



News media's framing of health policy and its implications for government communication: A text mining analysis of news coverage on a policy to expand health insurance coverage in South Korea

Wonkwang Jo^{a,b}, Myoungsoon You^{c,d,*}

^a The Institute for Social Development and Policy Research, Seoul National University: 220-540, 1, Gwanak-ro, Gwanak-gu, Seoul, 08826, Republic of Korea

^b Department of Sociology, Seoul National University: 16-204, 1, Gwanak-ro, Gwanak-gu, Seoul, 08826, Republic of Korea

^c Department of Public Health Science, Graduate School of Public Health, Seoul National University: 1, Gwanak-ro, Gwanak-gu, Seoul, 08826, Republic of Korea

^d Institute of Health and Environment, Seoul National University: 1, Gwanak-ro, Gwanak-gu, Seoul, 08826, Republic of Korea

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ABSTRACT

On August 9, 2017, South Korea announced a new measure to expand National Health Insurance (NHI) coverage, which was nicknamed “Mooncare.” At the early stage of its implementation, the interpretation of a policy by social actors influences its success and the formation of social conflicts around it. This study sought to identify the strategies for interpreting Mooncare in newspapers and government documents and examine the conflicts between them. Therefore, this study used text mining methods that are well-suited to processing large amounts of natural language data. Findings revealed that, while the conservative newspaper *The Chosun Ilbo* tended to highlight the financial feasibility of Mooncare, the liberal newspaper *The Hankyoreh* emphasized the change in rationality of government from the previous administration implied by Mooncare. Additionally, medical newspapers tended to adopt the perspective of healthcare providers and to focus on the changes in the medical system that may threaten them. In contrast, general newspapers tended to adopt the perspective of Mooncare's beneficiaries. Finally, government documents were found to focus on simply introducing the benefits of Mooncare, not responding to the framings of various media. This study identified how various social actors interpreted Mooncare. The results suggest that the government should assume a more active role in the meaning making of the policy.

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1. Introduction

On August 9, 2017, a new measure to expand National Health Insurance (NHI) coverage was announced in South Korea. Because it was introduced in President Moon Jae-in's formal speech, the policy was nicknamed “Mooncare,” similar to “Obamacare,” which refers to the “Patient Protection and Affordable Care Act” that former US President Barack Obama brought into effect in 2010.

According to press reports, the need for Mooncare can be found in the fact that South Korea's NHI coverage rate remains lower than the average in countries that are members of the Organisation for Economic Cooperation and Development (OECD). As a result of these findings, the government announced a mission stating that

“patients should be protected by NHI from bankruptcy or financial suffering when healthcare services are needed.” It accordingly set up a goal to increase the NHI coverage rate from the current 63% to 70% by 2020. Most of the necessary medical services, a list comprising 3800 items, would be included in the benefits package covered by the Mooncare scheme. According to the Ministry of Health and Welfare, to achieve the objectives of Mooncare, about \$28 billion would be spent between 2017 and 2022.

However, the implementation of health policies does not necessarily follow a predictable or intended trajectory [1]. Once a health policy is announced, key stakeholders with divergent interests strive to create their own narratives of the policy, intending to maximize their interests. Typically, discursive policy narratives are delivered to the public through the news media and, in the communicative context, ordinary individuals obtain plausible images and ideas about the aims of the policy and the perceived appropriateness of its benefits [2].

* Corresponding author at: 1, Gwanak-ro, Gwanak-gu, Seoul, 08826, Republic of Korea.

E-mail addresses: thinker1@snu.ac.kr (W. Jo), msyou@snu.ac.kr (M. You).

Therefore, this study focuses on the media's "framing" of Mooncare and the government's "meaning making" of the policy. The focus is on which frame was introduced and which meanings were distributed just after the announcement of Mooncare because the media framing and the government's meaning making, which appear early in the policy implementation, are expected to have a significant impact on the future direction of, and the social conflict over, Mooncare.

An interpretation of an event is as important as the event itself. The sense and meaning of Mooncare could be produced differently, depending on differing perspectives. According to the framing theory, framing is the process of highlighting certain aspects of a phenomenon and building a specific meaning and narrative based on the aspects [3,4]. Using the concept of framing, it can be said that the media introduces a variety of framing to create a specific meaning for Mooncare. The framing of these media dramatically influences the way people perceive Mooncare. That is why media framing also contributes to forming a social conflict surrounding Mooncare. For example, those affected by framing that explains Mooncare from the perspective of a government financial burden and those affected by framing that explains Mooncare from the perspective of reducing patient burden will probably have very different attitudes toward Mooncare and are likely to be conflicted.

It is natural for the government to pay attention to the media's framings. In order to promote the purpose of its policies and induce people's support, the government should take into account the public's social opinion and conflicts created by the media. According to Arjen Boin and others, the process in which organizations such as the government propagate their intended meaning and interpretation competing with various external framings can be conceptualized as "meaning making" [5]. The more policies that require cooperation and consent from the public, the more important is the government's meaning making. Mooncare, considering its size and need for social consensus, requires the government's active meaning making.

In sum, in order to foresee the prospects for Mooncare and the social conflicts surrounding it, there is a need to measure and study the media framings which were introduced early in the implementation of the policy. Furthermore, it is necessary to analyze whether the government is playing a proper role in communicating the meaning of the policy, beginning with the initial announcement and whether it has been efficient and effective.

Unfortunately, there is limited related research. Though studies have been conducted for many years, regarding South Korea's NHI most have focused on its contents and expected effects, and not on social meanings or framings [6,7]. When not limited to South Korea's NHI, research on framings of the media exists; most studies, however, have used traditional content analysis for coding news articles directly [8,9]. Though this method has yielded several meaningful results, it has several limitations. For instance, this approach is not free from the risk of being affected by the subjectivity of the researcher. Additionally, this method adopts a pre-determined coding framework, which blocks the inductive discovery of findings from the data.

Therefore, this study aims to examine various media's framings of Mooncare and the governmental meaning making of the policy, using text mining methods, which make it possible to exploit massive amounts of data more objectively. The study adopts the assumption that the news coverage on Mooncare would be an effective and rich data source to analyze how various meanings are constructed regarding "what Mooncare is about." As mentioned previously, once a health policy is announced, news media plays a role in circulating information and meaning about the policy to the public [10]. If the government aims to implement Mooncare efficiently and effectively, it should consider the media framings and attempt an adequate meaning making of the policy. This study

will analyze whether the government's communication strategy is adequate in considering media framing as well as the media's actual framings. This research uses text mining techniques, including topic modeling, to overcome the limitations of existing research methods and identify the initial interpretation for Mooncare in a more objective manner.

More specifically, three kinds of analyses were conducted. First, newspaper data were examined to determine the kind of framings that exist. Though it is essential to understand the nature of narrative across leading newspapers to clarify the status and effectiveness of media's framing, this has never been appropriately tried because traditional research methods may not be appropriate for handling large-scale data.

Second, analyses were conducted to determine whether the framing varies depending on the type of media. For this analysis, two types of comparisons (conservative vs. liberal newspaper, and general daily vs. medical news) were conducted. In the first comparison, based on the literature that emphasizes the role of the political view of newspapers in its discursive policy communication, an examination was made to ascertain whether the framing of Mooncare differed in conservative and liberal newspapers. Next, news coverage by the general news media and that by the medical press were compared. If medical news formulates narratives of Mooncare differently from daily newspapers or governmental documents, it will help in understanding the background of the widening dispute encompassing this new health insurance policy.

Finally, it was necessary to identify the gap between the government's designated meaning of the policy and the newspapers' narrative. Weak concordance between the two was presumed to indicate an increased likelihood that government communication is not advantageous for framing the context, information sharing, and policy persuasion.

In sum, the following three research questions were established:

RQ1: What kind of framings exist in the media about Mooncare?

RQ2: How does the coverage of Mooncare differ depending on the type of media? (conservative vs. liberal newspaper, and general daily vs. medical news)

RQ3: What is the focus of governmental documents' meaning making, and how does it correspond to the media framings?

2. Materials and methods

Data were collected from three sources. First, news articles containing the words "Mooncare" and "National Health Insurance" (NHI) in the title or contents were gathered from four daily newspapers (*The Chosun Ilbo*, *Donga Ilbo*, *The Hankyoreh*, and *Kyunghyang Shinmun*) and one news agency (Yonhap News Agency), using a professional website for identifying news articles (EYESurfer). In South Korea, *The Chosun Ilbo* ranks the highest in daily circulation, and, with *Donga Ilbo*, it represents the conservative press. Comparatively, *The Hankyoreh* and *Kyunghyang Shinmun*, which rank 7th and 8th in daily circulation, respectively, are known as liberal newspapers. Yonhap News Agency was included as it is the most influential news agency in South Korea. After identifying news articles, those that were unrelated to Mooncare were deleted.

Data were also collected from four medical newspapers (*Doctorsnews*, *Youngdoctor*, *Dailymedi*, and *Rapportian*). As evident from their names, the first two convey news targeting doctors and their organizations. *Doctorsnews*, formerly known as *KMATimes*, has been published by the Korean Medical Association (KMA) since 1967. *Youngdoctor* was established by a group of young doctors involved in a social movement in the late 1980s and was launched by the news service in 1992. According to information on their official websites, *Dailymedi* and *Rapportian* target a broader audience. The same keywords as those used for gen-

eral newspapers, were used to identify news articles from these medical newspapers (Mooncare and NHI). Lastly, 26 text materials which have been created to provide information regarding Mooncare (e.g., press releases) were collected from the official website explaining Mooncare (<http://medicare1.nhis.or.kr/hongbo/static/html/minisite/sub/bj03.2.html>). Scripts of four speeches by President Moon Jae-in on Mooncare were also included. To investigate the early framing of Mooncare, the reference period for all data was August 9, 2017 to February 9, 2018, six months after the introduction of Mooncare.

Text mining methods were used to analyze 1617 pieces of text (26 official government documents, 488 general daily articles, and 1103 medical newspaper articles) to infer framings and meaning-making strategies in the data. Like content analysis, which is often used in studies on communication, public administration, and politics, text mining is an effective method for transforming unstructured written and oral communication material into data for quantitative analysis. Although both allow researchers to discern semantic patterns or frames from the text, content analysis is less powerful when large amounts of data need to be processed. For instance, it would be difficult for one or two authors to read and code over 1000 news articles thoroughly. Furthermore, content analysis is susceptible to the researcher's subjectivity and biases in thematizing and interpreting the data.

Alternatively, text mining is advantageous because it can "take large amounts of unstructured language and quickly extract useful and novel insights" [11]. This approach was deemed relevant and effective for this study because it aimed to extract meaning from words produced in diverse texts. Specifically, two methods, topic modeling and word network analysis, were used. The underlying assumption was that the existence of a specific framing or meaning making would be evident from the appearance of specific words and networks of words. For example, if a text intends to deliver the meaning of Mooncare from the patient's perspective, words related to patients (e.g., patient, devastating medical cost) would appear frequently, and the words Mooncare or NHI coverage reform would appear in the same sentence or document. Thus, frequently appearing words and various types of co-appearances of words could help the researchers to infer framing and meaning-making strategies. The two methods mentioned above are suitable for this purpose, and they complement each other.

Topic modeling is a method to estimate multiple topics and distributions of topics in each document from an extensive collection [12]. This method is useful for summarizing and extracting framings in large amounts of text data because extracted topics have information about frequently appearing words and networks of words in a given text. These are valuable resources for inferring the framing and prevalent narrative style.

The term "topic" means a probability distribution of words that are most likely to generate given text [13]. This study can infer framing and narrative from a topic because the probability distribution of words indicates which words appear frequently and which appear simultaneously. For example, let us assume the occurrence of the following topic (a probability distribution of words): [Mooncare – 0.05, burden – 0.05, government – 0.04, budget – 0.02, . . .]. From this topic, it can be inferred that "Mooncare" and "burden" appear most often in documents on this topic. Additionally, it can be inferred that "Mooncare," "burden," "government," and "budget" are highly likely to compose a cluster of words that convey a specific meaning or make a frame. It is rational to assume that the individuals who produced the text data focused on the effect of Mooncare on the national financial burden. Therefore, the framing or narrative style can be deduced from a topic.

As mentioned previously, topic modeling methods extract "multiple" topics and estimate the distribution of topics in each document. That is, topic modeling assumes that each document is

composed of multiple topics; a realistic assumption because one document, usually, has multiple themes or points.

The actual process of extracting topics could be summarized as follows: Topic modeling assumes that a document is a bag of words (BoW), which means that the frequency and type of words are the information used to develop a model (a sequence of words is ignored). Additionally, topic modeling assumes the prior distributions of parameters of interest, in this case, probabilities of words and proportions of topics in each document. The type of prior distributions could differ based on the type of topic modeling algorithm used. For example, Latent Dirichlet Allocation (LDA), which is used most frequently for topic modeling, utilizes Dirichlet distribution as prior distributions [14]. In determining the prior distribution, researchers need to determine several hyper-parameters, such as topic number, and parameters of prior distribution. Finally, various algorithms (e.g., Gibbs Sampler, Variational Inference) are used to update prior distributions to posterior distributions using the given text, that is, a collection of bags of words [15]. By using this statistical procedure, it can be assumed that topics and their distributions are most likely to generate given text data. Consequently, topics can be interpreted not only as summaries of the given text data but also as indicators that trace framings and meaning-making strategies that would have influenced the writers of the given text.

The Structural Topic Model (STM), a topic modeling method, is useful for answering the research questions. STM extracts additional information from the data compared to LDA. STM attempts to infer differences in topic proportions or contents based on the meta-information of documents, such as author category or time of publication [16,17]. This feature makes it possible to estimate the differences in topic proportions among different media or varied types of text. STM was adopted to infer the difference in topic proportions among newspapers and to interpret the results as different framing among media.

Researchers need to interpret the results of topic modeling appropriately because the results are mere probability distributions, and they do not carry any intuitive meaning. Therefore, a human interpreter needs to infer the meaning of the results. For instance, with reference to the example topic explained earlier, the researchers inferred the narrative that emphasized the financial burden of Mooncare. We interpreted each topic based on two kinds of information. First, within each topic, a cluster of words was identified as relevant based on its probability and FLEX score. Words with a high probability of appearing in a topic are considered significant. However, paradoxically, a word with a high probability of appearance in all topics, would be deemed unimportant because it does not provide any unique information about the topic. The FLEX score is an index used to resolve this issue by considering the exclusivity of words in a topic. Second, in addition to a cluster of important words in a topic, identifying a group of documents in which the topic occupies a large proportion of the document is also helpful in interpreting topics, as it signals the realization of the topic in real human language. In this study, all topics were interpreted based on these two sources of information, through agreements between two authors. The following table is an example of a topic interpretation in this paper. All the titles and words have been translated into English (Table 1). In the actual analysis, the top 10 documents and 20 important words (10 top-probability words and 10 top-FLEX-score words) were considered.

A network clustering analysis was also conducted to summarize the results of the STM. The topic model extracted dozens of topics from the data, which was an excellent summary of more than 1500 documents. However, it still comprised large quantities of information that could not be understood by human intuition alone.

Given that the primary purpose of a topic model is to summarize large volumes of text data and to identify the approximate

Table 1
Example of topic interpretation.

Titles of reports in which the topic was most prevalent	Important words in the topic	Interpretation
Dementia is different from aging . . . relevant state policy	Highest probability: dementia, patient, recuperation, long-term, center	Policies of expanding national services for individuals with dementia
The government starts to expand national services for individuals with dementia Healthcare insurance benefits for light dementia	FREQ: dementia, assurance, nutrition, rating, national services for dementia patients	

framing tendency inherent in them, it would be helpful to use another method to summarize the extracted topics again. Therefore, this study involved an analysis of correlative information between topics. In addition to basic topic modeling, STM estimates the correlation coefficient among topics, which indicates the likelihood of co-appearance of topics in the same document. The positive correlation coefficients between topics were converted to network information, and a network clustering algorithm was applied to extract clusters of topics that were judged to be more strongly connected in terms of the probability of emergence in each document. Specifically, the Walktrap algorithm was used because of its strength in avoiding resolution problems [18,19]. This approach yields clusters of topics, which are produced in a data-driven manner, and the results aid the extraction of more intuitive interpretations without subjective bias.

In addition to topic modeling, a network analysis was conducted. Although topic modeling extracts a cluster of essential words, their connections are unclear. In principle, words that are not connected by any criterion can have a high probability of appearing simultaneously in the same topic. The word network analysis measures and analyzes the connection between words more directly.

The connection between words was defined as co-appearance in the same document. Analyzing networks of words could reveal important information. In this paper, the centrality of all words in each document group was measured and used to infer the central concept or subject in the documents based on centrality indexes. In network analysis, the centrality index indicates the importance level of each node or word, considering the connection of the node with other. For this, two indexes, *degree centrality* and *betweenness centrality* were used [20]. Specifically, the former indicates how many nodes are linked to the node in question. Thus, the more a node connects with other nodes, the more important it becomes in the network. Since degree centrality only considers direct connections and thus could miss centrality resulting from indirect connections, it is necessary to examine betweenness centrality to reduce the gap. The focus of this measure is how frequently a node (word) appears on the shortest path between the other node pairs. Thus, betweenness centrality can be useful when the network is clustered into several groups of nodes.

It is possible to define the connection between words based on other criteria, like co-appearance in the same sentence. The reason why a network based on the co-appearance in the same document was used in calculating the centrality index was to see the centrality of the words when considering the networks between different subjects. The subject of a sentence is usually singular, so it is not possible to capture links between multiple contents from the network based on co-appearance in the same sentence. The sentence-based network was only used to examine words associated with “burden” because one of our research objectives was to ascertain who felt burdened or in what areas burden was described to be imposed on people. This is indicated by the subject or object of the sentence in which the word “burden” was used, so it was necessary to examine the words that appeared in the same sentences as the word “burden.”

R and Python were used, with their following packages or libraries to conduct the analyses: R packages STM (Version 1.3.3, for applying STM), igraph (Version 1.2.2, for network analysis), tidyverse (Version 1.2.1, for data cleaning and transforming), widyr (Version 0.1.0, for data transforming), and cowplot (Version 0.9.2, for visualizing); Python library KoNLPy (Version 0.5.1, for morpheme detection and part-of-speech tagging. Komoran (morphological analyzer and a POS tagger) via KoNLPy was used).

3. Results

3.1. The overall schematic of framings for Mooncare used in the early stages of policy implementation

First, using STM, the framings in all newspapers was analyzed. STM yielded 55 topics. The number of topics was determined based on an indicator called held-out likelihood (see Appendix 1 for more information). These 55 topics were interpreted and clustered into six groups using the Walktrap algorithm (step=4) (see Appendix 2 for visualization of topic clusters based on the correlation network). Table 2 presents the interpretations of the 55 topics, their clusters, and the categories in which each topic is judged to appear more frequently (General: general daily, Medical: medical news, ND: not determined). The topics have been sorted by “Cluster” and “Frequent Category.”

Subsequently, clusters of topics were interpreted based on topics belonging to each cluster. For example, Cluster 1 comprised eight topics and was named: “The government’s macro-level social policy plan and implementation of Mooncare,” as this interpretation could cover all eight topics. Table 3 presents the interpretation of six clusters covering 51 topics (the remaining four topics, #4, #21, #48, and #53, did not form a cluster).

Table 3 could be considered as a summary of framings in the complete body of newspaper data (1593 news reports). All data were summarized into 55 topics and re-summarized into six clusters. The early framings of Mooncare appeared to comprise four kinds of narratives. The first narrative pertained to describing Mooncare in the context of the overall government policy (Cluster 1 and 4). The second narrative pertained to structural problems in the current medical system and changes in this structure caused by the introduction of Mooncare (Cluster 3 and 6). The third narrative referred to the benefits for beneficiaries of Mooncare (Cluster 5). The fourth narrative dealt with the reactions of key stakeholders (Cluster 2).

3.2. Different framing of Mooncare among newspapers

While it is fundamental to grasp the overall framings of Mooncare, it is essential to identify the differences in framing based on the type and political position of the newspaper. According to our analysis, the framing of Mooncare differed distinctly across newspapers—an important clue to understanding the social conflicts surrounding Mooncare.

First, there was a clear difference between medical newspapers whose primary subscribers are professional health care providers

Table 2
Topic interpretation and other information.

Topic Num	Frequent Category	Cluster	Interpretation
2	General	1	Public opinion and policy debates surrounding Mooncare
15	General	1	Ministry of Health and Welfare's philosophy of inclusive welfare in Moon Jae-in's government
23	General	1	News on the government's budget plan for 2018 (August)
25	General	1	The government's general and macro-level policy plan and related controversy
33	General	1	Political squabbling (including a small amount of discussion on Mooncare)
39	General	1	Moon Jae-in government's macro-level policy
43	General	1	Conflict between the ruling and opposition parties in the national assembly over the budget plan
20	ND	1	News of the implementation of Mooncare and its impact on the bio and pharmaceutical industry/enterprises (such as stocks)
30	General	2	News of increased coverage by National Health Insurance (NHI) in cancer treatment by Mooncare
5	Medical	2	Opposition to Mooncare and organizational news of future medical service providers, such as "Korean Intern Resident Association."
8	Medical	2	Participation in emergency committee and anti-Mooncare demonstration by medical interest groups in each region
18	Medical	2	Consultation between the government and medical interest groups
26	Medical	2	The Ministry of Health and Welfare's reporting of major plans (e.g., job creation, medical cost reduction) to the President, who left several comments on it
34	Medical	2	Inter-agency relationships and internal relationships among medical stakeholders
37	Medical	2	Healthcare stakeholders' resistance to the expansion of NHI's coverage and counterproposal to overcome the deterioration of their profits
47	Medical	2	Ensuring proper medical payment and discussing primary health care
49	Medical	2	Debates on the improvement of delivery system and Mooncare
51	Medical	2	Establishment of the Korean Medical Association's emergency committee to oppose Mooncare and issues in the use of medical devices in Korean oriental medicine
52	Medical	2	Promises made by the government to the medical community (e.g., ensuring proper medical payment)
55	Medical	2	Naming NHI coverage expansion as "Mooncare."
44	ND	2	Medical interest groups' direct action against Mooncare (e.g., demonstrations)
45	ND	2	The government's appeasement of the medical community and criticism of the medical community in the civil society
46	ND	2	Elections for various groups of doctors and other organizations
1	General	3	Excessive price gap and unfair payment in health care
3	General	3	Policies of expanding national services for individuals with dementia
9	General	3	Important social security policies
50	General	3	Financial scenarios and arguments in the implementation of Mooncare
10	Medical	3	Experts' attempts to publicize Mooncare and establish governance
12	Medical	3	Discussions on the financing and use of NHI reserves for the implementation of Mooncare
16	Medical	3	Support for catastrophic medical expenses and funding for them
17	Medical	3	System reforms to support the implementation of Mooncare by focusing on the "Health Insurance Review and Assessment Service" and the assessment system
38	Medical	3	Discussing the introduction of a global contract system
41	Medical	3	Modifying the healthcare system to support the implementation of Mooncare, such as payment system revision, patient classification system revision, DUR expansion, etc.
7	ND	3	The government's examination of lists and prices of treatments that were not covered by NHI and exertion of pressure on hospitals to disclose related information
36	ND	3	Macro-medical system problems, including health inequality
42	ND	3	Diagnosis and prospecting of the healthcare system based on the cost of care
31	General	4	Announcement of the economic revitalization policy
32	General	4	Revision of private loss insurance in accordance with the implementation of Mooncare
22	ND	4	News on the Ministry of Health and Welfare's budget decision for 2018
27	General	5	Reducing burden on and facilitating reimbursement for recipients through Mooncare
29	General	5	The President's explaining Mooncare to the people
6	ND	5	Changes in the NHI coverage of major treatment according to Mooncare, with reference to osteoporosis and tooth implant
11	ND	5	A big picture of Mooncare, which is expanding the scope of NHI coverage
24	ND	5	Rare diseases, diabetes, and other conditions that can be covered by the implementation of Mooncare
35	ND	5	Beginning to expand the scope of NHI coverage and creating a list of treatments that would be included under NHI's coverage
40	ND	5	Various arrangements and comments from the Ministry of Health and Welfare for implementing Mooncare
54	ND	5	A pilot project on Mooncare and related cases
13	Medical	6	Preparing Mooncare by focusing on nursing care provider coordination and nursing care integrated services
14	Medical	6	Pressing to disclose a list of experts who have consulted on Mooncare
19	Medical	6	Coordinating organization and personnel for implementing Mooncare
28	ND	6	The opposition party's attack on Mooncare through parliamentary inspection
4	ND	7	New leaders and vision of the NHI (focused on Mooncare)
21	ND	8	Government's efforts to promote Mooncare
48	ND	9	Current situation of trauma and acute care surgery centers, and the problem of expanding support for them
53	ND	10	Controversy over the scope of NHI coverage expansion originating from some diseases

Table 3
Cluster interpretation.

Cluster	Interpretation
1	The government's macro-level social policy plan and the implementation of Mooncare
2	Activities of key stakeholders on Mooncare
3	Problems of the current health care system and revising the system to support the implementation of Mooncare
4	Economy and budget
5	Details of the expansion of National Health Insurance coverage and beneficiaries' benefits
6	Experts' comments on Mooncare and arrangement of medical personnel (e.g., nurse)

and general dailies whose primary subscribers are consumers of healthcare services. This difference was evident in the categories in which each topic was judged to appear more frequently. As discussed earlier, STM can be used to estimate the proportion difference of topics by document category. This information has been presented in the “Frequent Category” column in Table 2.

Of the 55 topics identified, 20 appeared more often in medical newspapers, while 16 appeared more often in general dailies. The remaining topics did not have any clear trends in terms of the type of media. An examination of each topic list revealed that medical newspapers were more interested in the activities of the key stakeholders (e.g., medical interest groups) and the structural problems and changes in the healthcare system, especially from the perspective of healthcare providers (e.g., assessment system, payment system, and relevant government organizations). It was also found that all the topics in the medical category belonged to Cluster 2, 3, or 6.

On the other hand, general dailies largely contained information on Mooncare in the context of overall social policy of this Korean government. Additionally, the topics that introduced benefits for beneficiaries and related system changes also appeared frequently in general dailies (e.g., policies for expanding national services for individuals with dementia and reimbursement). The topics in the general category mainly belonged to Clusters 1 and 4. Even the topics in the general category which belongs to Clusters 3 and 5, mainly dealt with the effect of Mooncare from the perspective of beneficiaries. To sum up, these results show that framing of medical newspapers was based on healthcare providers' perspective, while general newspapers adopted the beneficiaries' perspective.

Similar results were obtained from the word network analysis. Fig. 1 summarizes these findings. Each bar represents one of the top 10 words for different indexes (frequency, degree centrality, and betweenness centrality). All the words in Fig. 1 have been translated into English, and the original Korean words have been presented in parenthesis. Words such as “people,” the actual beneficiaries of Mooncare, rarely appeared in medical newspapers, while general newspapers used the word frequently. However, as the measurement of the frequency of word appearance does not consider the relationship between words, these findings are not sufficient for drawing inferences. The centrality index is used to reflect the importance of nodes in word networks (i.e., the relationship among words). Similar results were obtained for the centrality index. In medical newspapers, words that pointed to significant issues for healthcare providers (e.g., Payment, Not Covered by Insurance) were central, while those related to beneficiaries (e.g., People, Burden) were central in general newspapers.

Furthermore, the narratives of Mooncare differed distinctly based on the political view of the media. Fig. 2 shows the differences between two politically representative papers, *The Chosun Ilbo* and *The Hankyoreh*. These two newspapers were chosen from among the four general newspapers because they represent each political position in South Korea, and the most contrasting results

were obtained from their analysis. These results were interpreted as being characteristic of each political perspective on Mooncare, as it is reasonable to assume that their narratives represent the typical narrative of their respective political groups.

Only word network analysis was applied because the number of documents in each category was not adequate for extracting significant results from topic modeling. Each bar in Fig. 2 presents the top 10 words for different indexes (frequency, degree centrality, betweenness centrality, and frequency of link with “burden”).

As evident from Fig. 2, “Public Financing” and “Burden” were dominant in the conservative newspaper *The Chosun Ilbo*, while “President” and “Moon Jae-in” were used more frequently in the liberal paper *The Hankyoreh* (the words that would obviously appear in the documents dealing with Mooncare were excluded from consideration [e.g., NHI, Government]). The centrality index revealed that “Public Financing” and “Burden” in *The Chosun Ilbo*, and “President” and “Moon Jae-in” in *The Hankyoreh*, appeared not only most frequently but also in a central position in the word network that was developed based on the co-appearance of words in the same news article.

However, the meaning conveyed by words with high centrality in a document remains unclear. For example, “burden,” which appeared commonly in news articles on Mooncare, could refer to the government's increased use of public financing or patient's decreased burden of medical costs. Therefore, the co-appearance of words in the same sentence, not document, was measured. Results showed that, in *The Chosun Ilbo*, “Burden” co-appeared as often with “Government” as it did with “Patient.” In contrast, in the liberal newspaper, “Patient” emerged as the sole top-ranking word.

3.3. Government documents and media's news coverage

Based on the frequent words and those linked with “burden,” it was found that the government's meaning-making strategy was relatively simple and that it did not consider the media's various framings.

Fig. 3 shows that “Dementia,” “Burden,” “People,” and “Patient” appeared most frequently in government documents, indicating that the government's communications focused on beneficiaries and the actual benefits of the policy. The words linked with “Burden” indicated that these terms were used to indicate the patient's or people's burden as in government documents because words such as “Medical Expense,” “Patient,” and “Person in Question” occupied high positions in Fig. 3.

In short, the government's documents mainly described the benefits of the policy from the perspective of patients and ordinary individuals. The present results also revealed that the government's meaning making did not consider or respond to the various framings of the media. While various focuses of Mooncare were discovered in the different news media examined, those in the government's materials were rather simple, which indicated one-way information provision.

4. Discussion

The population's health is a critical indicator of a successful and well-functioning society. Accordingly, it is important to design and implement effective healthcare policies, mainly because health is not enhanced in a vacuum. Rather, it is influenced by joint efforts among policies, regulations and laws, and programs.

Mooncare was introduced in South Korea in August 2017, as a governmental decision, plan, and action to expand NHI coverage to reduce patients' disease burden. However, since its introduction, Mooncare has often attracted questions over its feasibility. Although public support for the current government is high, and

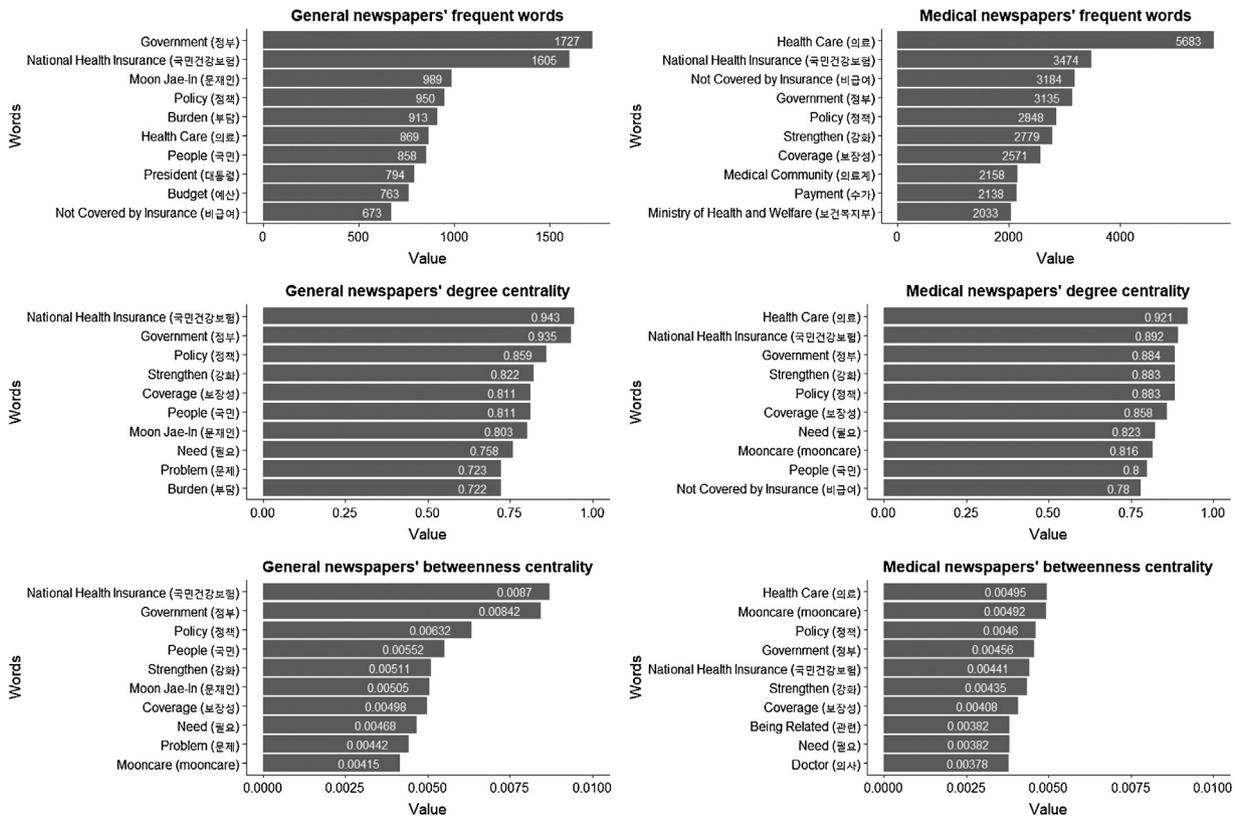


Fig. 1. Difference between general (488 articles) and medical newspapers (1103 articles).

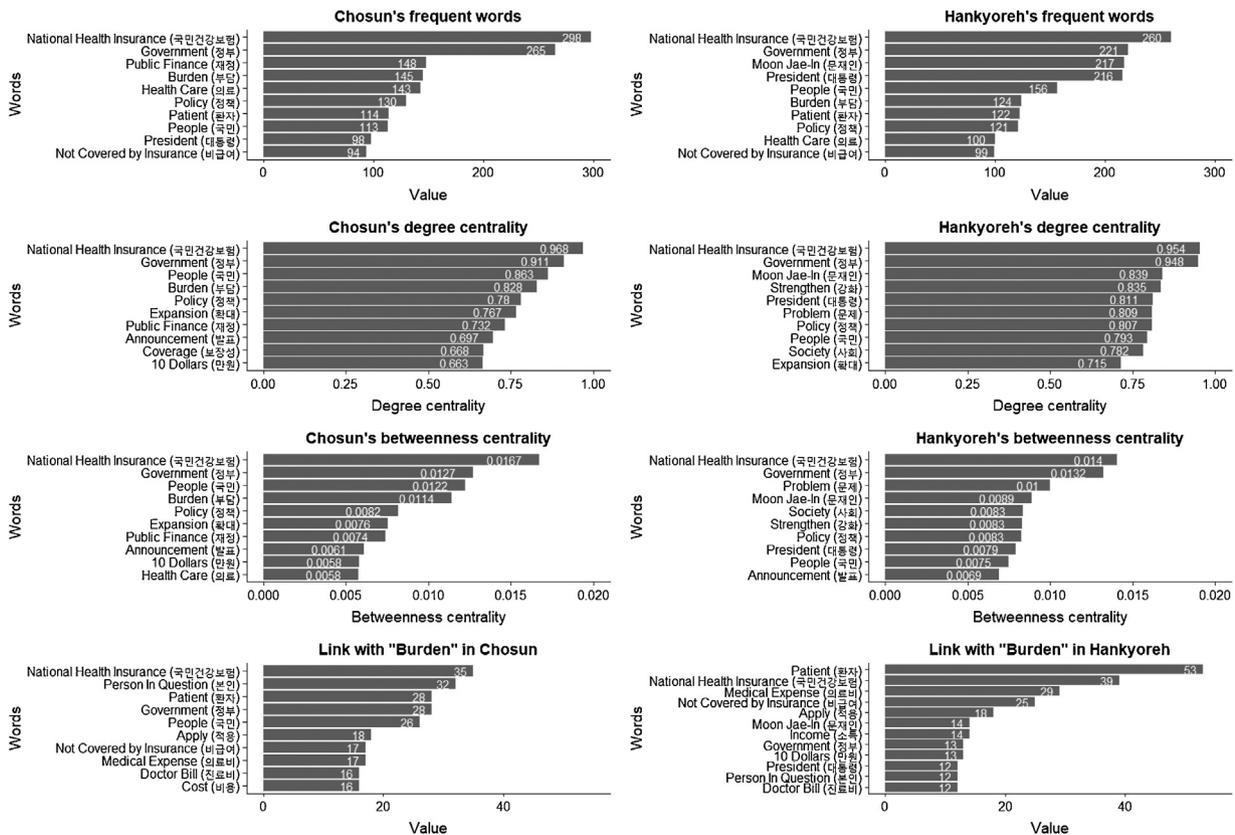


Fig. 2. Difference between *The Chosun Ilbo* (64 articles) and *The Hankyoreh* (60 articles).

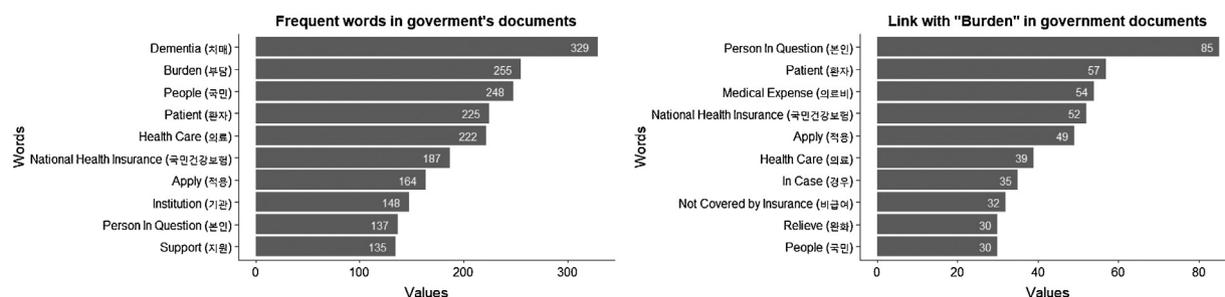


Fig. 3. Results pertaining to governmental documents (26 articles).

President Moon Jae-in is more popular than ever (the judgment is based on 2018), this does not guarantee the success of the policy. Therefore, this study attempted to evaluate whether stakeholders' meanings of Mooncare are consistent with the original policy's intent. Our special focus was on news media's framings of Mooncare. By analyzing more than a thousand news articles on Mooncare released in the six months following its introduction, in an attempt to identify framings of Mooncare in diverse news media. Lack of consistency of these framings with the government's narratives of Mooncare would evince a frame contest between policy implementers and other stakeholders calling for increased communicative interventions from the government to reduce the perception gap to achieving the intended goals of Mooncare.

In this data analysis, unlike prior studies that tended to focus on public surveys and/or key stakeholders' interviews, text mining methods were used, such as topic modeling, to analyze the news coverage on Mooncare from nine leading news media in South Korea. These methods are recommended to process large amounts of text data and to reduce subjectivity bias of the researchers, which is often cited as the reason for the lack of rigor in studies using content analysis and other qualitative approaches.

As expected, the differences in the cognitive highlights of Mooncare were identified among various newspapers, and between governmental and media discourses. Different framings were identified between general dailies, and the news media's political perspective explained the gap. Specifically, *The Chosun Ilbo*, which is a conservative newspaper, kept delivering the meaning that Mooncare would increase the financial burden on the South Korean government, which in turn could increase the stress on taxpayers. However, the same word "Burden" was interpreted contrastingly in the representative liberal newspaper. While burden was likely to mean increased economic burden in *The Chosun Ilbo*, *The Hankyoreh*, which is a liberal newspaper, conveyed the government's attempt to protect patients confronting high medical costs by implementing Mooncare. Furthermore, our word network analysis confirmed that *The Hankyoreh* frequently used the words "President" and "Moon Jae-in," which had the highest centrality in the word networks. This implied that *The Hankyoreh* intended to highlight Mooncare as a reformative action that aims to reduce patients' burden of high medical costs.

This result is interesting but not surprising. The current government came into power after the impeachment of the former President, who was supported by conservatives. Those who were opposed to the former government, including the liberal news media, might have expected that the current government, under President Moon's leadership, would do the right things to protect the underprivileged. Thus, Mooncare might be perceived not only as a healthcare policy but also as an evidence for the change in rationality of government from the previous administration [21–23].

Medical news was considered as an important source of framings of Mooncare. For Mooncare's implementers, the success of the scheme needs support not only from the beneficiaries but also from

healthcare providers. Findings of our topic modeling shed light on a substantial gap in the narratives of Mooncare between general and medical newspapers. Medical newspapers tended to focus on the medical system's change that could influence healthcare providers (e.g., changes in the payment system) and the medical community's collective actions against the government. The word network analysis showed that the words indicating medical service recipients, like "People," rarely appeared in medical newspapers. It is not irrational to conclude that medical newspapers adopt a service provider-oriented viewpoint. This result shows the epistemological background of tensions and disputes between KMA, which represents medical providers, and the government, the single purchaser of South Korea's NHI, which represents ordinary individuals in the country.

Lastly, it was found that the government only provided technical information on Mooncare (i.e., what Mooncare is), rather than actively providing a meaning of the policy. Considering the prominence and relevance of communication messages, the majority of these materials prepared by the government were not prepared well enough to motivate ordinary individuals to pay attention to the benefits of Mooncare or to intervene in many of the media's framings, despite the existence of various and strained frame contests in the media. When a healthcare policy appears, governmental institutions and officers are required to develop and maintain understanding and support for healthcare providers and ordinary individuals. Therefore, it is important for the government to focus on better communication with the public about what Mooncare intends to achieve, why it is essential, and what cooperation and collaboration are needed to achieve the policy's goals.

5. Conclusions

The evidence from multiple text mining methods on a large volume of news articles on Mooncare during the early stage of its implementation suggests that the social meaning of Mooncare is not concordant with what it intends to achieve. News media, a key player in agenda setting, produces meanings of the new policy depending on its political view. Specifically, while conservative newspapers emphasize the risks involved, such as the financial burden on the government and taxpayers, liberal newspapers strive to connect Mooncare with the government's accountability to protect individuals from life and health crises, implying that it is the new President's leadership identity. Furthermore, the focus of articles on Mooncare differed significantly between general and medical newspapers. Among medical newspapers, dominant meanings related to Mooncare pertained to a system change that might be a threat for medical providers. A relatively small number of medical newspaper articles addressed the expected benefits for patients and ordinary individuals owing to the implementation of this policy. Lastly, no evidence was found that indicated that the government effectively responded to such diverse framings.

People seek information when they face an unexpected situation. Thus, when Mooncare was introduced, the public needed to cognitively navigate the available information to understand its aims and goals. Since a value structure, rather than technical knowledge, is important for the successful implementation of a healthcare policy, efforts to gain and maintain public understanding and support are critical—particularly in the case of South Korea, where tensions between providers and purchasers are common. Thus, it is not surprising that physician groups might be against Mooncare. However, the implementation of Mooncare cannot be achieved without collaborative governance with such groups. Therefore, it is important to know how healthcare providers make sense of Mooncare. The government's meaning making is not active enough to intervene and control the social meaning of the media. It is, therefore, recommended that the government evaluate its prior performance in policy communication in terms of the “frame contest” with reference to news media and political competitors, and to adopt better strategies to determine what information and narratives should be delivered. Otherwise, the government will not be able to control the conflict over the policy.

The current situation proves that our analysis results have a significant policy implication and that similar analyses must be repeated for successful implementation of medical policies in the future. A year and a half after the introduction of the policy, although the policy itself is considered successful, the social conflict surrounding it is unlikely to have been abated. This is especially true of the conflict between healthcare providers and the government. Indeed, this is consistent with the present findings of the analysis of media data from the initial six months of implementation of Mooncare. Furthermore, the Korean government's recent creation of the Center for Public Communication at the National Health Insurance Service (in Korean, 국민건강보험공단 홍보실 국민소통센터) reflects the government's perceived lack of policy communication efforts and the government's failure to produce the intended meaning.

Lastly, this study suggests alternative methods for measuring framings or meanings in healthcare policies or other policies. The framing or meaning-making processes are not explicitly presented in the individual text, though their existence cannot be denied. Researchers or policymakers need to delve into a large volume of texts to reveal framings, which are usually latent. The methods adopted in the present study could be used for understanding framings of policies more efficiently and objectively than before because these methods make it possible to handle massive amounts of data in a short time, and to extract the essence of natural language. The increasing amount of natural language data on healthcare policies (e.g., available on social media) requires methods like these to obtain more advanced evidence-based suggestions on efficient meaning making strategies.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.healthpol.2019.07.011>.

Declaration of Competing Interest

There are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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