

ORIGINAL ARTICLE



Public Attitudes on Deadliest Diseases from 15th to 17th Centuries: A Corpus-driven Analysis of Historical Texts

Abstract

A significant issue in medical health care studies is the representation of illnesses and how they change and affect public attitudes through years. Diachronic corpus-driven linguistics has provided an opportunity for researchers to study these changes in the course of time. Having benefited from a corpus-driven approach and collocations analysis, this study was an attempt to shed light on the representations of six deadly infectious diseases prevailing from 15th to 17th centuries. The chosen corpus for this study was Early English Books Online which includes all the books written within these three centuries. The deadly diseases were selected based on Catalyst Media Network hierarchy of deadliest diseases in human history and their frequencies were first extracted, and then collocations associated with each disease were investigated and reported. Three historical phases of pre-pandemic, pandemic and post-pandemic were considered to categorize the collocations semantically. The analysis of data revealed that public conceptualization of deadly diseases changed from one century to another, as they were initiated, expanded, and treated. The findings might be suggestive for health care researchers, health service training programmers, medical counselors, and policy makers to shape and modify the public attitudes about epidemics consciously.

Key words: Public attitudes, corpus-driven Analysis, Deadly diseases representations

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Introduction

Public attitudes toward deadly diseases play a significant role in health care studies. This area of research deals with how public attitudes change in societies as time goes by as a result of public education and awareness. While some illnesses, particularly mental ones, were embarrassing for patients and their families in the past, nowadays many diseases are less restricted by social attitudes and some are not even disapproved¹. Health care studies and training are substantial for medical students as a part of their professional function and responsibility. Since they are expected to be proficient communicators with patients and their acquaintances, they must be aware and skillful enough with regard to the patients' worries that partly originate from public perceptions of that illness². In other words, social attitudes and awareness may facilitate or harden the pressure.

Public attitudes of diseases might have gone through changes as education in this respect has proliferated. Another reason for these changes is the partial or in some cases the entire control of deadly diseases by scientific medicine in the 20th century. As the history of medicine shows from ancient civilizations, humankind has always been somehow concerned with death caused by incurable diseases. However, after the Renaissance, with the advent of science in all areas and in medicine in particular, in the 16th and 17th centuries, many misunderstandings about health care and illnesses were modified³. The Aristotelian worldview of four elements (i.e., water, fire, earth, and air), underwent changes by the invention of microscope and the emersion of tiny living objects. Although medical advancements continued in the 18th century, the next century was the peak of a considerable pace in medical sciences. On the whole, these four centuries were a period of broad changes of public attitudes toward deadly diseases.

The development of modern technologies has created opportunities for health care information, problems, and tackles. One of the tools for investigating how such perceptions have changed through time is the medical corpus, including large body of medical texts. Such corpora offer an evidence-based awareness of medical science that former methodologies would not present; corpora allow for the investigation of a vast range of issues due to their wide coverage of texts in various decades and genres⁴. Derivation of frequency and collocations related to deadly diseases indicate representations of such diseases in public and whether or not they went through alterations in different centuries.

According to Tognini-Bonelli, depending on the purpose

- 1- Markelova, 2017: 1-17.
- 2- Crawford et al, 2010.
- 3- Weatherall et al, 2006: 119-138.
- 4- Davies, 2012: 121-157.



for which the corpus is utilized, two types of enquiries are performed in the realm of corpus studies: corpus-based studies and corpus-driven studies⁵. A corpus-based study refers to an approach in which previous language theories are expanded, confirmed or rejected by the new data. That is, corpus-based linguistics deals with a collection of data to exemplify and describe in details pre-existing models and categories and, in some cases, even refine or provide minor corrections to the theory or model rather than challenging or questioning the theory. A corpus-driven study, on the other hand, is unrelated to gathering data or details to test or validate theories, but it tries to unify data and attain a comprehensive description. To put it another way, corpus is not used for validating or expanding pre-existing theory or an already-made model but the researcher is after a brand new categorization or model depending on what data yields; that is to say, corpus is used as a main source for formulating new hypothesis and generating language theory.

The word collocation deals with words adjacent or approximate to each other as its name suggests (co + location). This semantic proximity is due to the affiliation of the words and their co-occurrence in the context⁶. Analysis of collocations is significant in that they play a vital role in communication “since their misuse can lead to misunderstanding”⁷. The analysis of collocations requires as many authentic texts as possible, and this is what a corpus offers. Additionally, collocations contain implicit messages inaccessible to consciousness, used naturally and in an unaware manner⁸. Given the subliminal messages hidden in collocations, they are capable of providing the public tendency prevailing a particular era. This study has been an attempt to investigate how medical corpora help elicit public attitudes toward deadly diseases and compare and contrast such perceptions across the 15th to 17th century. Hence, the frequency of each deadly disease has been determined in the corpus and then its collocations have been investigated and finally, the public attitudes toward deadly diseases have been compared in different centuries. In order to fulfill the above-mentioned objectives, the following research questions were addressed:

1. How frequently are deadly diseases represented in the Early English Books Online corpus?
2. What kinds of public attitudes were shaped toward deadly diseases from 15th to 17th centuries?
3. Have the public attitudes been changed toward such deadly diseases from 15th to 17th centuries?

5- Tognini-Bonelli, 2001: 114.

6- Sinclair, 1991: 11.

7- Miscin, 2013: 187.

8- Hunston, 2002: 150.



Literature Review

Corpus studies give reliable and valid results based on available evidence, since corpora consist of texts that provide lexical and syntactic information about a single word. As Putnam put it, many words are by themselves neutral, but their adjacent words add a positive or negative connotation to them⁹. Hence, studies of collocations, frequency, semantic prosody and lexical bundles offer beneficial information on the representations of words, public perceptions and attitudes in a specific period of time.

Accordingly, linguistic usage reveals some aspects of public perceptions through time; that is to say, it indicates how conceptualizations of different topics have been modified in linguistic climates. Being popular in political and public perception debates, linguistic climate refers to the “situational factors related to language use and its social position”¹⁰. This concept includes both linguistic aspects and other social, political, ideological facets, namely identities, individualism, gender, social and historical context.

The corpus-driven studies of health care were initially carried out by Thomas and Wilson who benefited from 1.25 million words of exchange among patients and practitioners for the purpose of measuring the effectiveness of communication in a professional health context.¹¹ To this end, having created a mixed-method design, the researchers examined various facets of the professionals’ language and the way in which it helped build an informal, casual, and relaxed work ambience. In another study, Skelton and Hobbs, using concordances, investigated health care consultations by analyzing 40 doctor-patient sessions in order to find different features of their language and jargon.¹² The findings revealed no significant evidence of medical jargon but the use of language in terms of social power on doctors’ side and lack of power from patients’ side.

Accordingly, Harvey, Brown, Crawford, Macfarlane, and McPherson made use of corpus linguistics to probe into health care e-mails sent to a British website.¹³ The results showed that young people are more willing to explicitly talk about their sexual health and physical anatomy, while former references to health care used to be replete with “vague terms and euphemisms”¹⁴. In another study, Crawford and Brown depicted how developments in corpus linguistics imply professional health care awareness.¹⁵ Having focused on the necessity of communicative characteristic of a doctor, they examined normal words in medical context with regard to their frequency and collocations, exploiting Cambridge and Not-

- 9- Putnam, 1975: 131-193.
- 10- Graedler, 2014: 3.
- 11- Thomas et al, 1996: 298.
- 12- Skelton et al, 1999: 108-111.
- 13- Harvey et al, 2007: 771-781.
- 14- Harvey et al., 2007: 771.
- 15- Crawford et al, 2010.



tingham Corpus of Discourse in English (CANCODE). The findings indicate that words considered normal and neutral are loaded with different meanings in medical jargon; hence, it is recommended for practitioners to become aware of potential and actual meanings of words when communicating with patients.

Atkins and Harvey conducted a study on how corpus linguistics can aid medical health research using Nottingham Health Communication Corpus (NHCC) as well as qualitative analysis of phone calls. NHCC includes 500,000 words of medical and health care texts from a variety of contexts.¹⁶ The authors marked out the significance of corpus linguistics in providing deep and sharp insight into the questionable interaction besides creating opportunities for educating medical professionals. Mention is also made of the facilitative role of corpus linguistics and its utilization in communication training programs. In a similar vein, for the purpose of improving knowledge of communication in clinical contexts, Adolphs, Brown, Carter, Crawford, and Sahota merged corpus linguistics and conversation analysis techniques to evoke proper strategies for health consultants.¹⁷ The authors pointed out that such integrated approach propose “new possibilities of data and theory building, as well as becoming a resource for practitioners themselves in clinical field settings”¹⁸.

Corpus studies such as the ones mentioned above have offered a diversity of realizations of nature of interaction in medical contexts and accordingly enable medical educators gather theoretical and practical data for medical communication training programs. The present study, however, attempted to analyze a medical corpus historically in terms of public attitudes towards deadly diseases from 15th to 17th centuries.

Method

1- Materials

The data used in this study were derived from a corpus named Early English Books Online (EEBO) which contains 775 million words in 25,368 texts varying in genre and age from 1470s to 1690s. EEBO was formed during 2014 to 2016 and was supported by United Kingdom Arts and Humanities Research Council. The process of semantic, syntactic tagging and lemmatization was conducted by UCERL team at Lancaster University. EEBO is available online with the contexts of the target words, their concordance lines and collocations.

2- Data collection procedure

To collect data, the researchers made use of “<https://corpus>.”

16- Atkins et al, 2013: 316.

17- Adolphs et al, 2004: 9-28.

18- Adolphs et al, 2004: 9.



byu.edu/eebo” to access the target corpus, EEBO. In order to make the analysis for the target words and their collocations possible, the website provides at least five tabs on the top including search, frequency, context, compare and KWIC. The target words for this study have been chosen from “www.healthcarebusinessstech.com” which is the official website of Catalyst Media Network and offers the deadliest diseases in human history. Some of the cited diseases were contemporary (e.g. AIDS, Ebola) and were wiped out from the list of target diseases for this study. The final list of fatal diseases comprises: Typhus, Malaria, Cholera, Smallpox, Measles, and Plague. A brief description of the above-mentioned diseases is given below.

1. Typhus: It is an infectious disease of different types, including epidemic, scrub, and murine. The signs consist of fever, rash, headache, and other flu-like symptoms¹⁹. As of today, no particular vaccination has been identified for its treatment and it is just prevented by limitation of exposure.

2. Malaria: This is a contagious disease spread by bite of mosquitoes affecting humans and animals’ liver and red blood cells²⁰. The symptoms include fever, nausea, headache, vomiting, diarrhea, skin color change, muscle pain, coma, and finally death²¹.

3. Cholera: It is an infectious bacterial disease cause by *Vibrio cholera* which leads to dehydration of body^{22,23}. Symptoms encompass vomiting, rapid heart rate, thirst, cold skin, and muscle cramps.

4. Smallpox: Known as Variola, it is a deadly disease caused by a virus and of four types: Two common types named Variola minor and major and two rare types called hemorrhagic and malignant with high mortality rate²⁴. The signs are fever, headache, vomiting, skin rash and sores, chills, and pain. Thanks to global vaccination and prevention this lethal disease has been eradicated. Other treatments are infection control, wound care, and fluid therapy²⁵.

5. Measles: also called rubeola, it is an infectious disease caused by a virus with the same name spread by close contact and mostly affects children under five years old. The symptoms are fever, sore through, cough, runny nose, and inflamed eyes²⁶. Due to the global vaccination, this disease is rare around the world, and in case it appears, medications such as antibiotics and vitamin A as well as oral rehydration solution can help²⁷.

6. Plague: It is a bacterial infectious disease transmitted from animals to human by fleas or cat scratches with three identified types: Bubonic, Septicemic, and Pneumonic. The

- 19- Levinson, 2016.
- 20- Caraballo et al, 2014: 1-23.
- 21- World Health Organization, 2018.
- 22- Chin et al, 2011: 33-42.
- 23- Bailey, 2011: 25, 26.
- 24- Volpe, 2008: 30.
- 25- Fenner, 1988: 366-418.
- 26- Milner, 2015: 8.
- 27- World Health Organization, 2015.



risk of catching plague is higher in overcrowded places with poor sanitation and where too many rodents live²⁸. The symptoms of plague differ depending on the type being infected. Yet the general signs include fever, cough, headache, diarrhea, body pain, and weakness²⁹. Prevention is aided by vaccination and if infected, treatment is attempted through antibiotics and other supportive cares besides fever resolves and breathing supports³⁰.

The universal hierarchy of the above-mentioned infectious diseases and the number of victims according to the World Health Organization (WHO) are:

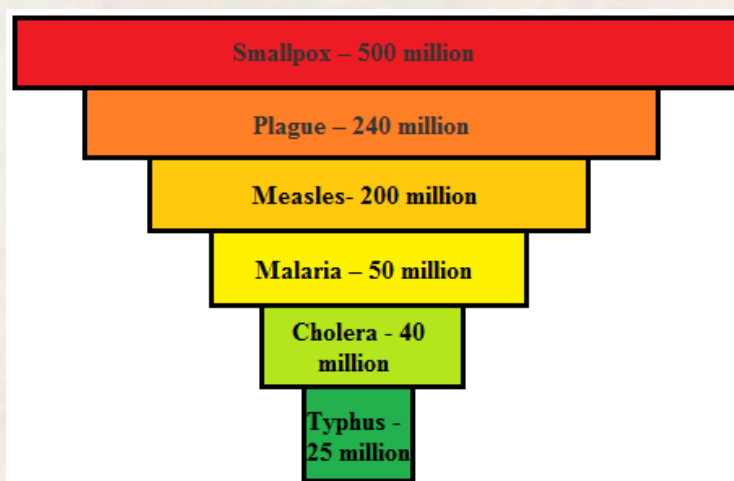


Figure 1. Hierarchy of diseases and their death rates

Figure 1 indicates the death rates of diseases from top (deadliest) to bottom (the least fatal). Plainly, smallpox has an approximate statistic of 500 million deaths as the deadliest disease and Typhus has a rate of more than 25 million victims. Other diseases have a range of deaths in between.

3- Data analysis

The obtained data was analyzed in terms of their frequencies and collocations in order to elucidate public conceptualization of deadly diseases and how their representations have been changed through time as the result of medical advancements. It must be noted that collocation analysis is conducted through mathematical statistics analysis and clustering methods given by EEBO. Moreover, a comparison is made between the representations of the target diseases in public attitudes in the 15th, 16th and 17th centuries. In the following section, the results are indicated and discussed.

28- World Health Organization, 2017.

29- Jefferson et al, 1998: 1-23.

30- Mwengee et al, 2006: 614-621.



Results and Discussion

In order to collect the needed data, names of the deadly diseases and their associated lemmas were entered in the search box of EEBO to offer an overview of their frequencies and occurrence in the books. Table 1 illustrates the inspected words, their frequencies and the decade with most occurrences for each.

Table 1: The frequency of deadly diseases

Disease	Frequency	Decade with most occurrence
Typhus	6	1690s
Malaria	6	1550s
Cholera	48	1580s
Smallpox	25	1570s
Measles	39	1590s
Plague	491	1510s

According to the table, the word plague outnumbered all other diseases with total of 491 occurrences. Next, the word Cholera is the second most frequent disease. Typhus, smallpox, and malaria revealed few occurrences in the corpus. This indicates a higher occupation or documentation of these most frequent diseases. That is to say, either people had more difficulty coping with these two or there seems to have been an opportunity to document their information. In another attempt, the collocations of each word were extracted according to each century. The results are shown in the tables below. In each table, the most frequent collocations of diseases are depicted in the three centuries under investigation. It is worth mentioning that some diseases were not found in the three centuries under study. Table 2 summarizes the collocations related to Typhus.

Table 2: Typhus collocations and frequencies

15th	Frequency	16th	Frequency	17th	Frequency
				Claim	2
No Collocation	-	Death	2	Church	1
				Killed	1

The above table shows no collocation in the 15th century; this suggests that it was not much widespread during these years in spite of its first appearance in 1489 AD. The rise of this fatal disease was in the two next centuries; in 16th and 17th centuries, it collocated with words such as “claim” and “church”, “death” and “killed” albeit with low frequencies.



Another perilous disease in history in general and in these centuries in particular was malaria which is mosquito-borne and contagious. Table 3 shows the collocation and frequency of the words related to malaria.

Table 3: Malaria collocations and frequencies

15th	Frequency	16th	Frequency	17th	Frequency
No Collocation	-	fever	3	fever	1
		death	2		

As Table 3 indicates, no word seemed to collocate with malaria during the 15th century; in the 16th century, although there are few occurrences, the words “fever” and “death” collocated with this disease and in the 17th century only one “fever” collocated with the target word with just one occurrence. The reason behind this shortage of frequency in EEBO is that although malaria has as long history of presence as man does, it was not until mid-eighteenth century that it became prevalent around the globe and finally in the 19th century its mortality even reached 50% in some coasts of America. This disease is known by its dreadful symptom, i.e. fever. By 1950s malaria started to vanish in America and Europe and gradually in other continents³¹.

The next infectious disease that emerged in Africa and India at first and then spread in Russia and other regions is cholera. The following table illustrates the collocations and frequencies of this disease in three centuries.

Table 4: Cholera collocations and frequencies

15th	Frequency	16th	Frequency	17th	Frequency
No Collocation	-	Red	16	Disease	4
		Black	11	Vomiting	4
		Totted	6	Stomach	2
		Melancholy	5	Observation	2

Table 4 shows no collocation in the 15th century because it was not far-reaching by then. In the 16th century, however, words including “red”, “black”, “totted” and “melancholy” collocated with Cholera, which is expressive of its early appearance. The words infer the fright and panic of public attitudes, as probably little was known and discovered about it. As time went by in the 17th century, other horrifying words including “disease” and “vomiting” collocated with cholera, which might be due to its outburst in many regions of the

31- Rich et al, 2006: 125-146.



world. In the meanwhile, words such as “stomach” and “observation” came together with this disease which might be indicative of the first trials to find the origins or a treatment for it.

Two other fatal diseases under investigation in the study were smallpox and measles, both highly infectious with almost identical primary symptoms, naming skin rash, mouth sore, fever, and in some cases blindness. Table 5 demonstrates the words collocating with the mentioned diseases from the 15th to 17th centuries.

Table 5: Smallpox and Measles collocations and frequencies

Disease	15th	Frequency	16th	Frequency	17th	Frequency
smallpox	No Collocation	-	Measles	7		
			Face	1	Measles	2
			Dysenteries	3	Face	2
			Death	4	Dysenteries	1
			Kill	5		
Measles	No Collocation	-	Blood	1	Treat	5
			Pock	1	Cure	3
			Shingles	1	Scarlet	3
			Death	4	Diagnostic	2
			Killed	16	Death	3

The above table displays that the words in relation to smallpox were not found in the 15th century; in the 16th century, the disease have been collocated with 5 words and only words, such as “measles”, “face”, and “dysenteries” collocated with it in the 17th century. The findings could be justified in term of the outburst of smallpox in these years and its close similarity to measles. Also, it collocates with face as a result of facial rashes on one hand and with “dysenteries” on the other. This is a symptom of smallpox in which intestines become severely infectious and diarrhea occurs with great deal of blood³². Such results show the frightening image of smallpox in public attitudes of the time.

Regarding measles, there was no collocation in the 15th century in a similar vein; yet, in the 16th century, words including “blood”, “pock”, “shingles”, “death” and “killed” were used next to measles, since this was the century of its



outbreak particularly in southern America and these were among many other tokens of this illness³³. In the 17th century, the collocating words differ in meaning; in other words, instead of common indicators of a disease, words containing “treatment”, “cure”, and “diagnostic” come to appear. To explain such findings, mention could be made of the efforts for seeking treatment for the disease. Although it was not until the 20th century that vaccines became available, the results suggest how public attitudes were changed within a century towards such diseases being immedicable in the 16th century but curable in the 17th century³⁴.

Another infectious lethal disease investigated in EEBO was plague, which still exists and kills around 600 people annually, particularly in Congo, Madagascar, and Peru. According to the World Health Organization, plague or black Death caused more than 50 million deaths in the 14th century. Table 6 demonstrates the collocations that go with Plague.

Table 6: Plague collocations and frequencies

15th	Frequency	16th	Frequency	17th	Frequency
		Pestilence	68		
		Famine	59	Famine	79
Direction	1	Infected	56	Die	56
Concerning	1	Contagious	42	London	43
Famine	3	Die	30	Preserve	13
		Sore	18	Remedy	12
		Bury	5		
		Poison	4		

As indicated in the above table, in the 15th century, the words adjacent to plague were “direction”, “concerning” and “famine”, connoting the early initiation of its gradual prevalence around the globe. In the 16th century contrarily, all the collocations offer horrifying implications, namely, “famine”, “infected”, “die”, “sore”, “bury”, and “poison”, to name a few. These words suggest that the public attitudes were intimidated as a result of expanding advent of black death, since they are associated with signs and symptoms after exposure, the epidemic nature of the disease, and the disasters afterwards. For example, the most frequent collocations with plague in this century is pestilence, which refers to an infec-

33- Furuse et al, 2010: 52.

34- Offit, 2007: 169.



tious fatal disease that spreads fast and kills a large number of people³⁵. Furthermore, the words “infected” (N=56) and “contagious” (N= 42) were found in EEBO, both referring to the catching characteristic of Plague, thus, highlighting the fright-frozen atmosphere of the time.

During the 17th century, the collocations found in the corpus can be classified into two groups. First, words related to the Great Plague of London, such as “London”, “Die”, and “Famine”. This catastrophic epidemic followed by the Great Fire of London occurred in 1665-1666 and killed more than a quarter of London population³⁶. These phenomena were marked as the biggest epidemics of England ever. Subsequently, the severity of plague and fire was so devastating that the parliament passed the Rebuilding of London Act 1666³⁷.

The second group of collocations included “preserve” and “remedy” to be specific, revealing the preventive measures taken to put a stop to the plague³⁸. One of these measures was quarantining of the ships coming to London and ships from infected ports for about a month just to be sure that there is no sign of the disease³⁹. Besides, a great exodus from the city of London took place first for king Charles II of England and the rich and then the poor to obtain a health certificate that proved they were not infected. In another attempt to cease the outburst of the plague, the authorities made a number of carts pass through the streets to gather the corpse and bury them in the ground or pits⁴⁰. Also, public health care was carried out to this end; for instance, plague doctors, some not even trained, started examining the infected ill. Or, the straying animals, including dogs, cats, and rats, were gathered and blot out of the city. In addition, in order to prevent the disease, in some cases tobacco was utilized.

The overall analysis of the data and investigation of the collocations associated with the studied diseases through time yielded that public conceptualization of deadly diseases was modified in the course of time. As the collocations and their frequencies indicated, in some cases, public attitudes towards a disease contained a frightened image of the illness; when the fatality of a disease reached its climax, the attitudes tended to be more negative, expressing the misery overshadowing thousands of lives. As attempts were initiated to seek a treatment or cure, the public realization of diseases changed. Altogether, the analysis of the collocates has revealed at least three main themes based on EEBO which can be classified into three groups, namely, early appearance of the disease, the outburst of the disease, and the preventing measures.

35- Anonymous, 2015.

36- Haensch et al., 2010: 1-8.

37- Reddaway, 1951: 49.

38- Porter, 2012: 25.

39- Leason, 1962.

40- Moote, 2008: 19.



1- Early Appearance of the Disease (Pre-pandemic phase)

The first group of the words deals with the primitive signs and worries related to the diseases. These collocations encompass initial symptoms emerged in the beginning of each epidemic. Obviously, in pre-pandemic phase, the diseases were not widespread yet; as a result, public attitudes towards them were not frightened and panicked. That is because people were not much aware of perilousness of such diseases, or probably, they were only hitting small geographical regions. This category includes the following words: “direction”, “concerning”, “infected”, “red”, “black”, and “fever”, to name a few.

The beginning stage of an epidemic is a phase where viruses move around animal bodies with no sign of human infection. Next, the viruses are transmitted into human bodies and small communities of human beings start to get infectious. This is a phase where that disease is becoming epidemic, yet not pandemic, as mild signs of early-onset of diseases appear. This category of collocations is concerned with this phase of an epidemic.

2- The Outburst of the Disease (Pandemic phase)

The second category of collocations is affiliated with prevalence of the disease. This is a phase in which small infectious communities are becoming larger and larger and the disease is turning to be ubiquitous as a result of close contact with infected individuals. This stage where the disease has spread in most continents and regions around the globe is called the pandemic phase. The collocations related to this group were: “pestilence”, “sore”, “die”, “poison”, “blood”, “pock”, “shingles”, “vomiting”, and “melancholy” among others. These are the severe advanced symptoms of the diseases that would finally lead to death. All the words convey serious condition of sick people and how the pandemic swayed the usual flow of their lives. Most collocates found in EEBO are concerned with this category, which connotes the greatness of calamity and suffering that people would tackle.

3- The Preventing Measures (Post-pandemic phase)

The third category of collocations is pertinent to the efforts done in order to find a treatment to stop or minimize the expansion of the diseases. In this phase, the public prevalence of the pandemic begins to diminish gradually and special measures must be taken to prevent a second pandemic, which is why it is referred to as post-pandemic phase. The words in this group include: cure, treat, observation, preserve, remedy,



and diagnostic. It goes without saying that all these words deal with medication and medical treatment in general. That is to say, in this stage, doctors and health centers were trying to discover a cure to stop the pandemic. Thus, the public attitudes might have changed under this category as hopes were about to glitter among sadness and gloom as a result of the development of scientific medicine.

Correspondingly, the analysis of epidemic diseases in EEBO shows a change in public attitude towards deadly diseases as time went by; because in the 15th century, these pandemics were not frightening as they were just began being widespread. In the 16th century, however, the notion of deadly diseases entered a new dark and fearsome phase mainly because most epidemics reached their peak and murdered millions of victims. In the 17th century, conceptualization of the diseases went through transformations due to more attention paid to find treatments.

EEBO was limited to books printed up to the 17th century, where many deadly diseases were still in their pandemic phase. Given the fact that most of the treatments including vaccines and antibiotics were discovered in the 19th and 20th centuries, if the corpus encompassed the data of the subsequent centuries, collocation analysis would yield a deeper vision of the representation of deadly diseases in terms of public attitudes.

Focusing on the connotations of the collocations of the target diseases, the researchers counted and identified negative collocates with the aid of “www.semdom.com”, a website which offers the positivity and negativity of words semantically. The following table (table 7) depicts the number of negative collocates for each disease in each century. Figure 2 also illustrates the frequency of negative collocates schematically.

Table 7: The number of negative collocates for each disease in different centuries

Disease \ Centuries	Centuries		
	15th	16th	17th
Typhus	0	2	1
Malaria	0	5	1
Cholera	0	11	8
Smallpox	0	19	3
Measles	0	20	3
Plague	3	178	135



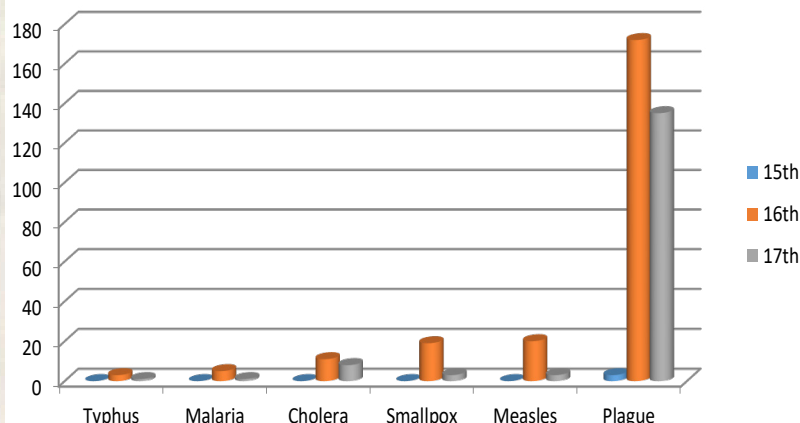


Figure 2. The frequency of negative collocates for the target diseases

As the figure suggests, the target diseases did not have many negative collocates in the 15th century. This may be due to the fact that these diseases were not completely known in that particular period of time (roughly pre-pandemic phase). The number of the negative collocates rose dramatically in the 16th century (roughly pandemic phase) for all the diseases because the 16th century was the historical period of outburst for most of these diseases around the world. Part of such an increase in negative collocates is related to inevitability of use of negative words by written texts for the purpose of informing people about the symptoms of these diseases. In the 17th century (post-pandemic phase approximately), the target diseases were known and medical development were employed to treat these deadly diseases; hence, the number of negative collocates decreased remarkably. Texts were trying to show the situations under control and alleviate the public's panic about these horrifying diseases. Overall, it can be concluded that the public attitude has become meaningfully recovered about the deadly diseases in the 17th century due to a more positive representations of them in texts.

Conclusion

The corpus-driven approach along with collocation analysis in this study was used to present an in-depth representation of deadly diseases in EEBO from the 15th to 17th centuries, when lethal epidemics were in vogue. The findings show that public attitudes towards these diseases have changed through time. This result has been drawn with the aid of corpus-linguistics which can provide an opportunity



for health care communities to have a clear picture of manifestation of diseases in public attitudes and how they affect public health. The results of this study could be beneficial in health topics, health concerns and counseling sessions to build up the particularities of health care genre. It might present useful strategies for health practitioners to soothe their patients and for general evaluation of public opinion. In other words, such studies pave the way for training health service staff that must be educated for talking patient into positive attitudes.

In conclusion, it could be suggested that researchers working in the field of health care gain an opportunity to access authentic data in order to have clear understanding of the power of public attitudes of diseases representations, which can be found in authentic corpora. This is another hidden aspect of health care not accessible in laboratory conditions, yet vital to be aware of. The contribution of corpus-linguistics in medical field is accentuated in the present study to offer insights for clinical outcomes.

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