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ORIGINAL ARTICLE

A Survey of Towards the Utilization of Volunteers as a Preventive Measure for Cognitive Decline in the Elderly; Nursing Care Scenes in an Acute Care Hospital Setting

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ABSTRACT

Acute care hospitals in Japan are struggling to manage the elderly with cognitive decline. In this study, we performed text mining analysis of 312 nurses at 78 hospitals with over 200 beds in the top 10 prefectures in Japan with a large population aged 65 and over to assess scenes in which nurses wanted someone to be involved with the elderly with cognitive decline.

The collection rate was 75.3%, and the valid response rate was 77.4%. Of the 294 sentences in the text data of the 164 participants, the total number of extracted words was 5,133 (2,183 words used), and the number of different words was 704. Among the top 100 frequently occurring words in the list of extracted words, the top 10 extracted words were "correspondence" (47 times); "time" (40 times); "need" (24 times); "fall" (17 times); "many" and "listen" (16 times); and "nurse call," "watch over," "person," and "talk" (all 15 times). From the data created by KH coder, it clarified that nurses in acute care hospitals recollected scenes, such as scenes in which they needed someone to provide basic care based on the symptoms of dementia, scenes in which they needed someone to be involved with patients with dementia for safe and comfortable recuperation, and scenes in which they wanted someone to execute work in the acute phase.

Keywords: The elderly with dementia, Acute care hospitals, Volunteers, Nurses, Conversation partners

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1. Introduction

The total population of Japan is estimated to be 124.71 million as of September 15, 2022, a decrease of 820,000 from the previous year. In contrast, the population aged 65 and over is 36.27 million, an increase of 60,000 from the previous year (36.21 million) and the highest ever. The percentage of the total population is 29.1%, which is a record high, indicating an increase of 0.3 percentage points from the previous year (28.8%)¹⁾. In 2012, the number of elderly people with dementia was 4.62 million, and about one in seven people aged 65 and over suffered from dementia (prevalence rate of 15.0%). In 2025, the number is expected to be approximately 7 million, and about one in five elderly people over the age of 65 will develop dementia²⁾.

Under these circumstances, the Ministry of Health, Labor and Welfare aims to create a society in which people with dementia are respected and can continue to live in their own way as much as possible in their familiar surroundings. In January 2015, the Comprehensive Strategy to Accelerate Dementia Measures, so-called the New Orange Plan, was formulated. The New Orange Plan consists of seven pillars. Of these, "timely and appropriate medical care and caregiving according to the condition of dementia" was listed to improve the ability to correspond to dementia in general hospitals, such as appropriate correspondence to behavioral and psychological symptoms of dementia (BPSD) and physical complications³⁾. In 2019, the seven pillars of the New Orange Plan were followed by five pillars of the Framework for Promoting Dementia Care. In June 2023, The Dementia Basic Act to promote the realization of a cohesive society was approved. Its aim is comprehensive and systematic promotion of policies to enable those with dementia to live in dignity with a sense of purpose.

In acute care hospitals, the prevalence of dementia among patients aged 65 and older was 23.5% in 2014, increasing to 32.5% in 2022⁴⁾. In the acute phase, nurses perform important roles, such as assisting with various treatments and examinations and managing medical equipment. In addition, nursing practices are increasing because of the shortening of hospital stay. "Recuperative care" is important for the elderly with dementia. However, nurses in acute care hospitals feel the dilemma of nursing care related to symptoms of dementia^{5),6)} and feel the dilemma of whether to choose safety or dignity when it comes to fall prevention⁷⁾.

44.5% of patients with dementia in acute care hospitals use one of the 11 physical restraints specified by long-term care insurance⁸⁾. It is pointed that the prioritization of the value of accident prevention in both aspects about legal/environmental and clinical implementation about nursing care for the elderly with dementia in acute care hospitals⁹⁾. In 2016, "Advocating for Older Adults with Dementia in Acute Care Hospitals 2016" was announced, and in the same year, the revision of medical fees included the additional dementia care¹⁰⁾. In a super-aged society, the number of hospitalizations for the elderly with dementia is expected to increase in the future. It is urgent and important to improve the quality of dementia care and promote team care for patients with dementia in acute care hospitals. Therefore, in order to resolve nurses' dilemma and improve the quality of care for elderly with dementia, we considered using dementia supporters who are knowledgeable about the symptoms of dementia and how to respond to elderly with dementia.

As of March 31, 2023, the number of dementia supporters was 14,339,585, they were trained in dementia supporters caravan implemented by the Ministry of Health, Labor and Welfare, an increase of 705,382 from the previous year (13,634,203)¹¹⁾. Supporters of people with dementia and their families undertake many activities in the community to enhance the well-being and self-esteem of the elderly, such as "volunteers for listening attentively" and "volunteers as conversation partners," in special elderly nursing homes and group homes for the elderly with dementia^{12),13)}. However,

there is not enough evidence to support the usefulness of dementia supporters and volunteer activities. Similarly, "Establishment of a volunteer organization within the hospital" was added to the evaluation items by the Japan Hospital Function Evaluation Organization (established in 1995), but there were no reports on the usefulness of volunteer activities in acute care hospitals. It is expected that watching over and responding to the elderly with dementia through dementia supporters and volunteer activities will lead to peace of mind and safety for the elderly with dementia. It is also thought to be useful in providing care to compensate for the shortage of nurses and busy nursing duties, as well as providing mental peace to families of elderly with dementia.

Therefore, when introducing volunteers for the elderly with dementia in acute care hospitals, it is necessary to figure out the situations in which nurses need volunteers. This study has significance as a basic investigation toward the introduction of dementia supporters as a volunteer activity in hospital that can replace conventional animal therapy and doll therapy.

2. Purpose of the Study

This study aimed to clarify the scenes in which nurses in acute care hospitals needed someone to watch over and be a conversation partner for the elderly with cognitive decline for the introduction of volunteers for elderly with dementia.

3. Research Methods

3.1. Participants

The participants were nurses working in hospitals with 200 or more beds in the top 10 prefectures in Japan with a large population aged 65 and over. As for healthcare system in Japan, hospitals with less than 200 beds are classified as family medicine in terms of medical fees. Therefore, we targeted hospitals with 200 or more beds that were not primary care hospitals.

3.2. Data Collection

We requested cooperation from hospitals with 200 or more beds in the top 10 prefectures with the largest population of people aged 65 and over. Then, questionnaires were distributed to 78 hospitals that were able to obtain cooperation (for four nurses per hospital) by posting mail.

Basic attributes of the target person were investigated, such as age, gender, years of experience, and position, and questions were asked about the introduction of volunteers, such as both frequency and scenes in which nurses wanted someone to be involved with the elderly with cognitive decline. In response to the question, "Would you want someone to be involved with elderly with dementia instead of nurses?" it was measured on a 4-point scale of <very often> <yes> <sometimes> and <no>, as for <very often> <yes> and <sometimes>, scenes were freely described.

3.3. Data Analysis Method

3.3.1. Reasons for choosing an analysis method

Analysis was performed using text mining software KH Coder (version 3.0). Text mining is a general term for techniques that try to find meaningful information and features¹⁴). It is a quantitative analysis method that uses statistical methods, focusing on the number of occurrences of words, types of parts of speech, and relationships between words contained in the text data to be analyzed¹⁵). Text mining using KH Coder was chosen because it ensured the objectivity and reliability

of the analysis,¹⁶⁾ such as the possibility of objectively analyzing the free descriptions of situations in which nurses in acute care hospitals wanted someone to be involved with the elderly with cognitive decline instead of themselves.

3.3.2. Analysis procedures

- 1) We entered free descriptions of situations in an Excel file, checked context before and after sentences, corrected typos and converted kanji, and unified words that were almost synonymous but had different spellings. We then decomposed the sentences into parts of speech through morphological analysis.
- 2) The division of medical treatment and nursing care terminology into smaller units would affect data analysis. Therefore, we carried out forced extraction using the “selection of words” function.
- 3) We excluded words that might identify individuals or organizations, such as proper nouns, organization names, personal names, place names, and interjective parts of speech.
- 4) The total number of extracted words (number of words used) refers to the total number of words included in the analysis, and the number of different words (number of words used) refers to how many types of words were included. The number of words used is the number of words that KH Coder recognizes by excluding common words that appear in any sentence, such as particles and auxiliary verbs. Words with a large number of occurrences were confirmed.
- 5) A co-occurrence network is the network of words with similar appearance patterns. The degree of co-occurrence was measured by the Jaccard coefficient, and the co-occurrence relationship was represented by circles and lines.
- 6) It is conceivable that the head and chief nurses (hereafter referred to as nurse managers) and the staff who provide training guidance, education, and night shifts (hereafter referred to as the nursing staff) have different perceptions of how to deal with the elderly with dementia. There may be different perceptions between nurse manager and the nursing staff because nursing managers manage overall nursing care and do not provide direct care. Moreover, specific scenes might influence how often both nurse managers and the nursing staff wanted someone to be involved with the elderly with dementia instead of nurses. Therefore, we used the positions of nurse managers and the nursing staff and the frequency of thoughts as external variables, and confirmed the co-occurrence relationship by the Jaccard coefficient for each variable.
- 7) We extracted characteristic words in position and frequency. Characteristic words are words or phrases that appear biased toward their attribute after taking into consideration not only the frequency but also the distribution. The resulting number represents the Jaccard coefficient. Frequent words had a low Jaccard coefficient and were excluded from the top 10 words, while characteristic words had a high Jaccard coefficient.

4. Definition of Terms

In this study, a "substitute (*kawari* in Japanese)" is a person who acts as a substitute for nurses to watch over and be a conversation partner for the elderly with dementia. "Being involved with the elderly with dementia" was defined as creating a place where it is easy to talk, not denying or evaluating what is being said, showing a willingness to listen and accept the patient's thoughts, and watching over the patient to ensure safety without restricting movement at the bedside or in the day room.

5. Ethical Considerations

An anonymous self-administered questionnaire was distributed to each participant, and explanations were given verbally and in writing about the purpose and method of the study, protection of personal information, voluntary nature of participation in the study, and the fact that there would be no disadvantage even if the participant did not participate in the study. The questionnaires were collected in separate envelopes, and return of a completed questionnaire was taken as consent to participate in the study. This study was approved by the ethics committee to which the researchers belong (approval number 2019-7).

6. Results

6.1. Overview of the Participants

A total of 312 questionnaires were distributed to 78 hospitals that cooperated with us, and 235 questionnaires were collected (response rate: 75.3%). There were 182 valid responses (valid response rate: 77.4%). The participants were 8 males and 174 females whose average age was 40.16 (SD=9.15) and average years of experience were 16.54 (SD=8.65). 167 participants answered that they wanted someone to be involved with the elderly with dementia instead of themselves, and 15 people did not want someone to be involved with them. Of the 167 participants who answered that they wanted someone to be involved with the patients, 164 were included in the analysis after excluding 3 who did not describe specific situations. Of the 43 nurse managers, 14 answered <very often>, 15 answered <yes>, and 14 answered <sometimes>. Of the 121 nursing staff members, 44 answered <very often>, 36 answered <yes>, and 55 answered <sometimes> (Figure 1).

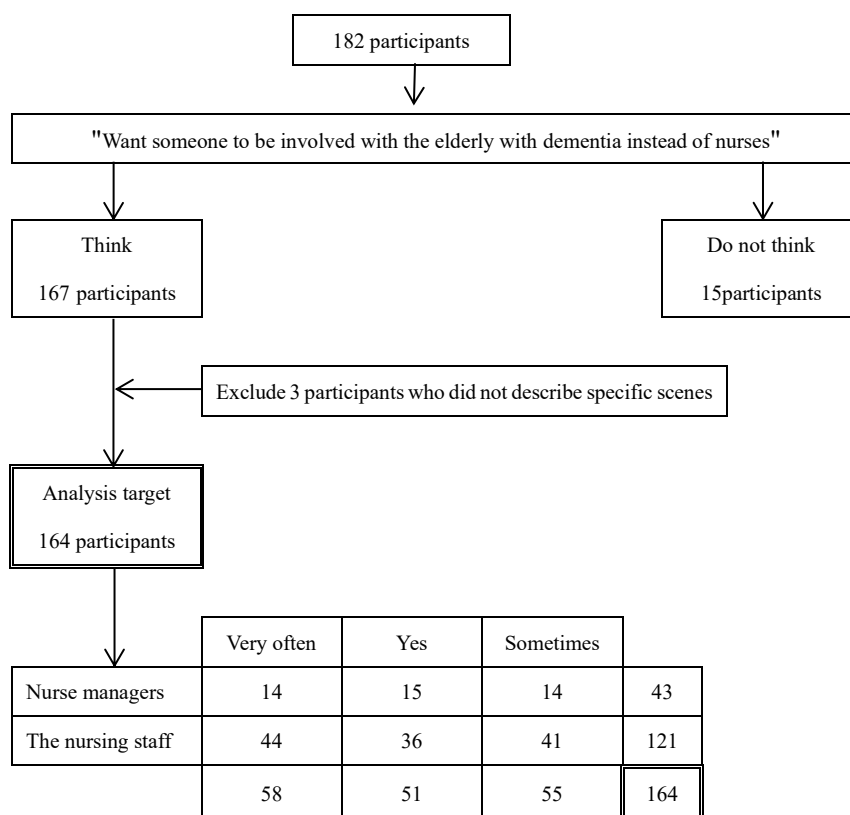


Figure 1. Overview of the participants

6.2. Frequent Words in Specific Scenes

In the 294 sentences in the text data of the 164 participants, the total number of extracted words was 5,133 (2,183 words used), the number of different words was 704 (545 words used), the number of occurrences was 4.01 times, and the standard deviation of the number of occurrences was 10.55.

Among the top 100 frequently occurring words in the list of extracted words, the top 10 extracted words were "correspondence" (47 times), "time" (40 times), "need" (24 times), "fall" (17 times), "many" and "listen" (16 times), and "nurse call," "watch over," "person," and "talk" (all together 15 times). The 57 words that appeared eight or more times in the list were shown in Table 1.

Table 1. The frequently words in situations in which nurses wanted someone to be involved with patients instead of themselves

Extracted word	Number of occurrences	Extracted word	Number of occurrences	Extracted word	Number of occurrences
Correspondence (*)	47	Other (noun)	13	Leave (verb)	10
Time (adverb possible)	40	Intravenous drip (*)	13	Self (noun)	9
Need (adjective verb)	24	Eyes (noun)	13	Treatment (*)	9
Fall (*)	17	Staff (noun)	12	Few (adjective)	9
Many (adjective)	16	Risk (noun)	12	State (noun)	9
Listen (verb)	16	Case (adverb possible)	12	Explanation (*)	9
Nurse call (tag)	15	Involve (verb)	11	Decrease (*)	9
Watch over (verb)	15	Repeat (verb)	11	Talk (verb)	9
Person (noun)	15	Ward (noun)	11	Rest (noun)	8
Talk (*)	15	Suppression (*)	11	Together (*)	8
Delirium (noun)	14	Dangerous (adjective verb)	10	Nurse (tag)	8
Task (noun)	14	Conduct (verb)	10	Strong (adjective)	8
Think (verb)	14	Go (verb)	10	Say (verb)	8
Calm down (verb)	14	Oneself (noun)	10	Face each other (verb)	8
Can take (eyes) off (verb)	14	Removal (tag)	10	High (adjective)	8
Wandering (*)	14	Frequent (tag)	10	Operation (*)	8
Care (noun)	13	Unrest (adjective verb)	10	Scene (noun)	8
Toilet (noun)	13	Night (noun)	10	Situation (noun)	8
Behavior (*)	13	Night shifts (*)	10	Cognitive function (tag)	8

Note; (*) = nouns that become verbs by adding "do (*suru* in Japanese)"

6.3. The Co-occurrence Relationship

6.3.1. Overall picture of the co-occurrence network

The co-occurrence network consisted of eight subgraphs (Figure 2). Each subgraph was assigned a group name from I to VIII. The numbers shown in the figure are the Jaccard coefficients (hereafter referred to as Jaccard). The larger the number of occurrences, the larger the circle, and the stronger the co-occurrence relationship, the darker the line. Extracted words in the co-occurrence network were indicated by " ", descriptive data were *italicized* « » , and words drawn within them were underlined. In addition, their usage was analyzed by reading the context before and after the words classified into eight subgraphs. Each group was given a name that expressed the characteristics of the scene in which nurses wanted someone to care for the elderly with dementia instead of them and was indicated by [] (Table 2).

Group I consisted of 14 words, which was more than the other groups, and in order of the number of occurrences, it was co-occurrence words, such as "time," "person," "talk," "task," "think," "calm down," "other," "involve," "suppression," "self," "face each other," "condition," "call," and "too busy." "Task" was highly central and had a co-occurrence relationship with "other" (Jaccard=0.23), "involve" (Jaccard=0.19), "talk" (Jaccard=0.17), "self" (Jaccard=0.17), and "face each other" (Jaccard=0.16). "Think" formed another centrality and had a co-occurrence relationship with "face each other" (Jaccard = 0.33), "calm down" (Jaccard = 0.19), "person" (Jaccard = 0.18), and "call" (Jaccard = 0.13). It was also associated with "staff" (Jaccard=0.17). "Time" had the highest number of occurrences and had a co-occurrence relationship with "involve" (Jaccard=0.19). It was [scenes where nurses could not have enough time to be involved with them], such as «*I don't have time to get involved and talk slowly*», «*I want to listen to their talk slowly, but when I have another task*», «*I cannot do myself a task in a situation where I cannot take my eyes off*», and «*I think that having someone by their side and telling them "It is okay," they are able to calm down, but I cannot find the time to do that myself*».

Group II consisted of 9 words: "correspondence," "need," "fall," "intravenous drip," "risk," "removal," "self," "rest," and "high." "Correspondence" appeared frequently and had a co-occurrence relationship with "necessary" (Jaccard=0.16) and "fall" (Jaccard=0.15). "Self" had a strong co-occurrence relationship with "removal" (Jaccard=0.58), "high" (Jaccard=0.31), and "intravenous drip" (Jaccard=0.29). Examples of [scenes where priority was given to avoiding risks such as removal of intravenous drips and falls] were «*It is need to give priority to the treatment and examination of other patients*», «*Patients who having risk of removal of roots or falling try to move alone restless*», «*They need rest, but they cannot keep it*», and «*There are concern of self-removal or falling during postoperative intravenous drip or insertion of a drain*».

Group III consisted of 10 words: "listen," "wandering," "staff," "ward," "unrest," "night shift," "state," "few," "talk," and "together." "State" had a co-occurrence relationship with "staff" (Jaccard = 0.20), "ward" (Jaccard = 0.19), "unrest" (Jaccard = 0.19), and "listen" (Jaccard = 0.15). In addition, "few" had a co-occurrence relationship with "night shift" (Jaccard = 0.27), "together" (Jaccard = 0.25), and "wandering" (Jaccard = 0.21). Examples of [scenes where it was difficult to correspond on night shifts with fewer nurses] were «*Especially when there are few staff, such as night shifts or weekends, they are likely to become unrest and I cannot leave their side*», «*I cannot take my eyes off wandering around at the night shift when there are few nurses*», «*They get so excited that they don't listen to what I say*», and «*I don't have time to listen to their current thoughts and concerns*».

Group IV consisted of 9 words: "nurse call," "delirium," "frequent," "night," "nurse," "say," "medical treatment," "hand," and "violence". "Nurse call" had a strong co-occurrence relationship with "frequent" (Jaccard=0.44), and "night" had a co-occurrence relationship with "delirium" (Jaccard=0.26). Examples of [scenes where care according to need was required], including frequent nurse calls and night delirium, were «*We can't communicate with each other, they keep getting nurse calls frequently*» and «*Marked night delirium and terrible wild words for nurses*».

Group V consisted of 9 words: "care," "toilet," "repeat," "go," "treatment," "explanation," "operation," "go home," and "watch." "Repeat" had a co-occurrence relationship with "go home" (Jaccard=0.31), "toilet" (Jaccard=0.25), "care" (Jaccard=0.21), and "explanation" (Jaccard=0.19). Examples of [scenes where it was necessary to compromise on other tasks such as care and treatment] were «*Repeat the same question over and over again*», «*Unfamiliar with the environment, repeatedly saying "I want to go home"*», «*Insufficient time due to treatment and care for other patients*», and «*Repeated complaints of "I want to go to toilet"*».

Group VI consisted of 4 words: "can take (eyes) off," "behavior," "eyes," and "dangerous." "Danger" had a strong co-occurrence relationship with "behavior" (Jaccard=0.28) and "fall" (Jaccard=0.17) in Group II. Examples of [scenes where there was dangerous behavior and nurses could not take their eyes off] were «*There is dangerous behavior and I cannot take my eyes off*» and «*When their behavior is restless. When it is judged that it is dangerous if I take my eyes off*».

Group VII consisted of two words: "watch" and "do" (Jaccard=0.16). Examples of [scenes where nurses wanted someone to watch over during recuperation] were «*Watching over when conducting medical care such as intravenous drips and drains*» and «*I want someone to watch over them about simple things like activities and coloring pages*».

Group VIII consisted of three words: "many," "decrease," and "cognitive function." "Cognitive function" had a strong co-occurrence relationship with "decrease" (Jaccard=0.89). Examples of [scenes where nurses realized the current situation in which there were many patients with cognitive impairment] were «*Many patients are elderly, and many of them have cognitive function decrease, it is difficult to do work smoothly*», and «*To need someone to talk to because they have many sleep during the day*».

Nurses in acute care hospitals recollected [scenes where care according to need was required] and [scenes where there was dangerous behavior and they could not take their eyes off], such as frequent nurse calls and night delirium, from [scenes where nurses realized the current situation in which there were many patients with cognitive impairment]. In addition, nurses recollected [scenes where it was necessary to compromise on other tasks such as care and treatment], [scenes where it was difficult to correspond on night shifts with fewer nurses], and [scenes where priority was given to avoiding risks such as removal of intravenous drips and falls] and found it difficult to carry out tasks. On the other hand, they recollected the scenes where they felt the necessity of involvement for the mental stability of the elderly with dementia from [scenes where nurses could not have enough time to be involved with them] and [scenes where they wanted someone to watch over during recuperation].

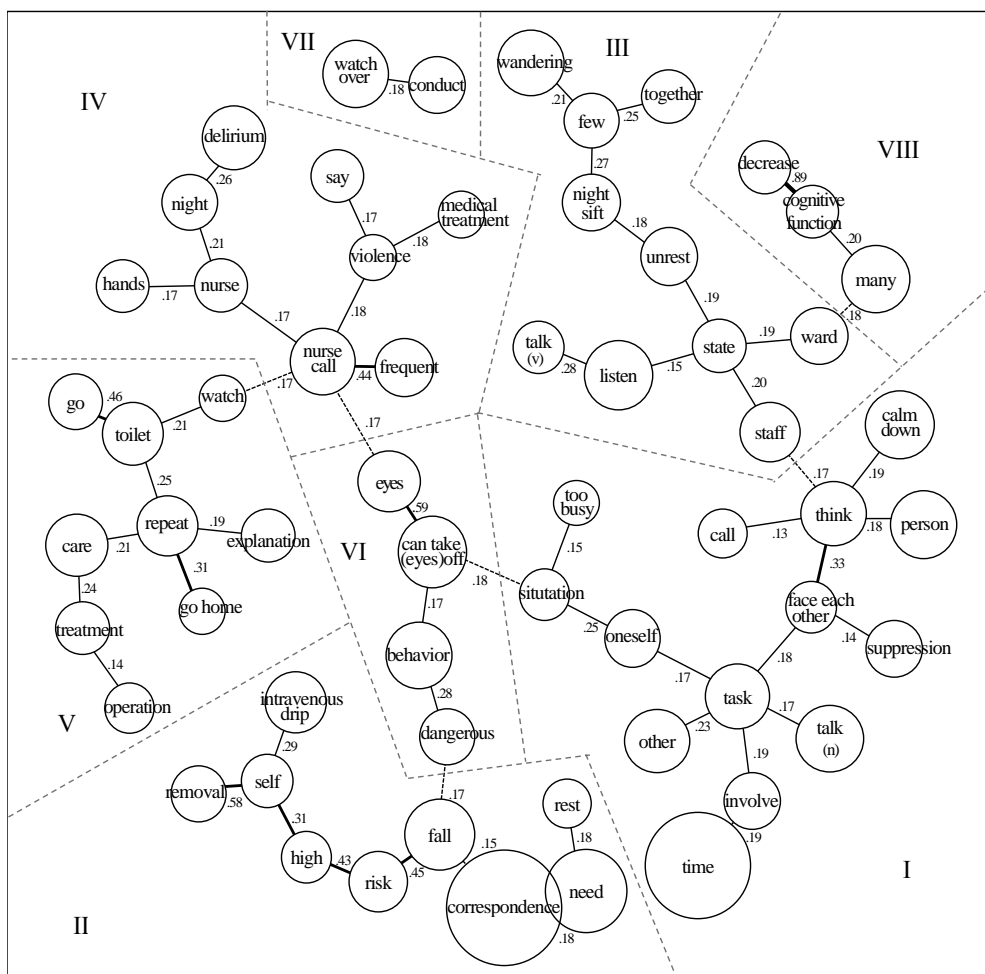


Figure 2. Overall picture of co-occurrence network in scenes nurses want someone to be involved with the other elderly with cognitive decline instead of themselves

Note; The larger the number of occurrences, the larger the circle, and the stronger the co-occurrence relationship, the darker the line. Numbers on the line indicate Jaccard coefficients. Numbers in dotted frames indicate group classifications.

Table 2. Characteristics of situations from extracted words by group

I	[Scenes where nurses could not have enough time to be involved with them]
II	[Scene where priority was given to avoiding risks such as removal of intravenous drips and falls]
III	[Scenes where it was difficult to correspond on night shifts with fewer nurses]
IV	[Scenes where care according to need was required]
V	[Scenes where it was necessary to compromise on other tasks such as care and treatment]
VI	[Scenes where there was dangerous behavior and nurses could not take their eyes off]
VII	[Scenes where nurses wanted someone to watch over during recuperation]
VIII	[Scenes where nurses realized the current situation in which there were many patients with cognitive impairment]

Note; Roman numerals indicate group classification in Figure 2.

6.3.2. Co-occurrence network with position as an external variable

In the co-occurrence network with position as an external variable, "correspondence," "time," and "fall" had a co-occurrence relationship with both the nursing staff and nurse managers (Figure 3). "Correspondence" had a co-occurrence relationship with the nursing staff (Jaccard=0.23) and nurse managers (Jaccard = 0.10), as for "time" the nursing staff (Jaccard = 0.20), nurse managers (Jaccard=0.09), as for "fall" the nursing staff (Jaccard=0.10), nurse managers (Jaccard=0.09). Both terms had a stronger co-occurrence relationship with the nursing staff than with nurse managers.

For the nursing staff, there was a co-occurrence relationship between "nurse call" (Jaccard=0.10), "toilet" (Jaccard=0.08), "wandering" (Jaccard=0.08), "delirium" (Jaccard=0.08), and "danger" (Jaccard 0.08). The nursing staff recollected [specific scenes related to dementia symptoms]. They felt that the "time" (Jaccard=0.20) to be involved with patients with dementia was the "necessary" (Jaccard=0.15).

For nurse managers, there was a co-occurrence relationship between "watch over" (Jaccard=0.17), "calm down" (Jaccard=0.10), "involve" (Jaccard=0.08), and "talk" (Jaccard=0.08). It is [scenes where nurses wanted to be involved with the elderly with dementia with so that they could continue their hospitalization in peace.] On the other hand, from the words "care" (Jaccard=0.10), "medical treatment" (Jaccard=0.09), and "too busy" (Jaccard=0.14), we could also read [scenes where the busyness of the nursing staff was captured from a managerial view].

6.3.3. Co-occurrence network with frequency as an external variable

In the co-occurrence network in which the frequency of wanting someone to be involved with the patient as an external variable, "correspondence," "time," and "need" were common to any frequency of wanting someone to be involved with the patient (Figure 4).

The frequency of "correspondence" was <very often> (Jaccard=0.17), <yes> (Jaccard=0.16), and <sometimes> (Jaccard=0.14). The more the nurses found it difficult to resolve their problems, the more frequently they wanted someone to care for the patients.

The frequency of "time" was <very often> (Jaccard=0.15), <yes> (Jaccard=0.12), and <sometimes> (Jaccard=0.14). The frequency of <very often> was related to [securing time for care practice that require immediate response to patients with dementia], and <sometimes> was related to [securing time to get close to patients with dementia].

The frequency of "need" was <very often> (Jaccard=0.13), <yes > (Jaccard=0.11), and <sometimes> (Jaccard=0.08). Focusing on related words about nursing care, among all nurses who answered <very often>, "nurse call" (Jaccard=0.14), "toilet" (Jaccard=0.11), "description" (Jaccard=0.10), and "care" (Jaccard=0.09), among all nurses who answered <yes>,"night shift" (Jaccard=0.09), "intravenous drip" (Jaccard=0.08), among all nurses who answered <sometimes>, "involve" (Jaccard=0.08), "face each other" (Jaccard 0.07), "watch over" (Jaccard=0.06). The higher the frequency of wanting someone to be involved with the patients, the more the co-occurrence of vocabulary related to specific care scenes.

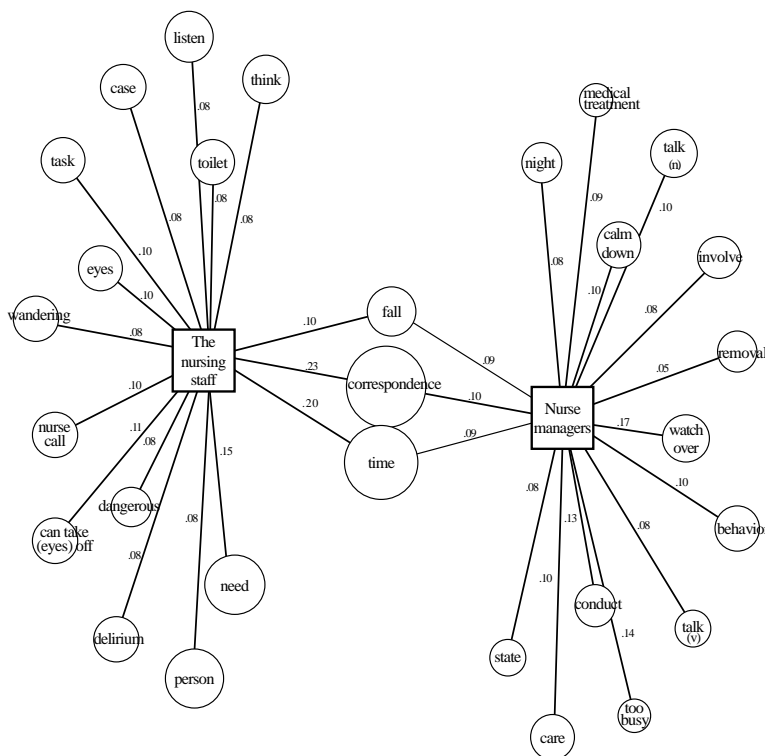


Figure 3. Co-occurrence network by position (the nursing staff or nurse manager) as an external variable
 Note; The larger the number of occurrences, the larger the circle, and the stronger the co-occurrence relationship, the darker the line.
 Numbers on the line indicate Jaccard coefficients.

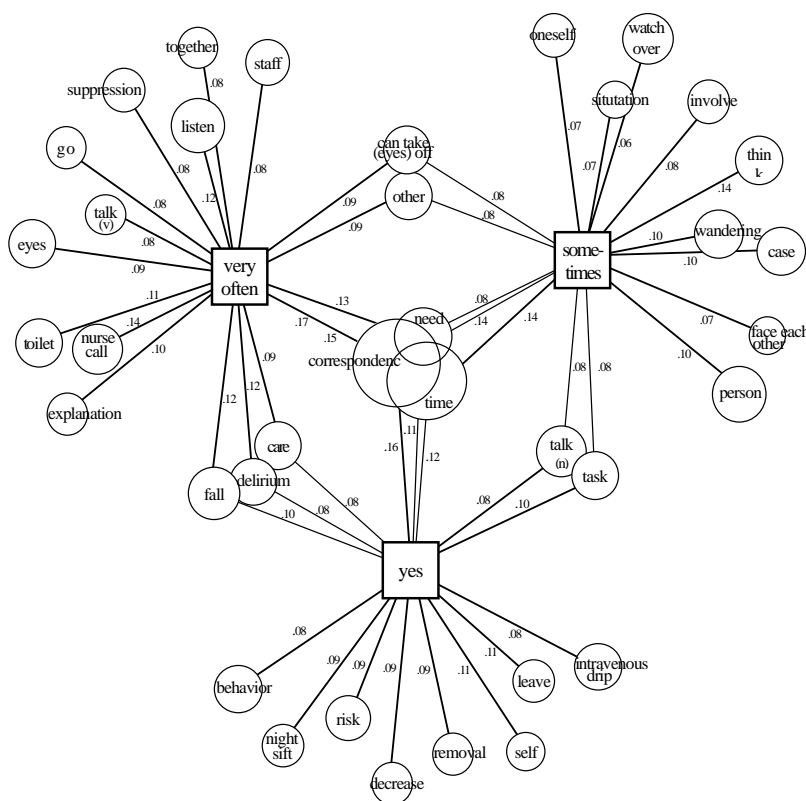


Figure 4. Co-occurrence network by frequency (in which nurses want someone to face each other patients with dementia instead of themselves) as an external variable
 Note; The larger the number of occurrences, the larger the circle, and the stronger the co-occurrence relationship, the darker the line.
 Numbers on the line indicate Jaccard coefficients.

6.4. Characteristic Words in Position and Frequency

The characteristics of words in "position" and "frequency" are shown in Table 3 and Table 4.

1) The nursing staffs

Among the nursing staff who answered that there were scenes in which they wanted <very often> someone to be involved with the patients with dementia, it was characteristic words about the influence on work because of [difficulty of correspondence], such as "correspondence" (Jaccard=0.157) and "time" (Jaccard=0.134). Examples of characteristic words related to [symptoms and behavior] associated with dementia were "toilet" (Jaccard=0.149), "delirium" (Jaccard=0.137), "fall" (Jaccard=0.109).

Among the nursing staff who answered <yes> , "correspondence" (Jaccard=0.159) was extracted as a characteristic word. Other words were extracted from the [perspective of performing a task], for instance, "task" (Jaccard=0.111), "treatment" (Jaccard=0.100), and "night shift" (Jaccard=0.095).

Among the nursing staff who answered <sometimes>, "time" (Jaccard=0.159) was extracted as a characteristic word. "Anxiety" was also extracted (Jaccard=0.070), as it was related to [mental involvement] to reduce anxiety.

The higher the degree of frequency, the more characteristic the words related to [symptoms and behavior]. On the other hand, "time" was perceived differently depending on frequency.

2) Nurse managers

Among nurse managers who answered <very often>, "watch over" (Jaccard=0.130) and "relation" (Jaccard=0.118) were extracted as characteristic words, as they indicated [mental involvement] in a calm environment.

Among nurse managers who answered <yes>, "watch over" (Jaccard=0.125), "calm down" (Jaccard=0.120), and "involve" (Jaccard=0.083) were extracted as characteristic words, they wanted [mental involvement] in a calm environment more than nurse managers who answered <very often>.

Among nurse managers who answered <sometimes>, "wild words" (Jaccard=0.118) and "removal" (Jaccard=0.091) were extracted as characteristic words, as they were related to [symptoms and behavior]. As for [perspective of management], among nurse managers, there were characteristic words such as "assessment " and "prevention."

Table 3. Characteristic words by position and frequency

The nurse staff								
<very often >			<yes>			<sometimes>		
Correspondence	†	.157	Correspondence	†	.159	Time	†	.159
Toilet	*	.149	Self		.125	Think		.152
Need		.138	Leave		.122	Case		.106
Delirium	*	.137	Need		.115	Person		.100
Nurse call	*	.137	Task	**	.111	Involve	***	.083
Time	†	.134	Fall	*	.104	Task	**	.078
Eyes		.118	Treatment	**	.100	Can take (eyes) off		.078
Listen		.115	State		.098	Wandering	*	.078
Can take (eyes) off		.115	Decrease		.098	Come		.071
Fall	*	.109	Night shift	**	.095	Anxiety	***	.070

* [symptoms and behavior], ** [perspective of performing a task], *** [mental involvement],

† [difficulty with correspondence]

Note; Numbers in the table indicate Jaccard coefficients.

Table 4. Characteristic words by position and frequency

Nurse managers					
<very much>		<yes>		<sometimes>	
Conduct	.200	Ordinary	.133	Other	.125
State	.150	Watch over ***	.125	Prevention ‡	.125
Assessment ‡	.143	Nurse situation	.125	Talk ***	.120
Afternoon	.143	Calm down ***	.120	Wild word *	.118
Possible	.133	Measurement of body temperature **	.118	Understanding	.118
Watch over ***	.130	Go home	.100	Can obey ***	.111
Bed	.125	Medical treatment **	.100	Rest	.105
Body	.125	Too busy †	.100	Self	.105
Want	.125	Removal *	.087	Too busy †	.105
Relation ***	.118	Involve ***	.083	Removal *	.091

* [symptoms and behavior], ** [perspective of performing a task], *** [mental involvement], † [difficulty with correspondence],

‡ [perspective of management]

Note: Numbers in the table indicate Jaccard coefficients.

7. Discussion

The scenes in which nurses in acute care hospitals wanted someone to be involved with the elderly with dementia were analyzed using the frequency of words used, co-occurrence relationships, and characteristic words.

7.1. Scenes in Which Nurses Wanted Someone to Provide Basic Care Based on the Symptoms of Dementia

In the overall picture of the co-occurrence network, nurses in acute care hospitals recollected [scenes where they realized the current situation in which there were many patients with cognitive impairment]. Even in acute care hospitals, the issues because of increase in the number of the elderly with dementia have been highlighted from [scenes where care according to need was required] and [scenes where there was a dangerous behavior and nurses could not take their eyes off].

In the co-occurrence network with frequency as an external variable, "correspondence," "time," and "need" had a co-occurrence relationship with each frequency. The more the scenes in which nurses suffered from "correspondence" with patients with dementia, the more frequently they wanted someone to be involved with them. Among all nurse who answered <very often>, correspondence was required in a timely and appropriate manner, such as fall prevention, delirium support, and toilet guidance. Among all nurse who answered <yes>, it was related to work situation of nurses, such as correspondence, tasks, and intravenous drips, in night shifts. Among all nurse who answered <sometimes>, there was not a life-threatening risk, but they often thought that they needed someone to watch over, be involved with, and be involved with the elderly for better recuperation.

For the nursing staff, as the frequency increased, characteristic words related to symptoms and behaviors associated with dementia appeared frequently.

In acute care hospitals, hospitalization, treatment, and discharge of patients proceed in formal way. Therefore, when nurses be involved with the elderly with dementia, they are confused by a different perspective from normal nursing care. Nurses in acute care hospitals understand the importance of accurately grasping the cognitive function and physical and psychological conditions of patients with dementia in critical situations¹⁷⁾. Each nurse is required to have self-management

to fully implement predictive correspondences and be involved with the patients with dignity based on dementia symptoms. In addition, the ability of dementia nursing was indicated the ability to cooperate with relevant parties and help the elderly with dementia to maintain lives¹⁸). In the local community, Dementia Supporters actively organize Orange Cafes (places where anyone can easily come, such as elderly with dementia, their families, local residents and professionals), and their activities have already been recognized and established¹⁹). However, experienced volunteers pointed out the need for teamwork with nursing staff, as it was impossible to provide direct physical care to dementia patients²⁰). Therefore, if information on the needs of patients with dementia can be obtained and shared through cooperation with volunteers, for example, dementia supporters, sharing information about needs can be positioned as an ability similar to "the ability to continue living with the elderly with dementia in cooperation with related person."

7.2. Scenes in Which Nurses Wanted Someone to Be Involved with Patients with Dementia for Safe and Comfortable Recuperation

In the co-occurrence network with position as an external variable, "correspondence," "time," and "fall" had a co-occurrence relationship with positions for both the nursing staff and nurse managers. Both positions had a stronger co-occurrence relationship for the nursing staff than for nurse managers.

Reasons for physical restraint include fall and removal by the patients themselves (e.g., intravenous drips) with dementia admitted to acute care hospitals²¹). In addition, although many safety items are prepared for patients with dementia admitted to acute care hospitals, there has been not enough places considered of their well-being²²). Against this background, nurses have become more sensitive to "falling."

Nurse managers recollected [scenes where nurses wanted to be involved with the elderly with dementia with an emphasis on their peacefulness] and [scenes where the busyness of the nursing staff was captured from a managerial point of view]. Acute care hospitals give priority to medical treatment and safety, but they do not provide a physical environment in which the elderly with dementia can feel comfortable. Therefore, volunteers contributed to patients' mental stability. Then, Volunteers were also more psychologically well than support recipients in terms of personal growth, depression and perceived well-being²³), so volunteer work was thought to be beneficial not only for elderly with dementia but also for volunteers.

7.3. Scenes in Which Nurses Wanted Someone to Execute Work in the Acute Phase

In the overall co-occurrence network, nurses often encounter [scenes where nurses could not have enough time to be involved with them], [scenes where it was necessary to compromise on other tasks such as care and treatment], [Scenes where it was difficult to correspond on night shifts with fewer nurses], and [scenes where priority is given to avoiding risks such as removal of intravenous drips and falls]. Therefore, they felt that they did not have "time" for "correspondence" for [scenes where nurses wanted someone to watch over patients during recuperation].

Characteristic words for nurse managers were "assessment" and "prevention." Reflecting on their previous work experience, they felt necessity for their alternative existence in order to prevent cognitive decline and activities of daily living (ADL). In addition, for nurse managers, the higher the frequency, the more the characteristic word "watch over" was extracted. They wanted a relationship based on the premise of facing each other elderly with dementia themselves. However, for the nursing staff, the higher the frequency, the more the characteristic word "correspondence" was extracted. At the

same time as I felt the need for "correspondence" to safely carry out "task", they also felt expectations for someone who could take the place of them in the role of "correspondence".

The nursing staff find it difficult to provide acute nursing care, including care for the elderly with dementia, leading to both reduction and improvement of work, as volunteers watch over patients with dementia and are their conversation partners. Thus, adopting an organizational approach that can improve the response capability according to the environmental characteristics of the ward and nurses' abilities is important.

8. Limitations and Future Challenges

In this study, using the text mining software KH Coder (version 3.0), we analyzed the "free descriptions" of situations where nurses in acute care hospitals thought that elderly people with cognitive decline needed someone to watch over them and be their conversation partners. We obtained basic data on the introduction of volunteers.

However, "free descriptions" did not reflect nurses' recognition of dementia and years of experience. Therefore, it was possible that we could not sufficiently interpret information and characteristics with meaningful and significant. In addition, volunteers at hospitals had to deal with not only elderly people with cognitive decline but also ward nurses. Therefore, in scenes where nurses wanted someone to the elderly with dementia instead of themselves, a system design that allows volunteers to intervene appropriately was required.

9. Conclusions

Through text mining, the following points were reached regarding scenes where nurses in acute care hospitals wanted someone to be involved with the elderly with cognitive decline.

- 1) Regarding position, "correspondence," "time," and "fall" had a co-occurrence relationship with both nurse managers and the nursing staff, and all words had a stronger co-occurrence relationship with the nursing staff than with nurse managers.
- 2) Regarding frequency, "correspondence," "time," and "need" were found to have a co-occurrence relationship with all frequencies, and the frequency increased as the number of scenes in which "correspondence" was more difficult increased.
- 3) For nurse managers, "assessment" and "prevention" were extracted as characteristic words, and the more scenes in which they wanted someone to be involved with the elderly with dementia, the more "watch over" was characteristic word. For the nursing staff, the more scenes in which they wanted someone to care for the elderly with dementia, the more there were characteristic words, such as words related to symptoms and behavior associated with dementia, and "correspondence."
- 4) Nurses in acute care hospitals recollected scenes in which they wanted someone to provide basic care based on the symptoms of dementia, scenes in which they wanted someone to be involved with patients with dementia for safe and comfortable recuperation, and scenes in which they wanted someone to execute work in the acute phase.

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Conflicts of interest

There are no conflicts of interest to disclose regarding this study.

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