opinion of the author and thus create clear and concise arguments. For example, the marker ‘always’ show that the authors want to direct the readers towards the particular idea rather than extending the idea. However, the frequency of boosters is not very high which means that authors are not using clear and concise statements very often.

Roka (2020) corpus-based study shows that the metadiscourse marker ‘always’ is used in substantial amount (146) just as it is used in considerable amount in the current study. Shahid, Qasim and Hasnain (2020) conducted a comparative research on English and Urdu newspaper editorials and the results revealed that boosters are the third most used interactional markers. In the current study, boosters are the third most used interactional metadiscourse markers which makes both the studies in line with one another.

Attitude marker:

Table 8: Attitude marker

Attitude marker	Frequency
I agree	1
Hopefully	4
Surprisingly	8
Fortunately	5

According to the above-mentioned frequency table of attitude markers used in one hundred Covid-19 articles from well-known medical research journals, it can be inferred and interpreted that ‘surprisingly’ is the most used attitude marker and ‘I agree’ is the least used attitude marker. The percentages of the attitude markers in the Covid-19 articles are as follow;

‘I agree’ (5.555%), ‘hopefully’ (22.222%), ‘surprisingly’ (44.444%) and ‘fortunately’ (27.777%). Tuba and Nida (2018) study show resemblance with the current research that it employs very less use of metadiscourse markers in the medical sciences. Roka (2020) research reveals that ‘surprisingly’ which is the most preferred metadiscourse marker in the current study is the least used in the corpus of the academic writing. Thus, the current study is in contrast with Roka (2020) results in terms of attitude markers. The percentage Attitude markers serve a different purpose as compare to other metadiscourse markers. Attitude markers show emotions such as astonishment, infuriation, agreement etc. Through attitude markers, author presents its attitude and emotion before the readers. However, looking at the frequency tables it can be inferred that author’s almost negligible amount of attitude markers in Covid-19 articles.

Self-mentions:

Table 9: Self-mentions

Self-mentions	Frequency
I	767
We	1428
Mine	1
My	159
Our	622

According to the above-mentioned frequency table of self-mentions used in one hundred Covid-19 articles from well-known medical research journals, it can be inferred and interpreted that ‘we’ is the most used self-mention and ‘mine’ is the least used self-mention. The percentages of the self-mentions in Covid-19 articles are as follow; ‘I’ (25.764%), ‘we’ (47.967%), ‘mine’ (0.033%), ‘my’ (5.340%) and ‘our’ (20.893%). Self-mentions convey how overtly author presents himself/herself in his/her writing. It is a very influential source of self-portrayal of writer in the text. It can be inferred from the frequency table that authors in the Covid-19 articles use a lot of personal pronouns and explicitly express themselves in the medical research journals. The authors in selected articles have indulged themselves in the text for quite a number of times to clearly show the particular stance they want to take.

Alyousef and Alotaibi (2019) conducted a Corpus based study on self-mention marker and their rhetoric functions in Dentistry Research Articles shows contrast with the current study. The percentages of ‘we’ and ‘our’ in the previous work are 39.55% and 58.96%

respectively. In the current study, the percentages of ‘we’ and ‘our’ are 47.96% and 20.89%. However, the current study is completely in line with Roka (2020) corpus-based study. According to the results, ‘we’ is the most used metadiscourse marker and ‘mine’ is the least used metadiscourse marker.

Engagement markers:

Table 10: Engagement markers

Engagement markers	Frequency
Consider that	3
note that	16
see that	5
Consider	2

According to the above-mentioned frequency table of engagement markers used in one hundred Covid-19 articles from well-known medical research journals, it can be inferred and interpreted that ‘note that’ is the most used engagement marker and ‘consider’ is the least used engagement marker. The percentages of the engagement markers in the Covid-19 articles are as follow; ‘consider that’ (11.538%), ‘note that’ (61.538%), ‘see that’ (19.230%) and ‘consider’ (7.692%). In the current study, directive engagement markers are discussed in detail and their frequencies are analyzed. Sahragard and Solmaz (2019) conducted a contrast study on the use of engagement markers in science and humanities research journals. On cross comparison it is revealed that authors of science journals used 62.5% of directive engagement markers which is quite a high number and thus they make up a great part of total number of metadiscourse markers which is in contrast with the current study because it contains very less percentage of the directive engagement marker.

The current study is also in contrast with the Roka (2020) corpus study as it is clear from the marker ‘consider’ which is used 556 times in previous research and only 2 times in this dissertation. Engagement markers as the name suggest serve the purpose of engaging the readers into the text. These markers attempt to bring the attention of the readers to a specific point as a process of involving the reader into the text thus assigning him or her the role of discourse participant. The frequency table of engagement markers shows that authors have only twenty-six times involved the readers into the text which is a very little number. It can be inferred from this that authors have not directly involved the readers into the text and does not provide the readers a specific point to focus on.

Now, I will analyze the frequencies and percentages of the subcategories of the Metadiscourse Markers as proposed by Hyland in his model. From the above-mentioned frequency tables, the total numbers of each subcategory will be calculated and then the percentages will be compared to find out which subcategory is most preferred and which one is least preferred by the authors in the Covid-19 research articles. Following are the total numbers of each category of the metadiscourse markers;

4.3 Interactive Metadiscourse Markers:

1. **Transitions:** The total number of transitions according to the above-mentioned frequency table is 18,483.
2. **Frame markers:** The total number of frame markers according to the above-mentioned frequency table is 79.
3. **Endophoric markers:** The total number of endophoric markers according to the above-mentioned frequency table is 637.
4. **Evidentials:** The total number of evidentials according to the above-mentioned frequency table is 393.
5. **Code glasses:** The total number of code glasses according to the above-mentioned frequency table is 918.

From this, it is calculated that the total number of interactive markers is 20,510 according to above-mentioned frequency tables.

4.4 Interactional Metadiscourse Markers:

1. **Hedges:** The total number of hedges according to the above-mentioned frequency table is 814.
2. **Boosters:** The total number of boosters according to the above-mentioned frequency table is 101.
3. **Attitude Markers:** The total number of attitude markers according to the above-mentioned frequency table is 18.
4. **Self-Mentions:** The total number of self-mentions according to the above-mentioned frequency table is 2977.
5. **Engagement Markers:** The total number of engagement markers according to the above-mentioned frequency table is 26.

From this, it is calculated that the total number of interactional markers is 3,936 according to above-mentioned frequency tables.

The percentages are as follow;

Interactive Metadiscourse Markers:

Table 11: Interactive Metadiscourse Markers

Transitions	90.117%
Frame Markers	0.385%
Endophoric Markers	3.105%
Evidentials	1.916%
Code Glasses	4.758%

Looking at the percentages of the above-mentioned categories, it can be analyzed that within the sub-division of the interactive metadiscourse markers, transitions are the most preferred metadiscourse markers. Code glasses are second most used markers and after it comes Endophoric markers. Evidentials are the second least used interactive markers while, frame markers are the least used interactive markers. The percentages of the markers reflect the author style of writing. It shows how the author build connection in his writing i.e., how the ideas are connected to one another, and it is the reflection of how the authors achieve cohesion and coherence in the text. In short, the percentages of interactive markers show which markers authors of covid-19 articles published in the medical research journals preferred to direct and guide the readers through the text. Mina and Biria (2017) conducted a study on interactive and interactional metadiscourse marker which is in line with the current study in relation to transitions and code glosses, where transitions are the first and code glosses are second in terms of preferable metadiscourse markers. While the study shows contrast to frame markers as they stand on the third on the scale of preference and evidentials and endophoric markers on fourth and fifth respectively.

Interactional Metadiscourse Markers:

Table 12: Interactional Metadiscourse Markers

Hedges	20.680%
Boosters	2.566%
Attitude Markers	0.457%
Self-mentions	75.635%
Engagement Markers	0.660%

By comparing the percentages of Interactional Metadiscourse Markers, self-mentions are the most preferred markers. Hedges are the second most used interactional markers and boosters come after it. Attitude markers are the second least used markers and engagement markers are the least used interactional markers. The percentages are the reflection of how writers build connection with the readers through the text. It shows how writers assert themselves before the readers. It also shows what particular stance writer takes while presenting himself / herself before the readers and how explicitly or implicitly the authors present themselves in the text. In short, the percentages of interactive markers show which markers authors of covid-19 articles published in the medical research journals preferred to engage the readers into the text. Mina and Biria (2017) contrastive study reveal that hedges are most preferred interactional markers in medical sciences which does not in line with the current study. The study is in complete contrast in relation to interactional markers because the least preferred in Mina and Biria (2017) study is the engagement markers while the current study shows that attitude markers stand at the lowest position on the preference scale.

In this part, I finally compare the percentages of the interactive and interactional metadiscourse markers to show which metadiscourse markers author preferred in the Covid-19 articles i.e., interactive or interactional markers. For this, the total numbers of the markers are calculated and then the number of interactive and interactional markers are calculated and then finally the percentages are assessed. Given below are the total numbers and percentages of the interactive and intentional markers;

Total number of Metadiscourse Markers = 24,446

Total number of Interactive Markers = 20510

Total number of Interactional Markers = 3936

These calculations are based on the frequency tables mentioned above. The percentages of the categories proposed by Hyland are;

Table 13: Frequency Tables

Metadiscourse Markers	Percentage (%)
Interactive Markers	83.899%
Interactional Markers	16.1900%

The table clearly shows that interactive markers have much higher frequency than interactional markers, so it can be inferred that in Covid-19 articles authors are more inclined

towards guiding and directing the readers through the texts rather than engaging the readers into the text. The authors in Covid-19 articles through the use of metadiscourse markers tend to convey their opinion and ideas in a more coherent way before the readers. From this it can be interpreted that the approach adopted by the authors is to convey the knowledge and ideas about Covid-19 through a well-structured language where authors instead of engaging the readers into the text rather guides the reader through the text in order to convey their findings and perspectives. Veronica and Barli (2020) conducted a corpus-based study on metadiscourse markers in scientific journals articles. The results of the study are completely in line with the current research. The percentage of Interactive Markers is 75% and Interactional Marker is 25% in the scientific journals.

Part B:

4.5 Concordance lines:

In this section of the data analysis, concordance lines are taken from the text file using Antconc Software. These lines have been analyzed based on the Hyland model of Metadiscourse Markers. Metadiscourse markers from each category will be analyzed and this will help in finding the functional aspect of the metadiscourse markers in the Covid-19 articles. Mentioned below are the concordance lines and their analysis;

4.6 Interactive Metadiscourse Markers:

Transitions:

- ‘In many countries FP and abortion care are not essential services, hence care providers are unable to provide required lifesaving services.’
- ‘Out of several tests done for people, they are not considering such type of migrating people, and hence data is not natural, which is a basic problem.’

Functional Analysis of “hence”:

From these two concordance lines, the metadiscourse marker ‘hence’ is analyzed. It can be inferred that hence is joining two independent clauses and creating a connection between the two sentences that are making complete sense. ‘Hence’ is used to show the consequence of some action or some sort of event and here too it can be seen that in both these lines hence is used by the writer to show that the group of words after hence is the consequence of the statement before it. For instance, the author says that care providers are incapable of saving people as a result of ineffective abortion or FP services in many states.

- ‘One who has to come will come to this world, so a woman would require these services.’
- ‘To be assured that we found the best model, it is required to make sure residuals are white Gaussian noise. So, a residual diagnostic is carried out.’

Functional Analysis of “so”:

From these two concordance lines, the metadiscourse marker ‘so’ is analyzed. As, the metadiscourse marker ‘so’ falls in the category of transitions so its basic purpose is to join two independent clauses. It joins two clauses with the aim to present the manner in which information is presented in the preceding clause. It refers back to something implied or mentioned before. For instance, in the second concordance line it can be inferred that residual diagnostic is carried out in order to be confident that best model is found that. The word ‘so’ here gives the implied meaning that residual diagnostic must be carried out.

- ‘We interpret the Altrietric Attention score, thus, as primarily of value as a short-term gauge of general interest in current areas of research.’
- ‘Previous studies using LIWC have found that LIWC may over-identify emotional expression [36]. Thus, there is a possibility that LIWC captured extraneous sentiment.’

Functional Analysis of “thus”:

From these two concordance lines, the metadiscourse marker ‘thus’ is analyzed. ‘Thus’ as a transition metadiscourse marker serves the purpose of defining the degree or extent of the particular information or data. It shows how information is demonstrated and explained by the author. ‘Thus’ also built a logical connection, for instance, in the second concordance line author predicts that LIWC might capture superfluous emotions because in the prior clause the writer has given the reference of previous studies in which LIWC captured the extra emotional expressions.

- ‘In addition, close attention should also be paid to the background of the patient.’
- ‘In addition, FURIN is also a candidate to proteolytically modify the S protein and enhance viral entry into the host cell.’

Functional Analysis of “in addition”:

From these two concordance lines, the metadiscourse marker ‘In addition’ is analyzed. ‘In addition,’ is also a transition marker and it basically serves the purpose of adding additional information to an independent clause. It actually adds additional data to the entity under

discussion. For instance, from the first concordance line it can be inferred that author wants to convey the idea that background of the patient should also be considered. It is clear that in the prior sentence, author might be sharing his idea about the patients and the introduction of metadiscourse marker ‘in addition’ shows that this independent clause is adding additional information.

- ‘Accordingly, our infographics’ palette consisted of different shades of teal in equal proportions [26].’
- ‘Accordingly, GA could be a safe medication in the treatment of MS patients during the SARS-CoV-2 pandemic.’

Functional Analysis of “accordingly”:

From these two concordance lines, the metadiscourse marker ‘accordingly’ is analyzed. The metadiscourse marker ‘accordingly’ is an adverb and basically used in a sentence or clause to show that information provided by the author is right according to the demand of the situation and the information presented to the readers is in accordance to the argument built by the author. For instance, if we look at the second concordance line it can be inferred that prior to this sentence, the author has established a well-built argument in which he has presented the information about ‘GA’. In the next statement, he used the marker ‘accordingly’ to substantiate his idea that GA can be a safe suppository for MS patients during Covid-19 and the marker shows that the information is right according to the situation.

- ‘Doffing of the mask needs to be properly done as well.’
- ‘These incidences have been increasing among the healthcare workers as well all over the world.....’

Functional Analysis of “as well”:

From these two concordance lines, the metadiscourse marker ‘as well’ is analyzed. ‘As well’ is also an adverb and adds information to an independent clause. It is mostly used in the end of the clause as it clears from the first concordance line and sometimes in the middle of the clause. ‘As well’ when the author tends to remark about something which is mentioned prior to the given information and is same like it and also it indicates that the information provided is about the same thing which is already in discussion. For example, if we interpret the first concordance line, a speculation can be drawn that author may be discussing about something related to face mask, an important prevention during Covid-19. By the use of marker ‘as well’,

the author intends to say that masks should also be doffed properly along with other measures mentioned prior to it.

- ‘.... the 1918 influenza pandemic caused a mortality rate of 2.6% in the overall population, but 37% among pregnant women.’
- ‘..... and the public realized COVID19 is not a distant threat shown on the news but a real, deadly virus.’

Functional Analysis of “but”:

From these two concordance lines, the metadiscourse marker ‘but’ is analyzed. ‘But’ has variety of functions in the text. As a grammatical category, it is a conjunction, sometimes as preposition and sometimes as an adverb. Hyland model declares it as a transition because it does build a logical connection between the two independent clauses. The other functions performed by the marker ‘but’ in the text are; it can be used to present something in contrast to the information or idea presented before, or it adds information to the prior idea or opinion, it is used to change the subject sometimes, as a preposition it means ‘except’ and as an adverb it gives the meaning just same as the word ‘only’. In the Covid-19 articles also, the marker ‘but’ performs different function but the basic function of building logical connection is maintained. For instance, in the first concordance line it can be inferred that the author is talking about the influenza pandemic of 1918 in which almost 2.6% of the total population died and the writer then introduces the marker ‘but’ to add to the prior information that 37% were pregnant women. In the second concordance line, the writer says that the public has acknowledged that Covid-19 is not just a false rumor spread by the media and then he or she introduces the marker ‘but’ to present before the readers the contrasting situation that now public considered it as a deadly and real virus. So, one can see different functions of but in the medical research journals by the authors of Covid related articles.

- ‘The non-survivors and severe COVID-19 patients have elevated serum AST levels than the survivors and non-severe COVID-19 patients.’
- ‘Resuming arthroplasty: a well aligned and a balanced approach in the COVID-19 era.’

Functional Analysis of “and”:

From these two concordance lines, the metadiscourse marker ‘and’ is analyzed. The last metadiscourse marker in the category of transitions is ‘and’ and its grammatical category is conjunction. It performs different functions in the text. The simplest function is to join or link two words, clauses and sentences. Secondly, it is used to join two clauses or sentences

containing information about the same thing. Thirdly, it is used to link the events and actions in their chronological order. Fourthly, it is used for the continuation of the idea expressed by the author in the first clause in the second clause. Fifthly, ‘and’ is used in the second clause to express that the second clause is the consequence of the idea or opinion expressed by the author in the first clause. For instance, in the first concordance line the writer has expressed the idea about the non-survivors and severe, survivors and non-severe. The author has made two pairs i.e., ‘non-survivors and severe’ and ‘survivors and non-severe’ with the help of marker ‘and’ and then presented the idea before the readers that the first pair has higher level of AST serum than the second pair. So, in this example, author has simply joined two words with the help of ‘and’. In the second concordance line, the author has used the marker ‘and’ between ‘a well aligned’ and ‘a balanced approach’ in order to connect two similar ideas about the same thing i.e., resuming arthroplasty. So, in this particular example, and is joining two similar ideas about the same thing. Just like the marker ‘but’, ‘and’ is also used by the authors in the Covid related articles published in reputable medical research journals.

Analysis of ‘Transitions’:

In particular, shifts, linkages, and transitions between sentences and paragraphs are marked by transition metadiscourse markers. Readers will find it simpler to follow the flow of information when a piece is well-organized and cohesive. Transitions contain words, phrases, or statements that provide readers hints about the connections between various bits of information. These indicators are especially crucial in medical research publications because they improve the writing's consistency and clarity, which makes it easier for readers to understand the complicated scientific material being given. These metadiscourse transition indicators aid readers in navigating the content of medical research publications and help authors arrange their work more efficiently. Authors may make sure that their thoughts are conveyed intelligibly, rationally, and cogently by strategically applying these indicators.

4.7 Frame Markers:

- ‘Finally, the all-cause mortality series model revealed an excess of deaths on March 16th and March 20th.’
- ‘After a negative SARS-CoV-2 test, we finally discharged him to his home on the 28th day after admission.’

Functional Analysis of “finally”:

From these two concordance lines, the metadiscourse marker ‘finally’ is analyzed. The marker ‘Finally’ falls under the category of frame markers which perform the function of producing a sort of sequence and order in the text or it describes the stages or phases in the text. Its grammatical category is adverb which adds to the verb. Finally, is used by the authors in the text in order to show what particular action or event will happen after a series of events and actions. For instance, in the first concordance line the author has used the marker ‘finally’ before informing the readers that mortality series model revealed the excess of deaths between March 16 to March 20 which shows that the information is revealed after a series of events described prior to it. In the second concordance line, ‘finally’ is used in the middle of the sentence and information is expressed in the text in such a manner that it shows that after a certain procedure the patient is allowed to go home. This is clear to the readers through the use of marker ‘finally’.

- ‘In this section, an analysis between the existing survey and this present research is made on the basis of some criterion.’
- ‘In this section, we calculated the rate of published articles only in the area of ML, DL, and Mathematical Models.’

Functional Analysis of “in this section”:

From these two concordance lines, the metadiscourse marker ‘in this section’ is analyzed. The marker ‘in this section’ explains or gives the meaning that the author intends to explain before the readers that what they can expect in the further discussion. It intends to explain what will be there in a particular section described by the author. For instance, in the first concordance line, the author has created a sort of boundary which contains specific information through the use of marker ‘in this section’ and then informs the audience that the particular section contains the information about the analysis is made between prevailing surveys and current research on the basis of some principle. In the second concordance line, just like first, the author has conveyed the point that particular section contains the information about the rates of issued articles in the fields of ML, DL, and Mathematical Models through the use of marker ‘in this section’ in the text.

- ‘Do not have to wait for the speaker to conclude or the moderator to acknowledge you at the microphone.’
- ‘..... to conclude that the destruction of endothelial cells permitted the progression of apoptosis.’

Functional Analysis of “to conclude”:

From these two concordance lines, the metadiscourse marker ‘to conclude’ is analyzed. ‘To conclude’ falls under the category of frame markers and ‘to infinitive’. As a frame marker, it organizes the text and helps the author in deducing his opinions and ideas. It is used by the authors to label their ideas and opinions in the text. For instance, in the second concordance line the author has used the marker ‘to conclude’ to show his sum up thoughts and ideas that ‘Apoptosis’ develop more when endothelial cells are damaged. In the first concordance line, the marker ‘to conclude’ is used in its literal meaning in which author says that in virtual academic session, one does not need to wait necessarily for the speaker ‘to conclude’ or mediator to recognize the existence on the microphone.

- ‘We found published evidence to suggest that those of Black ethnicity may be at higher risk of acquiring SARS-CoV-2 infection, compared to White patients.’
- ‘..... there appears to be a trend to suggest a slower spread of the virus in countries with current national BCG vaccination policies [50].’

Functional Analysis of “to suggest”:

From these two concordance lines, the metadiscourse marker ‘to suggest’ is analyzed. ‘To suggest’ is a frame marker which is used to label some argument in the text. The author used this marker in the text with the basic purpose of assembling and organizing the text. The authors of the selected Covid articles have used it in the same way as it is clear from the above-mentioned concordance lines. For instance, in the first concordance line the author has used the marker ‘to suggest’ with the word evidence. It can be inferred from this that author is labelling the word ‘evidence’ by using the marker the ‘to suggest’ and hereby expresses the idea that Black people are more at risk of being infected with Covid than those of White people. In the second concordance line, the author has labelled the word ‘trend’ by using the marker ‘to suggest’ and expresses the idea that the states with the national policy of BCG vaccination have a much lower rate of spread of the Covid virus. So, from the discussions about the frame markers it can be inferred that authors of selected Covid-19 articles have well incorporated the frame markers in their texts in order to substantiate their ideas, opinions and stance.

Analysis of ‘Frame Markers’:

Language-based devices called "frame markers," often referred to as "discourse markers" or "metadiscourse markers," are used in writing to direct readers through the organization and flow of a work. They offer hints regarding the connections between concepts,

aiding in the organization of data and improving understanding. Frame markers are linguistic tools that organize material and direct readers in medical research publications. Additive markers, like "Additionally," are used to indicate new information, causal markers, like "Because," are used to indicate cause-and-effect relationships, comparative markers, like "Similarly," are used to indicate similarities, contrastive markers, like "However," are used to indicate contrasts, sequential markers, like "Firstly," are used to indicate order, clarification markers, like "In other words," are used to indicate clarity, and exemplification markers, like "For example," are used to illustrate. These indicators improve the papers' consistency, making it easier for readers to follow intricate medical topics.

4.8 Endophoric Markers:

- ‘Fig. 17: No. of papers with image data used as input considered in this Study. Although the considered data is heavy, Inception net achieved 99.96% of classification accuracy’.
- ‘We interpret these data present in figure 1 that COVID-19 has attacked men more than women.’

Functional Analysis of “figure number”:

From these two concordance lines, the metadiscourse marker ‘Figure number’ is analyzed. Endophoric marker as the name suggests builds up ‘endo’ internal reference with in the text. So, in the first concordance line it can be inferred that ‘figure 17’ contains the information about the number of papers with the visual image as the input of this paper. In this particular example, the author has established a relation between the text and the figure by using the marker ‘figure number’. In the second concordance line, the author has given the internal reference by using the marker ‘figure 1’ and expresses his idea that from figure 1 it can be inferred that men are more at danger of getting infected with Covid as compared to men. So, author has established the logical connection and denoting to the other part of the text to authenticate his data.

- ‘Table 1 Characteristics and satisfaction survey of patients in each group’
- ‘Table 1: Estimates of R0, incubation period, infectious period, and CFR generated by bootstrap method.’

Functional Analysis of “table number”:

From these two concordance lines, the metadiscourse marker ‘table number’ is analyzed. ‘Endophoric marker’ refer to the other content in the text. It sorts of provide further information

and provide the supporting argument with in the text. It directs the audience towards the authentic and favored interpretation. For instance, in the first concordance line the author says that the information in table 1 is about the surveys of the patients in each group presented in the table. So, this information is referring to the information available in Table 1 and thus ‘table no.’ is the endophoric marker in this particular line. Similarly, in the second concordance line the author has presented the information that ‘table 1’ which is an endophoric marker, contains data related to the bootstrap method. So, here ‘table number’ is an endophoric marker and establishing the relation between two different parts of the text.

- ‘..... Some of the important points are discussed below:’
- ‘These components involved in viral replication are potential therapeutic targets, as discussed below.

Functional Analysis of “discussed below”:

From these two concordance lines, the metadiscourse marker ‘discussed below’ is analyzed. The marker ‘discussed below’ is the typical example of endophoric marker. It is actually a reference in the text. It is a reference which is present inside the text or simply it’s the text internal contextual reference. They are simply words or group of words that denote to the other part of the text. For instance, in the first concordance line the author is denoting or referring to some points in the text which will be discussed further in the text with the use of marker ‘discussed below’. Similarly, in the second concordance line the author is denoting that the other part of the text will discuss the mechanisms included in the viral duplication with the help of the endophoric marker ‘discussed below’. So, the authors of the medical research journals have built connections in the text using Endophoric markers in order to give contextual references with in the text and it also shows cohesion and coherence in the text.

Analysis of ‘Endophoric Markers’:

Endophoric markers are linguistic devices that are employed within a text to allude to preceding information. They assist in preserving coherence and minimizing communication redundancy. They assist readers or listeners in comprehending the context and connections between ideas by making references to earlier material. Endophoric markers are essential for productive discourse because they improve understanding and promote easier communication through succinct allusions. Endophoric signals are essential for preserving the coherence and intelligibility of scientific language in medical research journals. Common examples include acronyms, technical words, and references to earlier studies. The use of pronouns like "this"

and "these" to refer back to earlier notions ensures clear but concise communication. Similar to endophoric signals, citations and footnotes direct readers to pertinent sources. With the accuracy and integrity required by medical research, these markers streamline the presentation of complicated material, assisting researchers in making connections between concepts and expanding on body of knowledge.

4.9 Evidentials:

- ‘Only in February 2020, the Director-General of WHO said that “we are not just fighting an epidemic, we are fighting an infodemic” [4].’
- ‘Our respondents seemed to generally follow this practice as 65 per cent of them said that they used fresh clothes for cooking.’

Functional Analysis of “said”:

From these two concordance lines, the metadiscourse marker ‘said’ is analyzed. Evidentials denotes to the material or data from other sources or documents. It guides the viewer’s examination and constructs an influential argument about the topic or matter. As the name suggests it provides evidence in the text to validate the ideas and opinions of the writer. For instance, in the first concordance line the author provides the data from the other source by using the marker, ‘said’. The writer has quoted the saying of Director-General of WHO by using the marker ‘said’ in which he says that the world is not just having battle with epidemic but also infodemic. In the second concordance line the author provides the data that 65% respondents use fresh clothes for cooking by using the marker ‘said’. So, evidentials inform and guides the readers by providing them sound arguments.

- ‘According to Neubaum et al. [34], in a time of crises, social media platforms serve as a space for social sharing of emotions and pursuing empathetic concerns.’
- ‘..... we tagged each article according to its major concept areas.’

Functional Analysis of “according to”:

From these two concordance lines, the metadiscourse marker ‘according to’ is analyzed. In evidentials, authors presented the readers with the sound arguments with the help of textual evidences. For instance, if we interpret the first concordance line it can be analyzed that the author has used the marker ‘according to’ in order to convey the idea of Neubaum that social media has become a source of emotional outlet during the crises. So, here author has incorporated the idea of Neubaum in order to authenticate his idea. In the second concordance

line, the author has used the marker ‘according to’ to convey the idea that every paper is labelled to its major conceptual field in order to build a sound argumentative text.

- ‘Sir William Osler says “Medicine is learned by the bedside and not in the classroom”.’
- ‘Another article that I came across says that one fourth of the surveyed medical students felt discouraged during the COVID-19 quarantine period.’

Functional Analysis of “say”:

From these two concordance lines, the metadiscourse marker ‘says’ is analyzed. This evidential marker ‘say’ is used to share the idea of someone else or the hereby of someone into the writer’s own text in order to develop a well-organized and valid argument in the text. For example, the author has encapsulated the idea of Sir William Osler in the text in order to validate his idea in the first concordance line. It can be an example of bringing the evidences from the external sources so that author can present before the reader a valid and substantial idea. In the second concordance line, the author while discussing his ideas with the readers just brought the external evidence by citing the viewpoint of another author from another article by using the marker ‘according to’ in which he says that one fourth of medical students feel low during the quarantine.

- ‘The authors argue that deep learning models require large data sets for training that are not available currently for COVID-19 cases.’
- ‘However, we argue that the collective wisdom is not the same as physical meetings, having social connection and support from online platforms is important in combating mental health issues during this pandemic.’

Functional Analysis of “argue”:

From these two concordance lines, the metadiscourse marker ‘argue’ is analyzed. The evidential marker ‘argue’ means that different authors have discussions on a particular topic and the marker ‘argue’ is going to point out their discussions in the text. For instance, the author in the first concordance line has presented the idea that different authors have claimed that deep learning model requires the massive data which is unavailable in the case of Covid-19. The second concordance line expresses the viewpoint of the authors of this particular text from which the concordance line is taken. So, here authors have used the marker ‘argue’ to put forward their ideas before the readers in an organized manner. So, this evidential marker basically enlightened the readers with the viewpoints and discussions of the different authors from both outside and inside the text.

- ‘One prior study found that Black participants reported higher levels of stress’
- ‘This scoping review found that COVID-19 has severely impacted the lives of people with dementia.....’

Functional Analysis of “found”:

From these two concordance lines, the metadiscourse marker ‘found’ is analyzed. This marker also provide evidence in the text and validate the data provided by the author in the text. It reveals before the readers the discoveries of the different authors, articles and research conducted in different timespan. For instance, the author in the first concordance line has provided the sound evidence by using the marker ‘found’ in order to incorporate the findings of someone else’s into his own writing. In this particular example he says that one of the previous studies regarding stress reveals that Black people are more prone to the stress rather than the white participants and it is clear through the usage of marker ‘found’. In the second concordance line, the author has referred to a review which claim that people with dementia are harshly impacted by Covid-19 and it is evident through the use of the marker ‘found’. So, from all the above-mentioned discussion on the ‘Evidential Metadiscourse Marker’, it can be inferred that the authors in the selected Covid related articles have used substantial number of Evidentials in their work in order to validate their data and to guide the readers to the specific interpretation of the text.

Analysis of ‘Evidentials’:

A linguistic component employed in communication to indicate the source or strength of evidence substantiating a statement is known as an evidential metadiscourse marker. The justification for a claim is indicated by words like "studies have shown" or "research indicates," for example. These indicators help academic, scientific, and persuasive writing be more transparent and convincing by revealing the reliability and substance of the material being given. Writers can provide readers with a clear context for their claims and provide them the tools they need to assess the accuracy and dependability of the material they are reading by openly identifying the source or certainty of the evidence. In medical research journals, evidential metadiscourse markers like "studies have shown" or "evidence suggests" are used to denote a claim's source or degree of support. The legitimacy and transparency of the research findings are enhanced by these linguistic signals, which give readers information about the strength of the evidence that is being presented. By using these markers, authors communicate a nuanced understanding of their own and other people's research, promoting a fair and knowledgeable debate among scientists.

4.10 Code Glosses:

- ‘The overarching final classification was whether an article was primary, i.e., adding original scientific information to the literature, or secondary.’
- ‘Candidates (i.e., a person who presented to the ED with census data suggesting a potential TBI) were screened

Functional Analysis of “i.e.”:

From these two concordance lines, the metadiscourse marker ‘i.e.’ is analyzed. The marker ‘i.e.’ is a short form of ‘such as’ and it falls under the category of code glosses which provides the additional information by providing examples and rephrasing. Code glosses are used by the authors in order to make the audience capable to grasp the idea of the author in a clearer manner. For instance, in the second concordance line the author is sharing his idea about the candidates that were screened and to clarify the readers about the candidates, the author has provided the additional information by using the marker ‘i.e.’ Similarly, in the first concordance line the author while talking about the final classification between the primary and secondary articles has clarified what is primary article by introducing the marker ‘i.e.’. So, this particular marker clarifies the text before the reader by providing the additional information.

- ‘In our process, we rely on iterative objective (e.g., data recorded from the system) and subjective (e.g., opinions and observations) feedback from exercise therapists.....’
- ‘... the total costs of COVID-19 would be even higher if primary care costs and indirect costs (e.g., loss of productivity during illness, outpatient costs during the recovery phase) were included.’

Functional Analysis of “e.g.”:

From these two concordance lines, the metadiscourse marker ‘e.g.’ is analyzed. This marker ‘e.g.’ stands for ‘for example’. It is introduced into the text by the authors in order to validate his data and to describe what the writer intends to say by giving examples. For instance, in the first concordance line the author has described what is objective and subjective feedback by providing the examples and using the marker ‘e.g.’ Similarly, in the second concordance line the author has used the marker ‘for example’ in order to explain; what is indirect cost, while discussing the total costs of Covid-19. So, this marker explains the reader the actual meaning of the text and author do so by giving additional information through examples.

- ‘In contrast, the NIH Clinical Center, known as “America’s research hospital”.’
- ‘A potentially fatal form of it is known as severe acute respiratory syndrome (SARS) 10.’

Functional Analysis of “known as”:

From these two concordance lines, the metadiscourse marker ‘known as’ is analyzed. Authors used this marker to inform the audience or to enhance the knowledge of the reader. ‘Known as’ is used in a sentence to tell the audience that the information is about this particular idea or object and the author wants to acknowledge the readers with it in order to provide them additional information and to clarify them. For instance, the author in the first concordance line provides the readers with the additional information about NIH clinical center by using the marker ‘known as’. Similarly, the author in the second concordance line while discussing about Covid informs the audience that one of its fatal forms is known as ‘acute respiratory syndrome’ and thus provide the readers with the additional information. This marker ‘known as’ is used in the text by the readers in order to guide and provide the audience the additional information.

- ‘The disease is caused by a coronavirus called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).’
- ‘The first module of cCBT, called the cognitive therapy module, aims to.....’

Functional Analysis of “called”:

From these two concordance lines, the metadiscourse marker ‘called’ is analyzed. Just like the marker ‘known as’, the marker ‘called’ also performs the similar function like ‘known as’. ‘Called’ is also a code gloss and it provides the additional information and the intention of the author here is to educate the audience about the medical terminology. For instance, the author in the second concordance line informs the audience about cCBT by using the marker ‘called’ and informs the readers it is also termed as ‘cognitive therapy module’. So, it can be inferred that the author here wants to provide the readers with the additive information. Same is the case in the first concordance line, the author while discussing about the disease informed the readers that it is caused by corona virus which is known as ‘severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)’ in the field of medicine thus clarifying and describing the information before the readers. So, the marker ‘called’ just like another typical code glosses intends to describe and clarify the information for the readers through the text and guides the readers through the text.

- ‘It is known that DL is a subset of ML. In fact, DL is exactly like ML as it functions in the same way.’
- ‘15.51% (56/361) felt that they received no helpful information. In fact, 91.97% (332/360) agreed that scientists should use infographics on social media for effective communication.’

Functional Analysis of “in fact”:

From these two concordance lines, the metadiscourse marker ‘in fact’ is analyzed. ‘In fact,’ is also a code gloss and it directs and guides the reader towards the very accurate information and to a very precise interpretation. For instance, the author in the first concordance line informs the readers that DL is a subcategory of ML and in the next line he used the marker ‘in fact’ in order to give the readers a very precise description of the DL that it is just like ML because both functions in the same way. The author in the second concordance line provides the data in the numerical form and presented the data before the readers with greater accuracy. The author has used the marker ‘in fact’ to provide the detailed information about the use of infographics by the scientists for effective communication on social media platforms. The author says that 332 out of 336 agreed upon this fact which makes 91.97% of the total. So, this marker basically leads and guides the audience to the actual facts and figures and provides them a very precise data.

- ‘Basic facilities such as access to separate washrooms, provisions of sanitizers, and separate entry and exit passage for HCPs remain a primary requisite during their off-hours.’
- ‘For this variable, we did not include other non-neoplastic diseases such as anemia or thalassemia.’

Functional Analysis of “such as”:

From these two concordance lines, the metadiscourse marker ‘such as’ is analyzed. So, this marker performs the function of clarifying and describing the idea, opinion or stance presented before the reader. For instance, the author in the first concordance line while discussing his opinion about basic facilities has presented his or her actual meaning before the reader by using the marker ‘such as’. The author has fully described what he means by the term ‘basic facilities’ by giving detailed examples included in basic facilities. The author in the second concordance line is discussing about the variable in which he informs the reader that non neoplastic diseases are not included. For further clarification and additional information, he has explained what are

non-neoplastic diseases are with the help of marker ‘such as.’ The author, then, informed the audience that anemia and thalassemia are exempted from the variable. So, just like typical code glosses this marker also illuminate and guides the readers through the text and helps the reading in finding the actual intention and meaning of the text and the writer.

- ‘Age was inversely proportional to the effect of obesity on poor outcomes. In other words, the estimated effects of obesity were lower in older patients.’
- ‘Of all those people dying within 1 year, it is likely that COVID-19 brings forward the death earlier in the year. In other words, there are competing causes for the mortality.’

Functional Analysis of “in other words”:

From these two concordance lines, the metadiscourse marker ‘in other words’ is analyzed. This marker is used by the author in order to rephrase the information for the readers to help them understand the data and idea in a better way and in order to get the actual meaning of the text. For instance, the author in the first concordance line expresses the idea that age and obesity are inversely related to one another and then the writer introduces the marker ‘in other words’ and rephrase the information for the audience and says that in older patients the projected effects are quite less and thus helps the reader to understand the actual meaning. Similarly, the author in the second concordance line informs the readers that Covid-19 is causing a great number of deaths of all the present causes and then he used the marker ‘in other words’ and rephrase the information for the readers to explain and describe the information before them in a clearer manner. So, this marker helps in rephrasing the data so that readers can get an insight into the actual meaning of the text and the actual intention of the writer. Overall, from all the discussion on the code glosses it can be inferred that being an Interactive Metadiscourse Marker it performs the basic function of guiding the readers through the text. The authors of the selected Covid-19 articles have used Code Glosses in a very rightful manner which can actually help the readers to get an insight into the meaning of the text and medical language.

Analysis of ‘Code Glosses’:

Code glosses are comments that define or translate technical or specialized vocabulary inside a text. They are useful in linguistics and language acquisition because they help readers understand jargon or unfamiliar words. These succinct remarks improve understanding without interfering with the main text's flow, making it more understandable to a wider audience. Code glosses are especially helpful in academic papers, literary translations, and instructional

resources because they let readers interact with the text while also better understanding complex terms or ideas. In order to help readers understand complex terminology, code glosses are small explanations of technical phrases or abbreviations found in medical research papers. Researchers, physicians, and readers from all backgrounds can more easily traverse the information thanks to these annotations, which improve the accessibility of complicated scientific literature. Code glosses make reading easier while still keeping the accuracy and precision necessary in medical discourse by providing brief explanations beside the main text. Within the larger scientific community, this method encourages effective communication and works to advance a common understanding of complex medical topics.

The analysis of the concordance lines of the subcategories i.e., (Transitions, Frame Markers, Endophoric Markers, Evidentials and Code Glosses) of the Interactive Metadiscourse Marker reveals that the authors of medical research journals have used the markers in a very rightful manner and have built the arguments in a very logical manner by using markers at the right places. This also has helped the authors to bring cohesion and coherence in their text and at the same time it has also helped in guiding and directing the readers through the text. The basic purpose of the markers is achieved well in the selected Covid articles. The authors have well incorporated Interactive Metadiscourse Markers in their writings which has made it easy to understand the language and overall discourse of the medical research journals.

4.11 Interactional Metadiscourse Markers:

Hedges:

- ‘After almost a year since the first case of COVID-19 was identified, vaccinations have been approved and the rollouts have begun in several parts of the world.’
- ‘We tested almost all patients undergoing procedure for Covid-19 2 weeks after procedure but for endoscopy staff, PCR testing for infection was only performed for symptomatic individuals and it risks under-reporting of disease as a significant percentage of infected cases remain asymptomatic.’

Functional Analysis of “almost”:

From these two concordance lines, the metadiscourse marker ‘almost’ is analyzed. Hedges instead of stating facts helps the writer in forming a proposition which seems subjective and author shows the element of doubt about a particular idea, thought or perception. It is the rationality which determines the reliability of the information rather than the perception of someone. The marker ‘almost’ in the text reveals that author is doubtful about the idea or

situation. For instance, the author in the first concordance line while explaining the time duration between the first case of Covid and the approval of vaccination has used the marker ‘almost’. It shows that author has some doubt about the time duration and therefore he has used almost with ‘a year’. In the second concordance line, the author has used the marker ‘almost’ with the patients to convey the idea that he is doubtful about the testing of all the patients. He has expressed his doubt by introducing the marker in the very start of his statement to show his clear intention and stance before the reader. He has expressed the idea that his approach to the idea presented in the text is uncertain and interact with the readers by informing them there are chances of the information to be false. So, the authors of the medical research journals use this marker to express their uncertainty and to clarify their intention before the readers.

- ‘While younger age might be a predictor of a higher recovery rate, it might not significantly contribute to faster recovery.’
- ‘The study showed that patients that had previous infections of hepatitis B virus (HBV) and hepatitis C virus (HCV) developed a more serious form of SARS-CoV-2 infection. (11)(22) It was hypothesized that this might be due to increased viral replication during a COVID-19 infection that can potentially worsen their current infectious state.’

Functional Analysis of “might be”:

From these two concordance lines, the metadiscourse marker ‘might be’ is analyzed. Hedges, as discussed in the above analysis, presents that the idea of the author in the text may be uncertain and not true. It explains the probability of idea to be wrong. Different markers have different probability of falseness. This marker ‘might be’ shows that there are higher chances of the particular idea to be true but still there is a little chance of it be false and thus bring the element of doubtfulness in the text. The author employs this marker in the text to engage the reader into the text by informing them about the uncertainty of the idea through its use. For instance, the author in the first concordance line employed the marker ‘might be’ to create doubt in the minds of the readers about the idea though young age might predict higher number of recoveries but it does not ensure fast recovery. Here, the author is confused about the relation between age and higher recovery rate but at that the somewhat believe in it. Similarly, the author in the second concordance line expresses the idea that hepatitis B and C patients have developed a chronic form of Covid. The author while explaining the potential causes of the idea show his doubtfulness over the opinion that it may be because of replication of the virus which worsen the state of the patients with the help of marker ‘might be’. He has believed in his statement but still he is not certain about his statement in the text. So, the authors

of the selected Covid-19 articles also employed this marker into their writing to express the uncertainty about the idea.

- ‘After the infection, an immune response’s attenuation was seen in the patients on Fingolimod and anti-CD20 monoclonal antibodies. This may be a critical finding in future vaccinations.’
- ‘An effective method may be cognitive behavioral therapy (CBT), which is widely used to treat mild to moderate depression and anxiety [17].’

Functional Analysis of “may be”:

From these two concordance lines, the metadiscourse marker ‘may be’ is analyzed. Hedges explain the extent of accuracy of the data presented by the author in the text. Just like ‘might be’ the marker ‘may be’ also shows uncertainty and makes the statement doubtful. This marker shows the probability of particular idea to be wrong or false is much higher as compared to that of marker ‘might be’. The author employs this marker into the text to explain the fact that he is having a clear doubt about the statement he has made in his writing. For instance, in the first concordance line the author expresses the idea that it was analyzed that after the infection, a resistant response’s reduction was seen in the patients on Fingolimod and anti-CD20 monoclonal antibodies. The author is not sure about the whether it is a critical finding or not and it is apparent in the text through the use of the marker ‘may be’. Similarly, the author in the second concordance line has used the marker ‘may be’ to express his doubt about the CBT (cognitive behavioral therapy) to be an effective procedure in the treatment of the depression and anxiety. Here, the intention of the author is to inform the readers that the uncertainty that is present inside the head of the author which he has presented in the text through the use of the marker and thus interact with the reader and establishes the connection between the reader and the author and reader and the text.

- ‘There are great differences in the results of previous research studies; the correlation between education levels and insomnia remains unclear, and our study provided a little evidence of that.’
- ‘Therefore, after the lockdown, the psychological sequelae are still unclear and the effects of mindfulness-based training during that period need to be investigated.’

Functional Analysis of “unclear”:

From these two concordance lines, the metadiscourse marker ‘unclear’ is analyzed. Hedges are introduced into the text with the intention of presenting the uncertainty and to raise a

question in the mind of the reader about the extent of accuracy, reliability and certainty of the idea presented by the author in the text. So, the author answers the question by incorporating different hedges in the text which have different probabilities. The probability of information to be false is determined by the specific type of the marker employed in the text by the author. If you interpret this marker ‘unclear’, then the probability of the idea to be false in which it is incorporated is very high. It shows the uncertainty of the author about the idea. For instance, the author in the first concordance line shows his uncertainty about the connection between the sleeplessness and education level with the help of marker ‘unclear’. Similarly in the second concordance line the author has expressed that the psychological illness after lockdown is still blurred and he seems confuse about it and it is evident through the use marker ‘unclear’ in the text. So, it can be inferred that authors of the medical research journal employ this particular marker in their writing to express uncertainty.

- ‘In April 2020 for example, the Chinese government required that all COVID-19 articles be centrally reviewed, perhaps slowing the rate of collaboration between countries (although we did not study this question).’
- ‘In addition, confinement to the family home may have increased levels of near work, perhaps including increased use of electronic devices.’

Functional Analysis of “perhaps”:

From these two concordance lines, the metadiscourse marker ‘perhaps’ is analyzed. Hedges are used in the text by the authors so that readers can acknowledge the uncertainty of the particular idea in the text. Hedges shed light on the unclear, uncertain and doubtful ideas, opinions, situations, perceptions and the information expressed by the author in the text. This marker ‘perhaps’ presents the notion that there is possibility of a particular idea to be true but not necessarily in every case. There is still a chance of the idea or situation to be impossible. For instance, the author in the first concordance line has used the marker ‘perhaps’ to show that the idea has a possibility but lacks certainty. The element of uncertainty prevails in the use of this marker as well. The author has presented the idea that Chinese government has asked for the central revision of the Covid related articles in April, 2020, which has possibly but not certainly has resulted in the leisurelier relationship between the states. Similarly in the second concordance line, the author has presented the idea that quarantine to the family home may have amplified heights of adjacent work, or even the possibility of including augmented use of power-driven devices. The author has expressed his uncertainty about the amplified use of electronic devices which is evident through the usage of the marker ‘perhaps’. So, the authors

of medical research journals use this marker to explain the idea has a possibility but it is uncertain and author shows doubt in the idea presented in the text.

Analysis of ‘Hedges’:

Hedges are metadiscourse symbols that are employed in speech to temper the force of assertions and signal uncertainty or modesty. They are used to control interpersonal dynamics and to assist speakers transmit information carefully while allowing for interpretive latitude. By tempering claims, hedges take into account the possibility of opposing viewpoints, encouraging more complex discussions and improving successful interpersonal communication. Hedges in medical journals act as metadiscourse markers by highlighting the tentative nature of scientific claims. Hedges are essential for maintaining the objectivity of medical research since they show that a researcher is aware of potential confounding factors. Authors encourage scholarly skepticism and readers to critically assess the facts by using hedges in their writing. Finally, the use of hedges in medical publications promotes open and ethical communication among scientists.

4.12 Boosters:

From these two concordance lines, the metadiscourse marker ‘it is clear that’ is analyzed.

- ‘We lack a robust surveillance system with advanced testing technologies able to rapidly identify such agents and react to them. It is certainly very expensive but undoubtedly cost-effective.’
- ‘Clinical care was certainly limited by COVID-19.’

Functional Analysis of “certainly”:

From these two concordance lines, the metadiscourse marker ‘certainly’ is analyzed. Boosters are used in the text in order to show certainty and clarity about a particular idea or information. It is used with the intention to shut down the chances of doubt in the text. It shows author’s confidence in a particular idea. Instead of diverging the readers into different direction, they converge the thoughts of the readers to a particular idea and thus interact with the readers and build a connection between reader, writer and the text. The author’s confidence in the particular statement is reveal to the readers with the help of Boosters. This marker ‘certainly’ emphasizes the fact that the author presented in the text. It shows that the chances of the idea to be true is high and it presents the belief that the author has in his text before the readers. For instance, the author in the first concordance line has used the marker ‘certainly’ with the idea that though it is no doubt that the Robust Surveillance System is very costly but at the same it

is very profitable. So, here the author with the use of ‘certainly’ has expressed his belief in the particular idea. In the second concordance line, the author has presented the idea that the clinical care is reduced due to Covid-19 and he is completely sure of it and this is evident through the use of marker ‘certainly’ by the author in the text. So, the authors of medical research journals present valid information before the readers and inform the validity of the data through the use of the marker.

- ‘We have clearly observed that most of the available datasets of Covid-19 are image datasets.’
- ‘Consideration of the relationship between epilepsy and COVID-19 is clearly important.’

Functional Analysis of “clearly”:

From these two concordance lines, the metadiscourse marker ‘clearly’ is analyzed. The marker clearly shows that particular idea presented by the author is a representative of the author’s clarity about the perception and thought he has presented in the text. It shows that the idea is valid because it is observable that it is clear-cut and well-defined. The distinctiveness of the idea is presented through this marker. For instance, the author in the first concordance line has presented that mostly available datasets are visual dataset and he has explained the validity of the idea with the introduction of marker ‘clearly’ in the beginning of the sentence. In the second concordance line, the author has used the marker ‘clearly’ with the idea that it is important to consider the relationship between the epilepsy and Covid-19. The author has used ‘clearly’ with important to emphasize the fact that it is no doubt should be brought into the consideration. So, it also shows the belief of the author in the particular idea and thus engage the reader into the text by explaining the probability of the idea to be valid and true. So, the authors of the medical research journals incorporate this particular marker into the text to clarify the information and to explain the validity of the idea and all the time maintaining the essence of Boosters that they boost the confidence of the reader in the text and the writer.

- ‘The future is always unsure.’
- ‘The cumulative onset cases were always within the uncertain range of the simulations.’

Functional Analysis of “always”:

From these two concordance lines, the metadiscourse marker ‘always’ is analyzed. This marker shows that the particular statement is true in every sense and there is no chance of falsehood in this argument. The idea is hundred percent correct and there is no probability of the idea presented in the text to be wrong. The author uses this marker when he is completely sure of the statement made in the text. It presents a very clear and certain fact before the readers and here author engages with the readers with the full confidence in the idea and it helps the reader to interact with the text. For instance, the author in the first concordance has stated a general truth that future is unknown and with the introduction of marker ‘always’, the author has closed the chapter of doubt or uncertainty regarding the idea. He exclaims that the idea is completely valid and it’s not a temporary stance or idea but a general permanent truth. In the second concordance, the author is talking about a very specific idea that growing onset cases fall in the uncertain range of reproduction and it is always true and the author has proven its validity by using the marker ‘always’ within the particular statement. So, medical research journals also present completely valid information to its readers and this is possible through the usage of marker ‘always’ with a particular idea in the text and thus interact with the readers.

- ‘Definitely, sterilized fantasy is near.’
- ‘Serological testing, predominantly including the colloidal gold method, chemiluminescence method, and enzyme-linked immunosorbent assay, has been widely used for the diagnosis of various infectious diseases and will definitely enhance the efficiency of diagnosis of COVID-19.’

Functional Analysis of “definitely”:

From these two concordance lines, the metadiscourse marker ‘definitely’ is analyzed. This marker explains the strength of the argument that the author has made in the text. It explains that the certain idea is unquestionable and undeniable and the author has full confidence in the validity of the argument. For instance, the author in the first concordance line has presented that idea that the sterilized fantasy is not a very far-reached idea. He begins the argument with the introduction of the marker ‘definitely’ which shows the powerful position of the idea in the text and here the author has explicitly expressed his intention with the help of this marker. In the second concordance line, the author has introduced that the idea that Serological testing is widely used method of diagnosing different infections and the author has full confidence that

it will improve the efficiency of detection of COVID which is evident through the usage of marker ‘definitely’ in the last part of the sentence. The authors of the medical research journals

- ‘Essentially, they combine words with simple images and organize information into a clear visual narrative [13, 14].’
- ‘They need not essentially signify the entire infection description which is the hypothetical input of the model.’

Functional Analysis of “essentially”:

From these two concordance lines, the metadiscourse marker ‘essentially’ is analyzed. Authors generally use this marker in their writings to emphasize a particular idea or to express the idea that the particular opinion or information is mainly true and it may be somewhat wrong but the probability of it to be true is high. The authors include this marker in the text to show certainty and clarity of the information presented in the text. For instance, the author in the first concordance line expresses the idea that words and pictures are assembled together in order to produce a clear visual narrative. But it can be observed that he introduces the marker ‘essentially’ prior to the idea in the text which means that the author is defining the probability of the statement before the readers and engaging the reader into the text by taking a stance that particular statement has more chances of being valid. In the second concordance line, the author states that there is no need to show the full description of the infection because it is the hypothetical model. The author introduces the marker ‘essentially’ before signify which indicates that the probability of not showing the entire description is high because it is not the need. The author, here, intends to show that the probability of the particular statement to be true is relatively high and thus providing a clear and concise idea to the readers. The authors of the medical research journal use this marker in the text with the intention of providing a clear data to the readers and to engage them into the text by allowing them to interpret the probability and validity of the idea.

- ‘Generally, we know that the vast majority of research partnerships begin face-to-face (Wagner 2009), ...’
- ‘We know that the authors are doing their best in these circumstances.’

Functional Analysis of “know that”:

From these two concordance lines, the metadiscourse marker ‘know that’ is analyzed. So, generally boosters shut down the chances of diversity in the text and sorts to present a clear and concise argument before the readers and here the author interacts with the readers by

showing their confidence in the particular idea. The marker ‘know that’ in the text shows that the argument author is going to build is based on truth and the author agrees to the idea he has presented. So, it expresses that the probability of idea to be true is high. For instance, the author in the first statement has used the marker ‘know that’ to make it clear to the readers that he considers the idea (i.e., beginning of research partnership is mostly face to face) truthful and has confidence in its validity. In the second concordance line, the author has presented the idea that authors are giving their best in the prevailing situation. In this idea, the author has incorporated the marker ‘know that’ to clarify the readers about his intention in the text that he or she wants to convey that they have higher level of belief in this particular statement. So, the authors of the medical research journals have incorporated this marker in their writing with a purpose of interaction with the audience and to clarify the readers about their stance.

- ‘It is well-known that not all the techniques are fit for every data.’
- ‘Hypocortisolemia is well-known in depression and yoga has been demonstrated to reduce the parameters of stress, including cortisol levels.’

Functional Analysis of “well-known”:

From these two concordance lines, the metadiscourse marker ‘well-known’ is analyzed. Boosters show the confidence of the writer in the text. It explains the degree of certainty and how much clarity can be observe in the text and it is evident through the use of Boosters in the text. The particular marker ‘well-known’ presents that author has a great confidence in his ideas and opinions and this marker indicates that the idea presented in the text are already recognized and the author admits the popularity of the idea. For instance, the author in the second concordance line has used the marker ‘well-known’ for Hypocortisolemia that it is an acknowledged condition in stress and it is a very common condition. Similarly, the author in the first concordance line has used the marker ‘well-known in order to incorporate the idea in the text that people are already well aware of the fact that not all techniques and methods are suitable for every type of data. So, this marker ‘well-known’ shows that the author has full confidence in the fact, idea, opinion or the statement he is presenting before the readers. Thus, the authors of the selected Covid articles have incorporated this marker with the same intention as mentioned above.

From the all the above-mentioned discussion on the Boosters, it can be inferred that these markers express to the point and clear-cut data and perform the function of maintaining the validity of the idea. They show the certainty of the author in the particular idea and at the

same time boost the confidence of reader and the author in the text. From the analysis of the concordance lines, it can be inferred that the authors in the selected Covid-19 articles use Boosters to reinforce their ideas and opinions and to form a valid and concise argument to make it believable for the reader.

Analysis of ‘Boosters’:

The linguistic components known as "boosters," or metadiscourse markers, direct readers through a text to improve understanding and coherence. Boosters serve as signposts, highlighting information and defining the author's position. By highlighting ideas, boosters play a crucial role in scholarly, persuasive, and informational writing as well as in the promotion of good communication. By doing this, they improve the relationship between the author and the reader, resulting in speech that is more powerful and comprehensible. Booster metadiscourse indicators are used in medical research journals to emphasize the importance of discoveries. Boosters in the discourse surrounding medical research improve objectivity and facilitate interpretation, ensuring that readers understand the significance of the findings and their possible effects on healthcare. The development of an effective communication channel between researchers and the medical community depends heavily on these linguistic tools.

4.13 Attitude Markers:

- ‘I agree with the above statements and declare that this submission follows the policies of Solid-State Ionics as outlined in the Guide for Authors and in the Ethical Statement.’

Functional Analysis of “I agree”:

From this concordance line, the metadiscourse marker ‘I agree’ is analyzed. So, this marker expresses the approach of the writer towards a particular idea in the text. The author used this marker to interact with readers and to become an active entity in the text and to express his attitude and stance before the readers. For instance, from the above concordance lines it can be inferred that the author has shown his agreement with the statement or idea expressed in the text and it is clear to the readers through his use of marker ‘I agree’. In this particular example, he claims that he agrees upon the statements mentioned above that they follow the policy of Solid-State Ionics as it is mentioned in the Author’s Guide and Ethical Statement. However, it is quite surprising that it is used only one time in hundred Covid articles which shows that authors have not shown agreement upon their statements and ideas. So, this marker is used to show agreement rather than expressing truth and fact.

- ‘Drug repurposing hopefully provides a way to develop avoidance and cure policies for COVID-19.’
- ‘Hopefully, further studies will emerge to help guide treatment strategies to optimize success with vaccination protocols while minimizing treatment interruption risks.’

Functional Analysis of “hopefully”:

From these two concordance lines, the metadiscourse marker ‘hopefully’ is analyzed. The grammatical category of the marker ‘hopefully’ is an adverb and it shows that author has an optimistic approach towards a particular idea or opinion in the text. This marker shows the positive approach of the author towards a particular idea and statement. For instance, the author in the first concordance line has used the marker ‘hopefully’ to express his positive attitude about drug remodeling that it will help to avoid and cure Covid-19. The author in the second concordance line has used the marker ‘hopefully’ which expresses his optimistic point of view about the emergence of the further studies which will serve the humans in the different ways i.e., will guide about the strategies related to the treatment which will heighten the success through the vaccination conventions and will lower the risks of interruption in the treatment. So, this marker instead of focusing on providing the readers with facts and figures, establishes the connection between the author and the reader and also explains the positive approach of the author in the text and thus become a source of interaction between the reader and the writer.

- ‘Surprisingly, only a small percentage of the responders noticed an improvement in their personal health in this period.’
- ‘In general, and somewhat surprisingly, the trend of publication shares of each country (Fig. 1) mirrors the trend of newly confirmed cases of COVID-19 in the selected countries.’

Functional Analysis of “surprisingly”:

From these two concordance lines, the metadiscourse marker ‘surprisingly’ is analyzed. This marker presents the emotive side of the writer before the reader in the text. It presents the element of astonishment and shock over a particular statement and shows that the idea presented in the text is somewhat difficult to belief and it does not conform to the facts and ideas presented before. So, in such cases the author uses this particular marker ‘surprisingly’ in order to show his disbelief and to convey his or her understanding of the idea in its actual and precise manner and thus create a sort of contact with the reader. For instance, the author in the first concordance line expresses his disbelief that only a small fraction of the respondents

has noticed betterment in their personal health during this period with the help of the marker ‘surprisingly’. In the second concordance line author has explained the degree of his astonishment about the trends of shares of publication of each country with the help of marker ‘surprisingly’ and interact with the readers that the trends follow the number of new cases in the selected states. The author has also used ‘somewhat’ with ‘surprisingly’ which explains the degree of the emotion that the writer feels and present the notion and intention of the writer in a very rightful manner before the audience. So, this marker explains the behavior and attitude of the writer to the readers which help them to understand the intention of the writer and thus sort of interact with the writer and text.

- ‘Fortunately, 17 cities of Hubei province were under lockdown from January 23 to 26 [Supplementary Table 5, <http://links.lww.com/CM9/A210>].’
- ‘The study was supported by three breast cancer clinicians from Wuhan, Hubei fortunately.’

Functional Analysis of “fortunately”:

From these two concordance lines, the metadiscourse marker ‘fortunately’ is analyzed. According to the grammatical category, the marker is an adverb and modifier and Hyland classified it as Attitude Marker. So, the marker reflects the author view about a particular statement that he or she considers the idea, opinion, situation or an action good enough. The marker shows that the attitude of the author towards a particular statement is quite good. For instance, the author in the first concordance line considers the particular situation good when lockdown was implemented from January 23 to 26 in the 17 cities of Hubei, as it clears from the use of marker ‘fortunately’ by the author in the text. Similar to this, the author used the marker ‘fortunately’ with the information that three breast cancer clinics from Wuhan were in favor of this study which means he is feeling good about it and also expresses his attitude before the readers through the usage of the marker. So, this marker like typical Attitude markers reflects the author’s stance and his emotions and feelings about the particular statement in the text. On a whole, the authors of the selected Covid articles have well incorporated their emotions and feelings in their writings and thus interact with the readers by expressing their personal thoughts and feelings into the text and this make an author an active entity in the text.

Analysis of ‘Attitude marker’:

A metadiscourse marker known as an attitude marker expresses the speaker's opinion, feeling, or posture toward the subject under discussion. It aids in expressing the speaker's own

opinion and shapes how the listener interprets the data. These indicators improve the overall clarity and impact of the content being communicated by introducing nuance and a personal touch. In publications on medical research, attitude markers act as metadiscourse cues that reveal the author's viewpoint or assessment of the study's results. A reader reaction that is informed and critical is facilitated by attitude indicators in medical research discourse, which also contribute to the overall clarity and contextualization of the offered findings.

4.14 Self-mentions:

- ‘But I have seen that in educated families also so it is not surprising that gender-based violence will increase.’
- ‘Although not clinical active, I am embedded in an academic medical center.’

Functional Analysis of “I”:

From these two concordance lines, the metadiscourse marker ‘I’ is analyzed. This marker ‘I’ is a first-person personal pronoun and explicitly ensures the presence of the author in the text and here the author directly conveys his opinion in front of the reader. Through this marker the writer takes the upfront position and overtly expresses his idea. For instance, by using the marker ‘I’ in the first concordance line the author is sharing his first-hand experience with the readers and telling them that he can see that gender-based violence will intensify because he has observed it even this in the educated families. Similarly, in the second concordance line the author is sharing his personal information with the readers and informing them that he or she is not clinically active but more into the academic medical center. This is evident through the marker ‘I’ in the particular statement. From these two examples it can be inferred that sometimes it become impossible for a writer to elude from the text because a text is itself the idea, opinion and interpretation of the writer and sometimes as a choice writer expressed himself or herself into the text in order to directly interact with the reader or sometime to share his own personal experiences and preferences. So, this marker is the best example of the Self-mentions Markers. The authors of the medical research journals also sometime appear in the text with the different intentions as discussed above and this help the readers to understand the perception of the writer.

- ‘We also collected the clinical information of 90 people from the healthy cohort in our biobank.’
- ‘Theoretically, we are affected by the scarcity of mask supply like other nations or countries.’

Functional Analysis of “we”:

From these two concordance lines, the metadiscourse marker ‘we’ is analyzed. In the category of the Self-mentions, the marker ‘we’ is a first-person plural personal pronoun and it ensures the presence of more than one person in the text. Just like the marker ‘I’, ‘we’ also ensures the presence of the authors in the text and it explains the combined perception, ideas and opinions of the authors in the text. Sometimes, the marker presents a group of people, a nation etc. For instance, the author in the first concordance line uses the marker ‘we’ and interact with the audience and talk about the collection of the clinical information. It can be inferred from this concordance line that here author is referring to himself and his fellow who collected this information. So, the writer here explicitly presents the authors of the text. Similarly, in the second concordance line the marker ‘we’ used by the author refers to his whole nation. Here, the author uses ‘we’ to present his nation and it is evident through the comparison i.e., like other nations, we too, are suffering from the scarcity of the mask. So, from these examples it can be inferred that this marker is used by the author to show the plurality and as well as the presence of the author or authors in the text.

- ‘I understand that my title and abstract will remain visible to all users.’
- ‘They somewhat hindered my understanding 12 (3.32)’

Functional Analysis of “my”:

From these two concordance lines, the metadiscourse marker ‘my’ is analyzed. ‘My’ is a determiner and it creates a sense of belonging or relation with the certain idea, concept, thing or perception. The presence of this marker in the text ensures the explicit presence of the author in the text and through this writer interacts with the reader. In the text, ‘my’ is used by the author in order to engage his readers with himself and to express his relation with certain idea. For instance, in the first concordance the author ensures his presence in the text by using the marker ‘my’. The author states that ‘my title and abstract’ will be available to all the user. Here, the intention of the author is to show his or her belonging to the title and abstract of a paper. So, in this sense it develops the understanding between the author and the readers. Similarly, the author in the second concordance line uses the marker ‘my’ to share his personal experience. The author is expressing the idea that he feels hindrance in understanding things. With the use of the marker, the author has interacted with the readers by making it clear that he is talking about his own understanding and this also ensures the presence of the author in

the text. So, this marker performs the function of expressing the belonging with a certain opinion or idea and also a way to interact with the readers.

- ‘This reduced our capacity to compare and contrast provider experiences directly, though it provided an opportunity to describe provider experiences when virtual care was being used for a longer period of time.’
- “‘Our COUNTRY is shut down, not because of a black guy, but because of a white guy @realDonaldTrump#COVID19”.

Functional Analysis of “our”:

From these two concordance lines, the metadiscourse marker ‘our’ is analyzed. ‘Our’ is a first-person plural possessive determiner. It presents a sense of belonging and association to a group of people. The author used this marker to interact with the audience which is the basic function of any Interactional Marker and being a Self-mention, it ensures the presence of the author in the text. As the text is the image of the author’s perception so authors do appear in the text to express their thoughts and ideas in an explicit way. For instance, the author in the first concordance line uses the marker ‘our’ with capacity so, here the author intends to show the readers that he is talking about the capacity of someone which includes the author as well. The author in the second concordance line has used the marker ‘our’ with the terminology ‘country’ to show the sense of belonging to a state. It can be inferred from this statement that the author of the text is an American and interacting with the audience that it was not because of some black person but rather it was Donald Trump who shut the country during the Covid-19. So, here the use of marker ‘our’ shows that author is an American too and thus the author interacts with the audience and through the text reveal his identity before the readers. Self-mentions are an authoritative rhetoric which ensures the presence of the author in the text. The authors of the medical research journals used Self-mentions in their writings to include themselves into the text and to explicitly interact with the readers by taking an upfront position in a text.

Analysis of Self-mentions:

In academic or business writing, self-mentions, a metadiscourse marker, entail identifying oneself as the author. Self-mentions help readers comprehend the author’s position and lend authority to the material being conveyed. These indicators further the transparency of the author’s contributions and show their dedication to the subject matter. Self-mentions in academic writing help to create authorial accountability and make it easier to communicate

complicated ideas, leading to a more involved and knowledgeable reading experience. In medical literature, self-mentions are essential for establishing author accountability, bolstering the reliability of findings, and assisting readers in evaluating the researchers' impact on the information presented. These factors all contribute to a more thorough and reliable understanding of the study's findings.

4.15 Engagement Markers:

- ‘With our definition of overall excess deaths, combining direct and indirect effects among those with and without infection, it is reasonable to consider that a high proportion (e.g., 80% of the population) might be affected by the COVID-19 emergency.’
- ‘Another aspect is to consider that crises exacerbate scarce resources, health complication, and challenges in medical education — including urgent de-prioritization or complete suspension of time-sensitive medical curricula out of deference to immediate public health needs.’

Functional Analysis of “consider that”:

From these two concordance lines, the metadiscourse marker ‘consider that’ is analyzed. The engagement markers directly involve the readers into the text by allowing them to interpret and evaluate the data presented by the author in the text. This marker ‘consider that’ directly involves the readers into the text and here the intention of the author is to interact with the audience and make them an active entity in the text. The author wants its readers to pay close attention to the idea or the opinion he or she is going to express in the text and to analyze it carefully. For instance, the author in the first concordance line while talking about the excess of the death rate and different combinations wants the readers to believe that it is judicious that almost 80% population is influenced by the Covid emergency and this is evident through the use of the marker ‘consider that’ and this clearly expresses the intention of the author that he wants his readers to think about it and evaluate the information. Similarly, in the second concordance line the author wants its readers to evaluate another important aspect by introducing the marker ‘consider that’ in the text. He directly involves the readers into the text by asking them to interpret over the idea that crises amplify the scarcity of resources and cause complications in health and intensify the challenges in the field of medicine. So, through this

marker the author wants its audience to become a part of the text and apply a certain lens through which they can interpret the idea of the text.

- ‘It is worthy to note that some studies have used higher doses of vitamin C in their patients [39, 40].’
- ‘We should note that the damage of COVID-19 has propagated far beyond the healthcare sector into almost all other industries.’

Functional analysis of “note that”:

From these two concordance lines, the metadiscourse marker ‘note that’ is analyzed. So, just like a typical Engagement marker, the marker ‘note that’ is used by the author in order to bring an idea into the notice of the reader and to engage them in the text. This technique is used by the author in order to gain the total attention of the reader and to bring a particular idea or fact in front of the readers. For instance, in the first concordance the author is discussing about the different doses of Vitamin C in the patients while conducting the studies. The author has used the marker ‘note that’ to explain the fact that it is worthwhile to bring the attention of the readers to the idea that some studies have preferred higher dose of VITAMIN C. In the second concordance line, the author has used the marker ‘note that’ in order to engage his readers into the text and wants his readers to ponder over the fact that the destruction caused by the Covid-19 has far reaching impact and almost all sectors are influenced by it. Just like any other Engagement marker, this marker too engages the readers into the text and establishes connection between the author and the reader by allowing them to interpret and analyze the text.

- ‘By viewing the results at different days of hospitalization, one can see that at discharge, both groups had values below the threshold of considering as fever.’
- ‘However, we do see that China-USA collaborations are resilient in the earliest months.’

Functional Analysis of “see that”:

From these two concordance lines, the metadiscourse marker ‘see that’ is analyzed. This marker allows the readers to speculate a particular idea, opinion or perception expressed by the author in the text and it directs the readers towards a particular interpretation of the text. It specifies the attention of the reader to a particular stance that the reader should focus on. For instance, the author in the first concordance line uses the marker ‘see that’ so that readers can speculate that results on the different days show that both groups have values which cannot be

considered as fever. So, here the intention of the author is to bring this particular idea into the notice of its readers. The author in the second concordance line has used the marker ‘see that’ in order to explain the perception that everyone has observed the strong collaboration between China and America in the early months. So, here the intention of the writer is to involve the reader directly into the text and to give it a thought again. So, the authors of the medical research journals incorporate this particular marker into their writings so that they can speculate a particular idea or to reinforce the idea upon the readers.

- ‘We also should consider differences in dates and countries.’
- ‘Broad definitions of HCP consider any professional that contributes to people’s well-being as an HCP.’

Functional Analysis of “consider”:

From these two concordance lines, the metadiscourse marker ‘consider’ is analyzed. So, through the use of this marker the author wants its readers to bring a particular idea or perception into their consciousness of the reader so that they can interpret, analyze and evaluate the particular idea according their own perception and mindset. This helps the readers to directly take a rhetorical position in the text and allow them to have their own interpretations. For instance, the author in the first concordance line uses the marker ‘consider’ to engage the reader with himself or herself in the text that it is evident when he said that we should bring into the notice the variances in the dates and states. So, here the intention of the author is to pinpoint a specific idea which should be brought into the light. In the second concordance line, the author tells the readers that the extensive description of HCP includes professional who contributes in the wellness of the people. So, here author conveys the idea that HCP reflects and includes the professional with a specific goal. The marker ‘consider’ here means that author wants the readers to understand that HCP reflects and contemplates as mentioned above. So, from these examples it can be inferred that this marker allows the readers to engage into the text and allows them to involve their consciousness into the text and thus become an active entity of the text. On a whole, concordance lines of the Engagement Markers reveals that the authors of medical research journals have used the markers in a very rightful manner and along with transmitting the information to them they also directly involve the readers into the text.

Analysis of ‘Engagement markers’:

A linguistic component known as an engagement marker denotes active participation, interaction, or interest in communication. It might be a statement, phrase, or nonverbal cue that

shows a speaker is paying attention or invites participation from the audience. These cues promote connection and understanding between participants, which helps communication flow more smoothly. Engagement markers can be used in written discourse to address the reader directly. An engagement marker is a language technique used in medical journals to connect with the reader and encourage active involvement and comprehension. Engagement markers in medical literature help readers better understand the research by generating a sense of interaction and common understanding. This promotes a deeper engagement with the information being presented and increases the efficacy of knowledge as a whole.

The analysis of the concordance lines of the subcategories i.e., (Hedges, Boosters, Attitude Markers, Self-mentions and Engagement Markers) of the Interactional Metadiscourse Marker reveals that the authors of medical research journals have used the markers in a very rightful manner and have built the arguments in a very logical manner by using markers at the right places and also ensure that they interact with the readers while maintaining the essence of the text. This category is concerned with the evaluative and analytical description of the text and at the same time author connects itself to the reader and the text and as well as creating a bond between the text and the reader. It reveals the basic purpose of the metadiscourse markers is achieved well in the selected Covid articles. The authors have well incorporated Interactional Metadiscourse Markers in their writings which has made it easy to understand the language and overall discourse of the medical research journals.

Discussion:

Based on Hyland's taxonomy (2005), this dissertation is an attempt to find the exact frequencies of the metadiscourse markers used in COVID research articles. Part A of the data analysis reveals that interactive markers are preferred by the writers of medical research journals. This study shows contrast with the study conducted by Mina and Biria (2017) which states that medical sciences articles prefer interactional markers. This dissertation is in line with the study of Mozayan, Allami and Fazilatfar (2017) which shows that English writers of medical research used much more self-mentions and it is also evident in this study as it makes up to 75.635% of the total interactional markers.

Cao and Hu conducted research for the interactive markers i.e., transitions and evidentials and it varies across different disciplines and through the present study it is revealed that transitions are the most used metadiscourse markers in both the interactive and interactional categories. This dissertation is also in contrast with the study conducted by Faghih

and Rahimpour (2009) which shows that hedges are the most used interactional markers while here the frequencies reveal that self-mentions are the most used interactional markers in COVID articles.

According to the findings of Ghadyani and Tahririyani (2015) Iranian ISI writers exhibit an excessive use of transitions, evidentials, and code glosses. The Iran ISI group may therefore be more concerned in openly establishing the texts and orienting the readers in order to provide them the assistance they need to grasp the material, in line with Shokouhi's (2009) argument. This study lines with the current research as well as authors prefer interactive markers much more than the interactional markers in order to guide the readers through the text and to provide them the logical connections. Although the effects of overgeneralization and interference between English and Persian can also be taken into account, Crismore and Abdollezadeh (2010) contend that the primary cause of the overuse of interactive markers is that authors struggle to be accepted by ISI journals because they may need to compete for a research space due to the larger size of the discourse community and the higher likelihood of audience rejection. As a result, authors use interactive markers more frequently which can be one of the reasons for the writers of Covid articles to use interactive markers extensively in their writings.

CHAPTER 05

MAJOR FINDINGS AND CONCLUSION:

Major Findings:

This dissertation is a Corpus-based study of the metadiscourse markers in the selected hundred research articles related to Covid-19 published in well-known medical research journals from all over the world. The selected articles are analyzed according to the Hyland Model of Metadiscourse and the tool for analysis is Antconc Software. With the help of Antconc software, frequencies of the Metadiscourse Markers are calculated and along with that concordance lines are also selected for the analysis of the markers to understand the functions of metadiscourse markers in medical research journals. From the frequency tables, the percentages are further calculated and which helps in finding the preferred metadiscourse markers. The results of the analysis are as follow.

Within the category of Interactive Metadiscourse Marker which makes up to 83.899% of the total metadiscourse markers, the most preferred in this category is Transition Metadiscourse Markers which makes up the 90.117% of the total Interactive Metadiscourse Markers. In the category of Interactive Markers, Code glosses are on the second position on the scale of preference and make up to 4.758% of the total Interactive Markers. Number three on the scale of preference is Endophoric Markers and their percentage contribution in Interactive Metadiscourse Marker is 3.105%. Evidentials are on the fourth position on the scale of preference and their percentage is 1.916%. Last on the preference scale is Frame Markers and their percentage is 0.385% which is almost negligible in the case of Interactive Metadiscourse Markers. So, from this it can be inferred that Transitions are most prominent and most preferred Interactional Metadiscourse Markers and the authors of Covid related articles have made a great use of the Interactive Markers.

Within the category of Interactional Metadiscourse Marker which makes up to 16.100% of the total metadiscourse markers, the most preferred in this category is Self-mentions Metadiscourse Markers which makes up the 75.635% of the total Interactional Metadiscourse Markers. In the category of Interactional Markers, Hedges are on the second position on the scale of preference and make up to 20.680% of the total Interactional Markers. Number three on the scale of preference is Boosters and their percentage contribution in Interactional Metadiscourse Marker is 2.566%. Engagement Markers are on the fourth position on the scale of preference and their percentage is 0.660%. Last on the preference scale is Attitude Markers

and their percentage is 0.457% which is almost negligible in the case of Interactional Metadiscourse Markers. So, from this it can be inferred that Self-mentions are most prominent and most preferred Interactional Metadiscourse Markers and the authors of Covid related articles have used Interactional Metadiscourse Markers in a very less number as compared to Interactive Metadiscourse Markers.

On the cross comparison of the subcategories of Interactive and Interactional Metadiscourse Markers, the authors have used Transitions in a very great number and they stand on number one on the scale of preference. Second, most used marker is from Interactional category and that is Self-mentions. On the scale of preference, Hedges from Interactional Marker stands on number three. On number four, the medical researchers prefer Code Glosses from Interactive Metadiscourse Markers in their writings. On fifth number, Endophoric Markers from Interactive category are preferred by the authors. According to the preference scale, Boosters from Interactional Category and Evidentials from Interactive category are on the sixth and seventh positions respectively. However, the Engagement markers and Attitude markers from Interactional category and Frame markers from Interactive category are used in almost negligible number and thus secured eighth, ninth and tenth positions on the preference scale respectively.

The second important aspect of this dissertation is the analysis of the concordance line from the hundred selected Covid articles. The detailed analysis of the concordance lines in the data analysis reveal that the authors have presented the information in the actual sense and meaning through the usage of metadiscourse markers in their writings. The authors have incorporated Metadiscourse Markers in their writings which serve the function of understanding the language and discourse of Covid related articles. The analysis of the concordance lines reveal that each marker used in the text of Covid-19 performs its function in a very rightful manner which resulted in the development of a well-organized and comprehensible text. The markers, as the concordance line show are used by the authors in their right places so that authors can strengthen their arguments in their writings.

As evident from the analysis of concordance lines of the Interactive Metadiscourse Markers that they perform the same function in the medical research journals as they are used in literary and academic research related to language. The authors have used the Interactive markers to guide and direct the readers through the text and to present a sound argument before them. The analysis of the concordance lines of the Interactional Metadiscourse Markers reveals that authors of the medical research journals have employed these markers in their writings just like the authors of academic research journals. The authors have used the Interactional Markers

in their writing in order to engage with the readers through the text and through the help of these markers the text become a bridge between the writer and the reader. It can also be inferred that the writers of the Covid-19 articles have strictly followed the Hyland Model of Metadiscourse in their writings. So, all this resulted in providing the readers with a well-organized and a well-built argument.

Conclusion and Implications:

From the major findings, it can be concluded that the authors of the selected Covid-19 articles are much more inclined towards guiding and directing the readers rather than interacting with them. So, the authors in COVID articles are more inclined towards using Interactive Metadiscourse Markers in their writings but also have made considerable use of Interactional Metadiscourse Markers which is quite evident from the frequencies and percentages of the metadiscourse markers. The purpose of the authors is to build logical connections in the text to present a cohesive and a coherent argument before the readers. Along with this, authors have also engaged the readers in the text and also explained their ideas, opinions and stance before the readers. In sum, from the frequency tables it can be inferred that the authors have used a mixture of Interactive and Interactional Metadiscourse Markers in the Covid-19 articles in order to convey the information and data about Covid-19 in the best possible way.

The use of metadiscourse markers is essential for directing readers through the text, assisting understanding, and improving reader-writer interaction. Effective use of metadiscourse markers substantially help informing and interacting with readers to explain intended meanings in medical writing, where effectively communicating complicated information is vital. Metadiscourse markers perform the following functions in the medical texts which helps the authors to convey their intended meanings before the readers. The functions are;

Structure and Organization:

Introduction clauses and other metadiscourse cues might reveal a text's general structure. This can make it easier for readers to follow the information flow and move between parts like introduction, methodology, findings, and discussion in medical writing. Readers can be successfully guided by statements like "In the following sections, we will explore..." or "To illustrate this point, we will discuss..."

Simplifying Content:

Complex ideas, terminology, and data are frequently found in medical writing. Such material can be made clearer by the use of metadiscourse markers like definitions,

justifications, and elaborations. These indicators make sure that readers correctly comprehend the terminology, processes, and conclusions. Examples of sentences that might help with comprehension are "To clarify this concept, we define X as..." and "In simpler terms, this process involves..."

Postulating Significant Material:

Whether it's a crucial piece of evidence, a noteworthy result, or a significant consequence, metadiscourse markers can be used to highlight essential points. Important information may be emphasized by using expressions like "Importantly, our study reveals that..." or "It is important to note that..."

Handling Reader Prospects:

By previewing forthcoming content, effective metadiscourse markers can control reader expectations. This strategy can help readers comprehend the relevance and goal of the material they are going to read. To set the stage for subsequent information, use sentences like "Next, we will delve into the mechanism of..." or "Before we proceed, let's examine the background of..."

Linking Ideas:

Complex arguments and conversations in medical writing can entail a number of interconnected ideas. By highlighting their connections and preserving coherence, metadiscourse markers may be used to link various concepts. Examples of linking concepts together include the expressions "Building on the previous point, we can infer that..." or "This supports our earlier assertion that..."

Active Reader Interaction:

Metadiscourse indicators can help readers interact with the text by promoting their participation. This may entail raising concerns, making implications, or encouraging more research. You may encourage reader participation and thought by using questions like "Can you think of other applications for this technique?" and "Consider the potential implications of this finding..."

Expressing Assurance and Vagueness:

It's critical in medical writing to communicate the degree of confidence ascribed to certain assertions and discoveries. Writers can show confidence or admit regions of ambiguity by using metadiscourse markers. Degrees of confidence can be effectively communicated using phrases like "Our findings strongly suggest that..." or "Further research is needed to confirm these results..."

From the analysis of the concordance lines in this dissertation it can be concluded that the authors use the precise and effective use of both Interactive and Interactional Metadiscourse Markers in the medical writings so that they can convey the intended meanings in a more structured and precise manner. In this dissertation both the syntactic and functional nature of metadiscourse can be observed through the analysis of the concordance lines. Metadiscourse is characterized by its syntactic features as a linguistic characteristic that is concerned with the text's structural evolution. Regarding the functional side of metadiscourse, it focuses on how the real goal of communication is accomplished. According to a functional analysis of metadiscourse, a text's precise and logical description must pay attention to how language is used during text development as well as the objective that the author intended to pursue while writing the text as a whole. Therefore, it can be concluded that metadiscourse concentrates more on the intended meaning than the structural aspects.

From the above-mentioned discussion, it can be concluded that this research is a best attempt to fulfill the objectives mentioned-above. This research with the help of Antconc Software and the Hyland Model of Metadiscourse Markers analyzes the metadiscourse markers used in medical research journals. The results of the study can be beneficial for the researchers especially for the cross comparison and to understand the functions of the metadiscourse markers in great detail. As far as the limitation of the dissertation is concerned, it is just limited to English Covid related articles from a much broader category of pure sciences. It has a very vast scope and can be subjected to further research and can be taken to advance level.

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