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**ARTICLE**

# Hedging in Medical and Pharmaceutical Academic Writing

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## ABSTRACT

The use of the English language as the global and universal language of science and technology has led English to be the main language in scientific articles. This study, in particular, aims to analyze how frequently different categories of hedging are used in 50 medical and pharmaceutical articles, with 25 articles written by female writers and 25 articles written by male writers. The data is analyzed qualitatively. The results show that there are no significant differences between male and female writers in the use of hedging devices in writing medical and pharmaceutical articles. The findings reveal that the modal verbs are considered the most used hedging devices with 1539 occurrences, while the lexical verbs are considered the least used hedging devices with 29 occurrences. In support of previous literature, it concludes that hedging devices are employed as communicative tactics to qualify writers' commitment, lessen the impact of the researchers' claims, convey probability, preserve the writers' reputation, influence readers, and prevent any potential rejection of their claims. Moreover, the findings indicated that the use of hedging devices was an inevitable strategy that could allow writers and authors of scientific genres to present their findings more effectively and precisely, therefore saving their face from any criticism in the future.

***Keywords:*** Medical; Pharmaceutical; Hedging; Academic Writing

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ARTICLE INFO

Received: 30 May 2025 | Revised: 17 June 2025 | Accepted: 1 July 2025 | Published Online: 17 July 2025
DOI: https://doi.org/10.30564/fls.v7i7.10269

CITATION

Alshbeekat, A., 2025. Hedging in Medical and Pharmaceutical Academic Writing. Forum for Linguistic Studies. 7(7): 758–769. DOI: https://doi.org/10.30564/fls.v7i7.10269

# 1. Introduction

Reading English clinical articles is one of the greatest challenges for both native and non-native speakers of English as these articles include some technical terms that are hardly understood, so health experts use simplified expressions when they attempt to reach people from different backgrounds. Discourse plays a vital role in communication. It helps people to communicate with each other regardless of the field they are discussing (e.g., fashion, medicine, teaching and technology). There are different types of discourse, one of which is the medical discourse. Medical discourse has been defined by Wilce (2009) as "discourse in and about healing, curing, expressions of suffering and any other language ideologies"[1]. This type of discourse is described with specific terminology which is used by certain specialized people, such as doctors, nurses and physicians. Like any type of discourse, the medical discourse has its own language, features, principles, and characteristics.

The study of medical discourse started in the 1990s when the field of English for Medical Purposes (EMP) was developed and English began to be used as the lingua franca in science and medicine[2].

Krulj, Prodanovic and Trbojevic (2011) stress that, "It is well known that English is the leading language of medical sciences"[3]. Communication in English has been indispensable throughout the history of medicine.

According to Zuck and Zuck (1986)[4], hedges refer to the "the process whereby the author reduces the strength of what he is writing" in case the reported news turns out not to be true. They try to extend the scope of hedging in a way that draws on pragmatic uses of the term in language.

Various medical articles were published about this topic, in which this study aims to investigate the use of hedging devices in a number of medical articles[5–9].

The questions of this study attempt to answer are as follows:

What are the hedging devices used in medical and pharmaceutical articles?

Are there any differences in using the hedging devices among male and female writers?

# 2. Literature Review

Hyland (1996) stated that the concept of hedging can be referred to as "linguistic strategies which qualify categorical commitment, expressing possibility rather than certainty"[10].

Much of the literature on medical discourse pays particular attention to academic and scientific genres. For example, Csongor and Rébék-Nagy (2013) investigated the use of hedging devices in five popularized medical articles on prenatal vitamins[11]. The findings of the study revealed that different types of hedges were used, namely, auxiliaries, epistemic verbs, approximates and adverbs to express uncertainty and politeness. Moreover, hedging devices were used to show that the writer was not responsible for the truth of the information. Similarly, Zhao and Wu (2013) examined 100 abstracts of medical research articles written in English[12]: Fifty written by Chinese writers and fifty by English native speakers which were published in the Chinese medical journal and the Lancet medical journal, respectively, between May and July 2012 in order to compare the discourse structure and the linguistic features that characterize the articles' abstracts of the two journals. The researchers concluded that the abstracts written by the English native speakers and the ones written by the Chinese writers comprised four parts: Stating announcement of the present research (move 2), methods (move 3), results (move 4) and conclusion (move 5), respectively. Moreover, while the abstracts written by the English native speakers contained part one stating the research background (move 1), move 1 was almost absent in the abstracts written by the Chinese researchers. As for the linguistic features, contrary to the English native speakers who favored the use of active voice and the first-person plural pronoun *"we"*, Chinese writers opted for passive structures and avoided the use of first-person pronouns.

Yang (2013) investigated the hedging devices in three academic writing corpora[13]. The first one is the English RA corpus, the second one is the Chinese-authored English RA corpus, and the third one is Chinese RA corpus. The results showed a parallel propensity for epistemic adverbs, adjectives, nouns and lexical verbs in all corpora. The choice for English writers is modal verbs in English RAs and phraseological expressions in Chinese RAs, English authors prefer using modal verbs. This variation has occurred because of the linguistic and sociocultural differences.

Riccioni and colleagues (2021) investigate uncertainty within a collection of medical articles published in the British Medical Journal between 1840 and 2007 [14]. While their categorization of uncertainty markers partially aligns with other authors' classifications of hedges, this study concentrates solely on a particular type of uncertainty marker, specifically subjectivity uncertainty markers (i.e., those that explicitly reference the author(s)). According to Atkinson (1996) [15], markers of subjective uncertainty decreased over the 167-year period; however, related studies by the same authors indicate that overall uncertainty remained consistent. The overall uncertainty varied between 16% and 23% across the four periods analyzed.

In another study, Hinkel (2005) examined the use of hedging devices by comparing the use of these hedging devices between the native speakers (NS) and non-native speakers (NNS) of English in 745 academic essays [16]. Results revealed that in oral conversation, the native speakers employ hedging devices more than the native speakers. The results also reveal that compared to the native speaker, the non-native speakers employ the hedging devices in a particularly restricted way.

Rabab'ah (2013) explored the hedging devices used in 50 nursing and education articles selected from Mosby's Index and EBSCO Host database, respectively [17], following Jalilifar's taxonomy of hedging words [18]. The findings of the study indicated that hedges were used less in the nursing articles and this can be attributed to the fact that nursing is a scientific discipline so writers can state their positions with much more confidence.

Huang (2014) examined five medical research articles taken from the electronic archives of the Lancet international medical journal which were about neurological pathology to analyze and identify the moves that were used in each section of the articles following a move structural analysis based on Skelton's and Nwogu's studies [19]. The findings of the study showed that twelve moves were employed: Four in the introduction section (present background knowledge, present past research an point out missing information, provide brief insight of experimental methods, identify research purpose), four in the method section (describe study materials, provide inclusion criteria, describe procedures, identify research purpose), three in the discussion section (discuss data, state the limitations, provide conclusion) and one in the results section (report findings). Moreover, the findings revealed that the use of personal pronouns was limited to only some moves.

Abdollahpour and Gholami (2018) conducted a study in which they examined the rhetorical structure used in 1500 medical research articles abstracts taken from five data bases, namely, Elsevier, Sage, Springer, Taylor & Francis and Wiley Online Library published between 2006 and 2016 following Santos's (1996) move scheme model [20,21]. The results of the study indicated that five moves were employed in the abstracts which are as follows: Moves situating the research (STR), presenting the research (PTR), discussing the research (DTR), describing the methodology (DTM) and summarizing the results (STR). While moves 3 and 4 were considered obligatory, that is, they occurred in all of the abstracts' sections, moves 1, 2 and 5 were seen as conventional since they occurred in more than sixty percent of the abstracts' sections. Moreover, the researchers concluded that medical abstracts do not always follow a linear order, that is, in some abstracts move 2 can be used before move 1.

This study aims to find how frequently different types of hedging devices are used in 50 medical and pharmaceutical articles, and whether there are any significant differences in the use of hedging devices by female and male writers. What makes this study different from previous studies is the focus on the whole articles not only on abstracts and conclusions.

# 3. Methodology

The aim of this study is to identify the hedging devices used in 50 scientific articles, particularly medical and pharmaceutical articles. To do this, 50 scientific articles published between 2020 and 2022 were selected. Of these, 25 articles were written by female writers, and 25 articles were written by male writers. Author gender has been identified from author profiles, institutional websites or databases such as ORCID/Research Gate and for the research articles with more than one author, the gender was identified based on the first author. The key criteria for choosing the articles include the following conditions: These articles should be written in English, articles must belong to the medical or pharmaceutical sciences, and they should be retrieved from the Scopus database and they should be authentic. The length of the articles was taken into consideration; each article consists of

a minimum of 5000 words. The analysis included the whole article not only the abstracts and conclusions. The frequency of the nine categories and their hedging words was found in the 50 selected articles. It also aims to find whether there are any differences in the use of hedging devices among male and female writers. As shown in **Table 1**, Jalilifar's (2007) taxonomy of hedges has been adopted in analyzing the selected articles [18].

**Table 1.** Jalilifar's Taxonomy of Hedging Words.

| Category | Hedging Words |
|---|---|
| **Introductory verbs** | Seem, tend, appear, doubt, believe, think, indicate, suggest |
| **Certain lexical verbs** | Assume |
| **Certain modal verbs** | May, might, can, could, will, would, must |
| **Adverbs of frequency** | Often, sometimes, usually, always, never, frequently |
| **Modal Adverbs** | Certainly, definite, clearly, possible, perhaps, conceivably |
| **Modal Adjectives** | Certain, definite, clear, possible |
| **Modal Nouns** | Assumption, possibility, probability |
| **That Clauses** | It could be the case that ..... |
| **To-clause+ adjective** | It may be possible to obtain ..... |
| | It is important to develop ..... |
| | It is useful to study ..... |

The analysis of the selected articles went through a coding procedure which started by reading the articles and developing a comprehensive understanding of the medical and pharmaceutical writing styles, defining hedging categories and creating a coding manual with examples of each hedging category, Segmenting each article into analyzable units (e.g., sentence, clause, or paragraph level) and then analyzing the data by using focus on sections like Abstract, Introduction, Discussion, and Conclusion. The data was analyzed by using t-test and one-way ANOVA.

# 4. Results

## 4.1. Overall Frequency of Each Hedging Category

The frequency and the percentage of all hedging categories in the data are included in **Table 2**. It can be noticed that the number of used hedging devices is (4,071). The findings reveal that the most used hedging device category is the Modal verbs (1,539) and the least used hedging device category is the lexical verbs (29).

**Table 2** presents a quantitative analysis of hedging devices employed within a given academic corpus, categorizing them by type and indicating their frequency and proportional usage. Hedging, a fundamental feature of academic discourse, serves to mitigate the strength of claims, express caution, and acknowledge alternative perspectives. The data reveal that modal verbs (e.g., may, might, could) are the most frequently used category, comprising 37.8% of all hedging instances (n = 1,539). This high frequency suggests a prevalent use of modal expressions to convey possibility and uncertainty. Introductory verbs (e.g., suggest, believe), accounting for 31.9% (n = 1,301), also play a significant role in distancing the author from categorical statements, thereby reinforcing the tentative nature of academic claims.

**Table 2.** The Overall Frequency of Each Hedging Device Category for Each.

| Hedging Device Category | Frequency | Percentage |
|---|---|---|
| **Introductory verbs** | 1,301 | 31.9 |
| **Lexical verbs** | 29 | 0.7 |
| **Modal verbs** | 1,539 | 37.8 |
| **Adverbs of frequency** | 225 | 5.52 |
| **Modal adverbs** | 401 | 9.85 |
| **Modal adjectives** | 370 | 9.0 |
| **Modal nouns** | 49 | 1.2 |
| **That clauses** | 62 | 1.5 |
| **To-that + adjective** | 95 | 2.3 |
| **Total** | 4,071 | 100 |

Other notable categories include modal adverbs (9.85%) and modal adjectives (9.0%), both of which function to further qualify the degree of certainty associated with propositions. Additional hedging forms such as adverbs of frequency (5.52%), to-that + adjective constructions (2.3%), that-clauses (1.5%), modal nouns (1.2%), and lexical verbs (0.7%) contribute to the overall hedging strategy, albeit with less prominence. The cumulative total of 4,071 hedging devices underscores the pervasive use of linguistic mitigation strategies in the corpus. This distribution highlights the importance of hedging in constructing a scholarly voice that is both cautious and reflective of the complexity and

provisional nature of academic knowledge.

## 4.2. Frequency and Percentages of Hedging Subcategories

### 4.2.1. Introductory Verbs

**Table 3** provides a detailed account of introductory verbs used as hedging devices in the analyzed academic corpus, presenting both individual frequencies and a total count of 1,301 occurrences. Introductory verbs—such as tend, seem, appear, think, indicate, and suggest—are key markers of epistemic modality, allowing writers to express uncertainty, caution, or personal stance rather than assert categorical claims [22,23]. These devices are central to maintaining the tentative and objective tone characteristic of academic discourse.

**Table 3.** The Frequency of Introductory Verbs.

| Introductory Verbs | Total |
|---|---|
| **Tend** | 50 |
| **Seem** | 212 |
| **Appear** | 130 |
| **Think** | 401 |
| **Indicate** | 418 |
| **Suggest** | 90 |
| **Total** | 1,301 |

Among these verbs, indicate (n = 418) and think (n = 401) are the most frequently employed, collectively representing over 60% of the total. The high frequency of indicate suggests a tendency to present interpretations as suggestive rather than conclusive, aligning with academic norms that value balanced and measured claims [24]. Similarly, think functions as a subjective marker that softens the strength of an assertion, particularly in authorial commentary or theoretical speculation.

Verbs such as seem (n = 212) and appear (n = 130) further enhance hedging by introducing perceptual uncertainty, which is often used to reflect cautious interpretation of data or observed phenomena. The less frequent use of suggest (n = 90) and tend (n = 50) continues this pattern of linguistic mitigation; suggest is particularly common in presenting tentative hypotheses, while tend introduces generalizations that are implicitly limited in scope [25].

This pattern of usage reflects what Hyland (1998) describes as a rhetorical strategy employed by academic writers to maintain credibility, politeness, and openness to alternative perspectives [22]. Through hedging, especially via introductory verbs, writers construct a discursive space that is flexible and inclusive of scholarly dialogue, thereby reinforcing the collaborative and provisional nature of knowledge in academia. Al-Ghazo and Ta'amneh (2021) shed light on the importance of rhetorical strategy by indicating that it can be employed in academic writhing to keep authority and coherence among the various parts of the whole article [25]. For example, the modal lexical verb "seem" was found in the data to indicate probability and to make statement less forceful as in the following example:

While science-based evidence consumers seem to be less engaged in sharing ...etc.

### 4.2.2. Lexical Verbs

The results reveal that the lexical verbs are the least used hedging devices in the medical and pharmaceutical articles. This category includes only two verbs: believe and assume.

### 4.2.3. Modal Verbs

**Table 4** outlines the frequency of modal verbs used as hedging devices in the examined academic corpus, totaling 1,539 instances. Modal verbs are among the most common grammatical resources for expressing uncertainty, probability, and non-assertiveness, and thus play a central role in hedging strategies [22,26]. They allow authors to modulate the strength of their claims, making their assertions more tentative and contextually sensitive.

**Table 4.** The Frequency of Modal Verbs.

| Modal Verbs | Total |
|---|---|
| **Will** | 300 |
| **Would** | 680 |
| **May** | 237 |
| **Might** | 102 |
| **Can** | 121 |
| **Could** | 99 |
| **Total** | 1,539 |

Among the modal verbs recorded, would appears most frequently (n = 680), indicating its importance in expressing hypothetical reasoning or projecting possibilities, particularly when discussing implications, future scenarios, or counterfactuals. The high frequency of would underscores its rhetorical utility in balancing assertion with caution, a hallmark of scholarly communication [24]. Following would is will (n = 300), which, although typically associated with certainty, can func-

tion as a hedging device when used to express predictions or conditional outcomes that are not entirely definite [23].

Other modal verbs—such as may (n = 237) and might (n = 102)—are more explicitly associated with probability and uncertainty, signaling that the writer is open to alternative interpretations or potential variation in outcomes. These modals are particularly common in discussion sections or when proposing interpretations of data, where absolute claims would be epistemologically inappropriate [25]. Similarly, can (n = 121) and could (n = 99) are used to express potential ability or possibility, especially in generalizing claims or when offering theoretical implications.

The prominence of these modal verbs in the data reflects their functional importance in constructing a cautious and balanced academic voice. As Hyland (1998) notes [22], modal verbs enable writers to negotiate their stance, accommodate reader expectations, and position their arguments within a framework of scholarly modesty and openness. This strategic use of modality not only enhances the credibility of the author but also reinforces the collaborative and dialogic nature of academic knowledge production.

Modal auxiliaries were employed in the conclusion sections in all articles. For example, modal auxiliaries such as "*can*", "*could*", and "*may*" indicated some degree of possibility and uncertainty. The following are some extracted examples:

WNV as an emerging global pathogen *can* be a model for international public health community to further strengthen the line of communication for all the infectious diseases and for better preparedness in worst case scenario.

WNV research topics associated with (A) project funding, (B) legal frameworks of WNV documentation, surveillance and monitoring or (C) evaluation of applied control methods can provide information about the status of preparedness of countries, which *would* be valuable information for political decision making and future research.

### 4.2.4. Adverb of Frequency

**Table 5** presents the distribution of adverbs of frequency used as hedging devices in the analyzed corpus, with a total of 225 occurrences. These adverbs—often, usually, sometimes, always, frequently, and never—function primarily to modify the certainty and generalizability of statements, thereby contributing to the broader hedging strategies employed in academic writing [2,22]. By quantifying or limiting the frequency of a claim, writers avoid overgeneralization and present their arguments with a degree of nuance and flexibility.

**Table 5.** Frequency of Adverbs of Frequency.

| Adverb | Often | Usually | Sometimes | Always | Frequently | Never | Total |
|---|---|---|---|---|---|---|---|
| | 69 | 29 | 29 | 40 | 27 | 31 | 225 |

The most frequently used adverb in the data is often (n = 69), followed by always (n = 40) and never (n = 31). Although always and never appear to express absolutes, in academic contexts they can also function as deliberate rhetorical exaggerations or markers of emphasis, particularly when used with caution or supported by empirical data. However, the predominance of adverbs like often, usually (n = 29), and sometimes (n = 29) reflects a more typical hedging function—one that allows the writer to present trends or tendencies without asserting that they are universally applicable.

Adverbs such as frequently (n = 27) and sometimes are particularly useful in observational or descriptive passages, where authors aim to indicate the recurrence of a phenomenon without implying that it is constant or exclusive. These adverbs mitigate the strength of claims and acknowledge variability or exceptions, which is crucial in academic discourse that values precision and epistemological humility [23,27].

It can be noticed that the employment of frequency adverbs stresses their role in aiding writers to balance assertiveness with caution, thereby improving the reliability of their claims and fostering an open, critical engagement with the evidence. As part of the broader category of hedging devices, these adverbs contribute to the creation of a measured, responsible academic voice, one that avoids definitive claims unless clearly warranted.

### 4.2.5. Modal Adverbs

**Table 6** displays the frequency of modal adverbs used

as hedging devices in the analyzed academic corpus, with a total of 401 instances. Modal adverbs such as probably, possibly, perhaps, and conceivably serve as key markers of epistemic modality, allowing writers to indicate varying degrees of certainty and likelihood. The main role can be summarized in decreasing the force of propositions and making these propositions seem more tentative and thus more suitable for the standards of academic discourse, which often values caution and intellectual humility over assertiveness can be considered as the main function for the modal adverbs[22,23].

**Table 6.** Frequency of Modal Adverbs.

| Modal adverb | Total |
|---|---|
| **Probably** | 96 |
| **Possibly** | 250 |
| **Perhaps** | 51 |
| **Conceivably** | 4 |
| **Total** | 401 |

The most frequently used modal adverb in this corpus is possibly (n = 250), followed by probably (n = 96) and perhaps (n = 51). These adverbs help the writer to acknowledge uncertainty or alternative interpretations without undermining the overall credibility of the claim. For instance, the use of possibly signals that the author is open to other explanations, thereby maintaining objectivity and inviting scholarly dialogue. Similarly, probably indicates a relatively high degree of likelihood, but still avoids full commitment to a proposition, which is especially useful when making predictions or discussing inferential findings.

The lower frequency of conceivably (n = 4) may reflect its more formal or speculative tone, which is often reserved for theoretical discussion or highly tentative statements. Despite its limited usage, it still contributes to the overall rhetorical strategy of softening claims and reducing categorical language, which is essential in disciplines where definitive conclusions are rare.

Modal adverbs thus play a significant role in the rhetorical construction of academic arguments. As Hyland (2005) notes, such lexical devices are not merely stylistic but interpersonal tools that help authors project a measured stance[24], anticipate reader objections, and create space for further inquiry. Their presence in this corpus highlights a commitment to responsible and dialogic knowledge construction, reinforcing the function of hedging as a vital element of effective academic writing.

### 4.2.6. Modal Adjectives

**Table 7** outlines the use of modal adjectives as hedging devices in the analyzed academic corpus, with a total of 370 occurrences. Modal adjectives such as probable, possible, and conceivable are key components of epistemic modality, enabling writers to comment on the likelihood or plausibility of their claims. These adjectives play a critical role in academic writing by helping authors maintain a measured and non-absolute stance, which is fundamental to scholarly discourse[22,23].

**Table 7.** Frequency of Modal Adjectives.

| Modal adjectives | Total |
|---|---|
| **Probable** | 160 |
| **Possible** | 162 |
| **Conceivable** | 48 |
| **Total** | 370 |

The most frequently used adjectives are possible (n = 162) and probable (n = 160), which appear in nearly equal proportions. The adjective possible expresses a broad range of uncertainty, indicating that a claim or interpretation is plausible but not guaranteed. Its frequent use reflects the writer's intent to propose ideas while acknowledging the limits of available evidence. Probable, on the other hand, conveys a higher degree of certainty than possible but still avoids full commitment. It is particularly useful in situations where conclusions are strongly supported but remain open to future revision.

The adjective conceivable (n = 48), while less frequent, serves a similar hedging function by suggesting that a proposition is within the realm of logical or theoretical plausibility, often used in speculative or theoretical discussions. Its more formal tone and relatively low occurrence reflect its specialized rhetorical function in academic texts.

The use of modal adjectives in this corpus reflects the writers' efforts to present claims with appropriate caution and rhetorical distance, which is a hallmark of creative and effective academic argumentation. According to Hyland (2005)[24], hedging through modal expressions not only manages the relationship between writer and reader but also helps position arguments within a framework of intellectual modesty and scholarly integrity. By signaling degrees of certainty, modal adjectives thus support the broader function of hedg-

ing as a strategic linguistic tool for engaging critically with knowledge while avoiding dogmatism.

### 4.2.7. That-Clauses

**Table 8** presents the use of that-clauses as hedging devices in a corpus of medical articles, totaling 62 occurrences. Phrases such as It could be the case that, It might be suggested that, there is every hope that, and hope function as epistemic markers, allowing medical writers to introduce claims in a tentative, cautious manner. This is particularly crucial in the medical field, where the consequences of overstatement or premature conclusions can have serious practical implications [25].

**Table 8.** The Use of That-Clauses as Hedging Devices in a Corpus of Medical Articles.

| That-clauses | It could be the case that | It might be suggested that | There is every hope that | Hope | Total |
|---|---|---|---|---|---|
| | 15 | 15 | 15 | 17 | 62 |

Each of the listed phrases—It could be the case that (n = 15), It might be suggested that (n = 15), There is every hope that (n = 15), and hope (n = 17)—performs the function of attenuating the strength of a proposition, allowing authors to distance themselves from full commitment. For instance, it might be suggested that signals that a claim is one possible interpretation among many, inviting critical engagement rather than asserting definitive conclusions. Similarly, it could be the case that introduces hypothetical reasoning, often used when discussing mechanisms of disease or treatment effects that are not yet empirically verified.

The phrase There is every hope that and the noun hope reflect a psychological or evaluative stance, commonly found in discussion or conclusion sections of medical articles. These expressions allow authors to emphasize optimism or expected outcomes without overstating certainty, which is ethically important in medical communication aimed at clinicians, patients, and policymakers [22].

The relatively modest frequency (n = 62) of these constructions, compared to other hedging forms such as modal verbs or adverbs, may reflect their more specific rhetorical function. That-clauses often appear in interpretive or speculative discourse, particularly where authors wish to suggest implications for future research or potential clinical application without exceeding the boundaries of available data [28].

In summary, the use of that-clauses in medical writing reflects a broader commitment to scientific caution, rhetorical balance, and ethical responsibility. By employing such structures, medical writers demonstrate awareness of the tentative nature of clinical knowledge, particularly in areas of ongoing investigation or innovation.

### 4.2.8. Adjective + To-Clauses

**Table 9** presents a subset of hedging structures in medical academic writing: adjective + to-infinitive clauses, with a total frequency of 95 occurrences. This syntactic structure—e.g., It may be possible to obtain, it is useful to study, it is very essential to shed light—serves both epistemic and pragmatic functions, allowing writers to introduce propositions with varying degrees of tentativeness and strategic emphasis.

**Table 9.** Frequency of Adjective _To-Clauses.

| **Adjective + to clauses** | **It may be possible to obtain** | **It is very essential to shed light** | **It is useful to study** | **Total** |
|---|---|---|---|---|
| | 25 | 50 | 20 | 95 |

Among the examples provided, the most frequent expression is It is very essential to shed light (n = 50). While the adjective essential appears strong, the entire phrase functions as a pragmatic hedge by foregrounding the importance of further investigation rather than asserting conclusive claims. This is particularly relevant in medical writing, where authors often stress the need for deeper exploration or highlight the significance of emerging questions without overextending empirical support [22].

The phrase It may be possible to obtain (n = 25) exemplifies a more explicit epistemic hedge, signaling uncertainty about feasibility or outcomes. Such expressions are typically found in the discussion of potential therapies, diagnostics, or experimental designs—areas where speculative language is ethically and rhetorically appropriate [25]. They allow the author to suggest possible directions without implying certainty,

thereby maintaining scientific integrity and credibility.

Similarly, it is useful to study (n = 20) introduces a proposition framed as a recommendation or justification for inquiry, rather than a definitive conclusion. This structure allows researchers to emphasize relevance and utility while softening their claims, which aligns with the norms of medical discourse that favor careful, evidence-based generalizations over assertive declarations [28].

Collectively, adjective + to-clauses function as a subtle but effective hedging strategy, helping medical researchers balance assertiveness with caution. They enable authors to frame the necessity or potential of actions and ideas, while still maintaining a critical, non-dogmatic tone. This is particularly important in the medical field, where overstating conclusions can have significant practical and ethical consequences.

# 5. Differences in Medical and Pharmaceutical Writing in Relation to Gender

An independent T-Test was used in order to find whether there are significant differences among female and male writers in using hedging devices in writing medical and pharmaceutical articles setting the significant point at alpha < 0.05.

**Table 10** presents the results of independent t-tests comparing the use of various hedging device categories between male and female academic writers. The analysis includes mean scores (M), standard deviations (SD), t-values (T), and significance levels (p-values) for each category. A p-value less than 0.05 indicates a statistically significant difference.

**Table 10.** The Results of Independent T-Tests Comparing the Use of Various Hedging Device Categories Between Male and Female Academic Writers.

| Hedging device category | t test | | Gender | | | |
|---|---|---|---|---|---|---|
| | T | *P* | Male | | Female | |
| | | | M | SD | M | SD |
| **Introductory verbs** | 0.2 | 0.8 | 1.5 | 2.8 | 1.3 | 0.8 |
| **Lexical verbs** | 1.3 | 0.2 | 3.1 | 2.9 | 1.8 | 1.4 |
| **Modal verbs** | -2.4 | 0.03 | 0.2 | 0.6 | 1.1 | 1 |
| **Adverbs of frequency** | 0 | 1 | 0.8 | 1.3 | 0.8 | 1 |
| **Modal adverbs** | -0.7 | 0.5 | 2.3 | 1.2 | 2.8 | 2 |
| **Modal adjectives** | -0.5 | 0.7 | 1.3 | 1.7 | 1.6 | 1.2 |
| **Modal nouns** | 0.5 | 0.6 | 2 | 2.1 | 1.6 | 1.2 |
| **That clauses** | -4.1 | 0.001 | 1.6 | 1.8 | 4.5 | 1.3 |
| **To-that + adjective** | 0.7 | 0.5 | 1.5 | 1.6 | 1.1 | 1.7 |

The results of the independent t-tests reveal notable gender-based differences in the use of hedging devices in medical academic writing. While most categories—including introductory verbs, lexical verbs, adverbs of frequency, modal adverbs, modal adjectives, modal nouns, and adjective + to-clauses—show no statistically significant variation between male and female authors, two categories stand out. First, modal verbs (e.g., may, might, could) are used significantly more by female writers ($p = 0.03$), suggesting a greater tendency to express epistemic caution or soften claims. This finding aligns with previous research indicating that female writers often adopt more tentative rhetorical strategies, especially in disciplines that require careful presentation of evidence [22,29]. Second, a highly significant difference is observed in the use of that-clauses ($p = 0.001$), with female writers employing them more frequently (M = 4.5) than their male counterparts (M = 1.6). This pattern implies a preference for more indirect and nuanced forms of expression among female authors, possibly reflecting broader gender-based differences in communicative style, where women tend to prioritize relational and inclusive discourse [30,31]. These results revealed that the gender cannot be an essential factor that play a vital role in academic writing, especially in scientific fields such as pharmacy or medicine.

# 6. Discussion

Kojima & Popiel (2023) stated that "differentiating what can be considered a fact, and what is only a possibility, is also very important in scientific/medical writing" [32].

The quote above shows that writing medical and pharmaceutical articles doesn't only need conveying information

or data, however, it need having the required skills for attracting the readers, in other words, there is a strong tie among writing skills and the way in which information is presented in scientific articles.

The findings reveal that the modal verbs are considered the most used hedging devices with (1539) occurrences, while the lexical verbs are considered the least used hedging devices with (29) occurrences. The results are in line with the study of Hardjanto (2016) where 75 articles have been analyzed [33]. The findings of this study revealed that modal auxiliaries were frequently used to express hedging. The overall results suggested that scientific disciplines' writers may resort to hedging when presenting their results accordingly, it can be hypothesized that the use of hedging devices was inevitable strategy that could allow writers of scientific genres to present their findings more precisely and therefore save their face from any criticism in the future. Sapir (1929) stated that the function of language can be summarized in reflecting ideas not only words [34]. Al-Qyeyam, Ta'amneh & Al-ghazo (2024) stated that writing is an effective way and powerful tool for attracting the readers and influence their perceptions and thought [35], so it can be noticed that the way of writing is an important matter in transmitting information. So the employment of hedging devices plays a vital role in reflecting ideas in a very precise way.

## 7. Conclusions

This study aims at finding out the hedging devices in medical and pharmaceutical writing. It also aims at finding if there are any significant difference among male and female writers of medical and pharmaceutical articles in using these devices. The findings reveled that that there are no significant differences between male and female writers in the use of hedging devices in writing the medical and pharmaceutical articles. This result is consistent with previous results conducted by Hassani and Razmdideh (2020) [35], Their analysis of formal writing, including MA theses, revealed no significant difference between male and female writers in the frequency of hedging usage. The researcher suggests a number of recommendations based on the findings of this study that can be beneficial for future research. Firstly, this study examined the role of gender in the use of hedging devices in writing medical and pharmaceutical articles. Consequently, it is recommended to examine how other variables such as age or ethnicity can affect the usage of these hedging devices. Another recommendation is to conduct a comparative study about the use of hedging devices between medical and other genres. As it is mentioned previously, the data comprises of 50 medical and pharmaceutical articles only, which indicated that the data size is not too large. As Alshbeekat & Awwad (2024) stated "Language and culture are intricately intertwined, shaping the way we communicate, express ourselves, and understand the world around us" [36].

## Funding

This work received no external funding.

## Institutional Review Board Statement

Not applicable.

## Informed Consent Statement

Not applicable.

## Data Availability Statement

The data supporting the findings of this study are available upon request.

## Conflicts of Interest

The author declares no conflict of interest.

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