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Original Article

The patterns and reasons for changing bed placement in territorialized four-bed rooms in acute care wards

Shingo Tanaka[1)], Keiko Kunie[2)], Yukie Takemura[1)]
Naoko Ichikawa[1)], Ryohei Kida[1)]

[1)] Department of Nursing Administration, Division of Health Sciences and Nursing, Graduate School of Medicine, The University of Tokyo
[2)] Department of Nursing Administration, School of Nursing, Tokyo Women's Medical University

Key words
health services research, beds, patients' rooms, hospital design and construction

Abstract

Aim: This study explored changing bed placement with nurses' intentions to provide appropriate environments for patients in multi-bed rooms in acute care wards.

Methods: A qualitative observational study was conducted in 15 wards of four acute care hospitals. We collected 144 pieces of sketch data on bed placement with respect to nurses' intentions and patients' conditions through direct observation of nine bed spaces and interviews with 37 nurses. After duplicate data were integrated, 92 unique data were analyzed in total, based on the nurses' intentions.

Results: We identified 14 patterns of why nurses change bed placement. There were several bed placements within the same pattern depending on patient conditions and the structure of patient room. While there were patterns serving one intention, some patterns also catered to two or three intentions. Although fixed structural features of the rooms, such as pillars, caused less than optimal placement, the nurses managed to achieve various intentions such as securing patient safety and care space by changing bed placement and using permanent structures of the patient room, such as the walls or the shape of the entire room.

Conclusions: The study found that nurses were creative in using limited space to build the environment needed for each patient, such as securing patient safety and adequate space for care. Understanding specific details on the use and the reason for changing bed placement can contribute to better hospital planning and design in acute care settings.

Corresponding author : Yukie Takemura
Department of Nursing Administration and Advanced Clinical Nursing, Division of Health Sciences and Nursing, Graduate School of Medicine, The University of Tokyo
7 - 3 - 1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan

Introduction

It is important for patients to have an adequate care environment. In order to fulfil this requirement, nurses must arrange for a caring environment, taking each of the patient's conditions into consideration. Evidence-based design (EBD) is based on scientific evaluation, which aids in achieving better healthcare outcomes[1]. In acute care settings, patients receive nursing care in their assigned bed spaces[2]. Acute care hospitals provide care for acute symptoms of various diseases. In addition, the conditions of patients in acute care are more likely to change rapidly than in other hospital bed functions, due to the shortening of hospital stays and the implementation of surgery and chemotherapy for the elderly. Therefore, it is important to create a caring environment that can flexibly respond to various types of patient needs. Therefore, structural design and nursing care are closely related.

Hospitals usually have two types of rooms —private rooms and multi-bed rooms. While private rooms are suitable for infection control and securing privacy, multi-bed rooms are better for preventing loneliness in older people and patient falls[3)4)]. With the increase in the number of private rooms, there is an increase in the cost of building and maintenance as well as travel time for nurses, which may lead to patients' social isolation[2)5)]. Therefore, multi-bed rooms are likely to be used in future too. For this reason, it is necessary to consider a better design for multi-bed rooms to meet the current demands in acute care settings.

A report stated that there is inadequate physical space for nursing care in some multi-bed rooms[2]. Even though it has been shown that sufficient space and flexibility in design are needed for proper bed space[6], it is difficult to design appropriate bed space for the demands of nurses without specific information on why and how they use bed space to meet patients' needs. Moreover, little is known as to how the physical design features of a bedroom influence nursing care[4]. Therefore, investigating the physical layout factors, which are important for optimal bed space in acute care settings, is important.

Patient bed spaces are structurally designed with due concern for infection control as well as patient safety, such as preventing patients from falling, providing efficient care, and patients' personal comfort. As for infection control, a previous study revealed that hand-wash facilities provided close to the bed are beneficial for preventing infections[7]. For efficiency, nurses need sufficient space in bed spaces[2]. For patients' safety, bed rails, alarms, and sensors are used to prevent patients from falling from the bed[8)9)]. In a study on patient comfort, noise and light were reported to be important factors for providing comfortable hospitalization[10]. As mentioned above, previous studies revealed how bed surroundings affect patients and highlighted the need for sufficient space for care.

Flexibility in space usage is also needed to appropriately respond to the various care demands of the patients[6]. A report stated that equipment around beds limited patients' and nurses' mobility[11]. It is expected that nurses would change bed placement when it hinders patient care and is not suitable for specific patient conditions. However, it is unclear how the bed placement is changed according to the patient's condition. Multi-bed rooms have limited space for each bed than private rooms. Understanding the patterns and reasons for changing bed placement in multi-bed rooms can help us understand the necessary characteristics of the physical layout in bed spaces.

In multi-bed rooms, privacy is a concern because multiple patients are put in one room. To incorporate features of private rooms in multi-bed rooms, "territorialized" four-bed rooms (TFRs) have been developed in Japan. Most of the TFRs are convex-shaped with the aim of providing more privacy by placing a window in all bed spaces and reducing visual interactions between patients, compared to regular square-shaped multi-bed rooms[12] (see Figure 1). TFRs were adopted in 85 hospitals in 2008[13]. However, it is unknown how many hospitals adopt TFRs presently. TFRs are designed for patient comfort, thus it is believed that the instances of changing bed placement based on the patient's

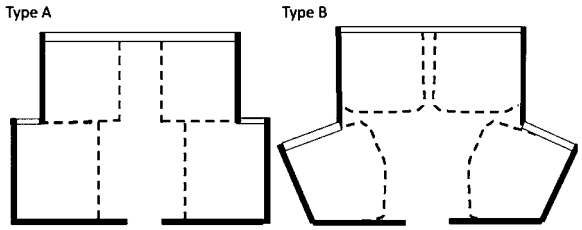


Figure 1 The two types of territorialized four-bed rooms used by the participating hospitals.

Type A (adopted by three hospitals) has all beds arranged in parallel. In Type B (adopted by one hospital), the two beds at the entrance are arranged diagonally.

wishes are lower than in typical square-shaped four-patient multi-bed rooms. Therefore, focusing on changing bed placement in TFRs could reveal various patterns aimed at dealing with clinical care demands.

This study investigated how and why nurses change bed placement in bed spaces of TFRs to fulfil specific spatial needs of bed space in acute care settings.

Method

1. Study design

A qualitative observational study was conducted.

2. Settings and target wards

We selected an acute care hospital in the Kanto region with more than 200 beds with TFRs, using data lists of the Health, Medical Care, and Welfare Facilities Building Information Sheet 2017[14] and Standard Reporting Acceptance Status[15].

The researchers approached 11 hospitals, of which four agreed to participate, following consent from the respective nursing director. Seven hospitals did not participate due to excessive workload or other reasons. Each hospital contained 200–650 beds. Among the four hospitals, two different types of TFRs (Figure 1) were observed: Type A and Type B. In Type A, the two bed spaces closest to the door were square-shaped, while in Type B these bed spaces were oblique-shaped. One of the hospitals used Type B TFRs, while the others used Type A TFRs.

Each nursing director referred the researcher to wards that met the criteria, and fifteen wards (surgical, internal medicine, and mixed) from the four hospitals were included. The inclusion criteria for the wards were acute care wards and intensive care units; emergency departments, and pediatrics, obstetrics, and gynecology wards were excluded. The participating wards comprised both surgical and internal medicine wards.

3. Data collection

All data were collected by the first author, who had work experience as a nurse in an acute-care hospital. For basic information, the following data were collected by directly interviewing the nurse managers in the participating wards: the medical fields of the studied departments and the types, number, and uses of multi-bedrooms. The investigation period was August–November 2018.

We examined how nurses, by changing bed placement, altered bed spaces from the basic layout in TFRs. Data regarding patients' conditions, nurses' intentions, and layout of bed space were obtained by creating sketches and conducting interviews. Data were collected by direct observation of nine bed spaces and interviews with 37 nurses, after explaining the study's objectives to the participants and obtaining verbal consent from the patients and nurses (Table 1). The inclusion criterion for the interview was that the nurses should have at least one-year working experience in the participating ward. The exclusion criterion was nurse managers and nurses with less than one-year working experience in the participating ward. The data collection lasted for approximately three days for each ward.

First, the researcher sketched the changed bed placements by observing the room and the items in the room (such as wheelchairs and tables), after obtaining the respective patients' approval.

After the observation, the researcher conducted 15–30-minute individual interviews with nurses regarding the rearrangement of beds, using the original interview guide, which was designed after thorough discussion among all the researchers. Based on this guide, the researcher

asked questions regarding the method and reason behind changing bed placement observed by the researcher or experienced by the nurse in the past, the tools used, and the patient's physical, psychological, and cognitive conditions. The interview guide contained question such as “What was your intention behind changing the bed placement?” “Please elaborate on the physical, psychological, and cognitive conditions of the patient using this bed.” “If you have prior experience in changing the bed placement excluding the present case, please explain the layouts used before.” Data from the nurses regarding the conditions of the patients using the bed space in question, the reason for the placement, and the usability of the layout were recorded in annotated sketches. We matched data from each sketch and interview regarding patients' conditions, and nurses' intentions and impressions of using the layouts (an example of the sheet used for data collection is shown in Figure 2). Nurses could give their answers about more than one bed placement. The accuracy of each sketch was confirmed by consulting the nurses on the spot. Saturation in data collection was determined when no new information was received from the 37 participants interviewed. A total of 144 pieces of sketch data were collected. Duplicate data regarding bed placement and intention, which were provided from different nurses in the same hospital, were integrated as same data with the addition of patient conditions. We excluded one sketch data in which one patient used two beds. Finally, 92 unique data were obtained.

4. Data analysis

We referenced qualitative cluster analysis[16] and analyzed visual data instead of text data[17]. First, the first three authors (ST, KK, YT) confirmed why and how nurses changed bed placements in TFRs. Next, we classified patterns on the basis of intention; that is, single intention and multiple intentions. The intentions listed in the "Layout Intentions" section in the right center of Figure 2 were inductively integrated to create the final group of intentions. The next step was to group patterns with multiple intentions by common intention. The researchers then classified physical bed placements according to intention and hospital groups. These steps were conducted repeatedly to reach an agreement among the three researchers who participated in the analysis phase.

To verify the reliability and validity of the data, the remaining researchers (NI and RK)

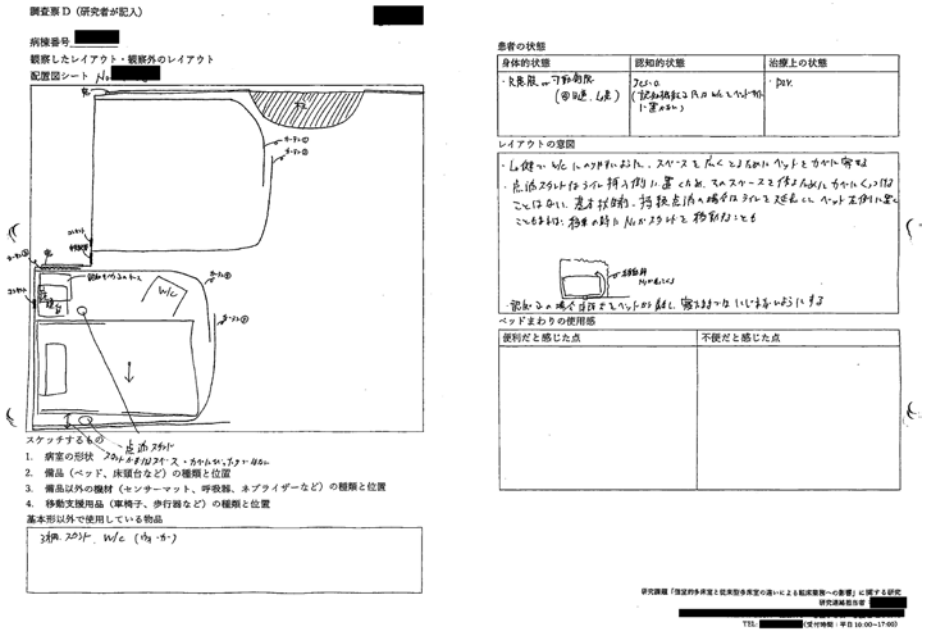


Figure 2　An example of the data collection sheet

The patient-room layout was sketched on the left side, and information about patient status (physical, cognitive, and medical treatment aspects), layout intentions, and usability (convenient and inconvenient aspects) collected through interviews, was on the right side, in order, from top to bottom.

were asked to agree on the results of the analysis obtained through the abovementioned steps[18]. All researchers then discussed and re-assessed data interpretation and categorization to reach a consensus. Finally, we created a table that summarized the layouts observed, taking nurses' intentions and patients' conditions into consideration.

5. Ethical considerations

This study was approved by the Research Ethics Committee of the Graduate School of Medicine and faculty of Medicine of the University of Tokyo (No.12071). Further, the study design conformed to the recommendations of the Declaration of Helsinki. Prior to commencing data collection, the approval of the hospital director or nursing director was obtained for each hospital. If necessary, we also obtained approval

Table 1 Details of the number of observations and interviews in each participating ward

Hospital No.	Ward No.	Type	Number of observations †	Number of interviewees ‡
1	1	A	1	3
	2		0	1
	3		1	2
	4		0	4
2	1	A	1	3
	2		0	3
	3		1	3
	4		1	1
3	1	A	3	3
	2		1	5
4	1	B	0	1
	2		0	2
	3		0	3
	4		0	2
	5		0	1

† For the number of observations, only the number of cases in which changing of the bed placement was performed is described. The number of observations of the unoccupied beds, to understand basic bed position, is not described. Regarding the number of sketches obtained by observation, we collected information about nurses' intentions and patients' conditions from one interviewee.
‡ Multiple layouts of changes regarding bed placement were collected from each interviewee.

Table 2 Intentions of space utilization

No.	Subcategories	Categories
①	For inducing patient to get down from one side.	Securing patient safety
②	For preventing patient from falling down from the bed.	
③	For enabling observation of patients from outside the hospital room.	
④	For enabling observation of patients from outside the hospital room by nurse and keeping patient away from equipment set in bed space such as nurse call.	
⑤	For securing space to set equipment placed beside bed such as portable toilet.	Securing sufficient space for nursing care, and installing medical equipment
⑥	For securing space to set and bring in equipment carried with patient such as wheelchair and drip stand.	
⑦	For facilitating approaching the shared space from the bed.	
⑧	For securing space where nurse can care for patient.	
⑨	For improving patient's recuperation environment about bed space.	Improving patient's recuperation environment

from the ethics committee of the participating hospital. Before data collection, the researchers explained the study details to the respective nurses and patients. Nurses were informed that participation in the survey was not mandatory. Patients were told that the survey was not compulsory and that no personal information would be collected.

Result

We identified nine unique intentions, which were categorized into "securing patient safety," "securing sufficient space for nursing care and installing medical equipment," and improving "patient's recuperation environment" (Table 2). We identified 14 patterns of bed assignment changes by nurses with these intentions. There were seven single-intention patterns and seven multiple-intention patterns. These intentions are listed in Table 1. Table 1 also shows how bed placement in TFRs was changed by nurses to accommodate patients' conditions. Nurses sometimes had only one reason for changing the bed placement, and on other occasions had multiple reasons for doing so. In general, the bed placement was changed by moving the bed to either the left or right side of the bed space. We also observed techniques such as changing the head position.

In many cases, bed placement was changed to secure patient safety; this intention was again based on the patient's condition. For example, in placement No. 1, the bed was placed against a curtain on one side. This placement ensured that the patient (who had declined cognitive function) would get off the bed from the opposite side where a sensor mat was positioned. Since the patient had to step on the mat when getting out of bed, nurses could be quickly alerted when the patient got up and began walking around. Placement No. 2 was similar to No. 1, but the intention behind it was different. In No. 2, one side of the bed was pressed against the wall rather than the curtain, with the intention of preventing patients from falling, in addition to getting patients to exit the bed from one side. This is because the visual guidance of a curtain blocking one side of the bed is not enough to address the risk of a patient falling from the curtain side. Placement No. 2 was used due to the patient's likelihood of falling while trying to climb over the bed rail. In placement No. 3, the bed was placed in a manner similar to No. 1 but was located at the back of the patient room to allow observation from outside the room. As the spaces for the beds at the back of the room were centered when compared with the front spaces, even if the front-space curtains were closed nurses could observe the patients in the back spaces. Placement No. 4 was also placed along the back wall for the same reason. Additionally, the intention to protect patient safety sometimes coincided with other intentions such as securing space (e.g., No. 6 and 7).

The bed placement was also changed to ensure space for movement depending on the patient's conditions. In the case of adding a wheelchair or drip stand or affording movement to and from the bed using a wheelchair (No. 8–11), nurses sought to expand the spaces to the left or right, depending on which side of the patient's body was paralyzed or on which the drip and/or drain was inserted. It was difficult for a wheelchair to pass between the beds in the back spaces because the shared space between the beds in this area was narrow. There were cases where the bed was placed diagonally as the direction for approaching the drip stand or wheelchair was already known (No. 8) because the patient had their leg fixed in a cast; however, placing the bed diagonally could lead to wastage of space. No. 12 depicts a layout where a patient using a wheelchair could directly access a shared space at the front of the room from his/her bed. This was easier if accessed from the front bed spaces because the distance from the shared space to the bed was short and required relatively few direction changes.

In some cases, changes in bed placement resulted in inconveniences even though they were in line with the nurses' intentions. For example, there were cases where beds were placed diagonally (No. 2-g, No. 5-d, No. 7-f & g, No. 8-a & k & m & n, and No. 10-e), which encroached on the

Table 3　A layout map according to nurses' intentions pattern

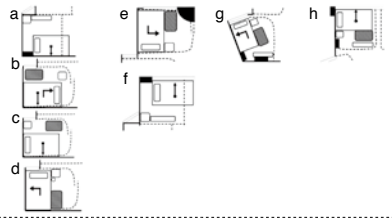
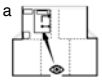
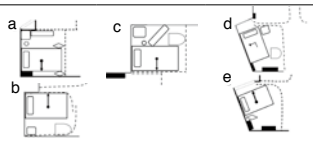
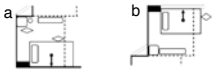
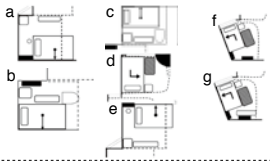
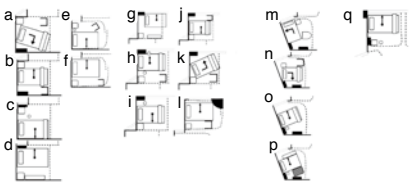
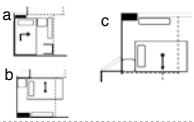
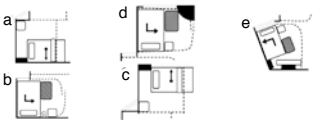
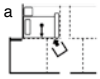
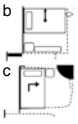
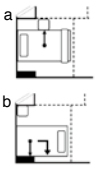
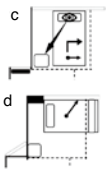
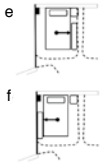
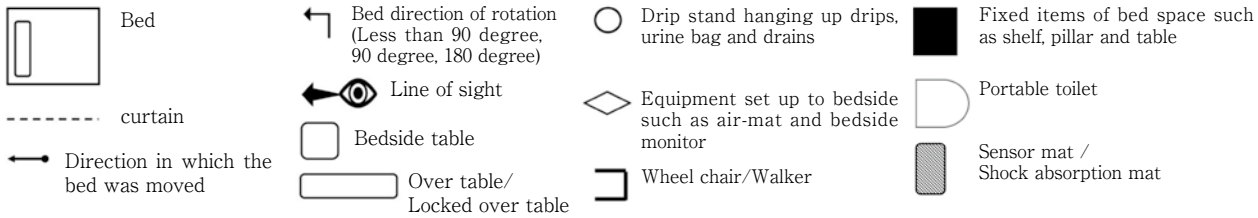
No.	Intentions of space utilization	Space utilization	Layout				Example	
			Type A		Type B			
			Front side	Back side	Front side	Back side	Patient	Equipment
	Basic set position of bed	Allowing space to get off the bed from the right and left sides					Walk freely	
1	①	Attaching one of the long sides of bed on the curtain/ fixed table to pr event patient from recognizing that patient can get down from the side.					Walk alone without pushing nurse call	Sensor mat
2	① + ②	Attaching one of the long sides on the wall to prevent patient from falling down from the bed and prevent patient from recognizing that patient can get down from the side.					Walk alone without pushing nurse call	Sensor mat
3	① + ② + ③	Attaching one of the long sides to the wall to prevent the patient from falling down from the bed and prevent the patient from recognizing that the patient can get down from the side. Place it in the bed on the back side and open the curtain so that the nurse can see the patient from outside the hospital room.					Walk alone without pushing nurse call	Locked over table
4	④	Attaching one of the long sides of bed on the curtain to prevent patient from touching equipment from the bed. Place it in the bed on the back side and open the curtain so that nurse can see the patient from outside the hospital room.					Suicide attempt using anything that patient can touch	
5	⑤	Attaching one of the long sides on the wall/curtain/ fixed table to expand opposite space.					Urinary frequency/Use CPAP	Portable toilet / Cart for holding CPAP
6	⑤ + ②	Attaching one of the long sides on the wall to expand opposite space and prevent patient from falling down from bed.					Confused because after surgery	Air mat / Bedside monitor
7	⑤ + ① + ②	Attaching one of the long sides on the wall to expand opposite space and prevent patient from falling down from bed and recognizing patient can get down from the wall side.					Hemiplegia and declined cognitive function, there is a danger of going over the rail and falling	Drip stand /Portable toilet
8	⑥	Turning the bed or moving bed closer to the wall/window or attaching one of the long sides of bed to the wall/fixed table to expand opposite space. Depending on the condition of the patient such as healthy side and paralyzed side, the side that creates space is restricted to one side and the other side.					Paralysis or hemiplegia / After the operation of the lower limbs /Inserted drains	Wheelchair / Walker / Drip stand
9	⑥ + ①	Attaching one of the long sides of bed to a curtain/wall to make the patient recognize not to get down from that side.					Hemiplegia with declined cognitive function	Wheelchair/ Sensor bed
10	⑥ + ① + ②	Attaching one of the long sides of bed to a wall to make the patient recognize not to get down and fall down from that side.					Hemiplegia with declined cognitive function	Wheelchair / Sensor mat or sensor bed

Table 3　A layout map according to nurses' intentions pattern (continued).

No.	Intentions of space utilization	Space utilization	Layout				Example	
			Type A		Type B			
			Front side	Back side	Front side	Back side	Patient	Equipment
11	⑥ + ⑨	Attaching one of the long sides of bed to a bedside table to expand opposite space and move the bed closer to a window.					Can't move after surgery	Wheelchair
12	⑦	Attaching one of the long sides of the bed to the curtain to let the patient access the shared space easily.					Paralysis or hemiplegia/ After the operation of the lower limbs	With this arrangement the patient can be carried to the bed with minimal turning of the wheelchair.
13	⑧	Attaching one of the long sides of the bed to a wall to expand the opposite space.					Bedridden	
14	⑨	Attaching one of the long sides of the bed to a fixed shelf/ bedside table to expand opposite space so that the patient can get down from the bed easily (a, e, f). Rotating the bed by 180 degrees and attaching the bed on a fixed shelf to make the patient walk using the wall from a direction in which it is easy for the patient to get down(b). Rotating the bed by 90 degrees and moving the bed to the centre of the bed space so that the patient can watch television from the bed(c). Attaching one of the long sides of the bed on the fixed shelf and opening the space on the head side to let the patient access the fixed shelf from the bed(d).					Cannot move from bed/Walk to toilet using wall	

Note 1: 'Front side' is the space closest to the door, while 'back side' is the space closest to the large window at the back of the room. All layouts describe the left side of the hospital room. During the data collection phase, all nurses confirmed that there was no difference in the layouts between the right side and left side of each patient room.
Note 2: In the "Intention of space utilization" column, each number corresponds to Table 2.
Note 3: Equipment used for painting.
Note 4: CPAP stands for Continuous Positive Airway Pressure.



shared space (No. 1-b & c, No. 2-a & f, No. 7-a & e, No. 8-g, No. 9-b & c, and No. 10-a & c) because of fixed furniture.

There was also a pattern for patient comfort, where the bedside table was moved from the head of the bed to the middle of the bed, so that the patient could see the outside view from the bed as well (No. 14-a).

Discussion

1. Flexible bed space for changing bed placement

In this study, nurses changed bed placements with various intentions. In many cases, these intentions were effectively realized by moving the bed to the left or right not only to expand the bed space but also to use the walls. In some cases, different bed placements were used to achieve the same intention. This is in line with Morse's[19] point that the same tool can have different effects when used for different purposes.

Nurses changed the bed placements not only to respond suitably to patients' conditions but also considering the shape of beds and fixed

furniture. In some cases, the beds protruded from the bed space or were placed diago nally owing to fixed furniture or pillars (No. 1-b & c, No. 2-a & f & g, No. 5-d, No7-a & f & g, No. 8-a & g & k & m & n, No. 9-b & c, No. 10-a & c & e). It is desirable to avoid including fixed furniture in acute care wards, as they can hinder changing the bed placement[5]. Therefore, fixed furniture and pillars should be removed for securing flexible bed placement. The current bed space required design flexibility and sufficient space for nursing care[2,6]. Each bed should have as much space as possible; however, this was currently limited. Therefore, understanding the details of why nurses change bed placement can contribute to the future design of patient rooms.

2. Ensuring patient safety using bed placement

We confirmed that nurses prevented patients from falling by encouraging them to get down from one side (No. 1, 2, 3, 6, 9, and 10). In some cases, sensor mats were used (e.g., No. 2-b, c, d, e, and g). As reported by a previous study, patients tend to fall more frequently in their rooms[20]. Other studies reported that sensors and alarms were used to prevent patients from falling[9,21]. Therefore, nurses can ensure that patients step on the sensor by changing the bed placement. Furthermore, some cases involved using a wall, including a wall with a window, to prevent patients from falling and inducing them to get down from one side (No. 2, 3, 5, 6, and 10, except No. 5-b, c). The cases involving the use of walls were used for patients with cognitive function decline, which can be considered similar to delirium (e.g., No. 5 and 6 of the example of patient condition in Table 1). It has been shown that nurses use bedrails for patients with cognitive function decline to prevent patients from falling[8,22]. However, it was also reported that bedrail use was not effective because some patients attempted to climb over the bed rail[19,21]. Therefore, it is possible that nurses believed that only using bed rails or sensor mats was insufficient and decided to close-off one side of the bed by placing it against a wall.

The pattern of No. 3 and 4 used the entire shape of the patient room to observe patients from outside the room. Even though there is a concern of privacy, visibility is important for patient safety[2,6]. Technology is developing to protect patient safety by remote monitoring using webcams and Kinect sensors. However, in hospitals without these technologies, direct monitoring is still an important way to protect patient safety[23,24]. Although privacy will remain a concern, direct observation from outside the patient rooms is effective for observing patients in wards that do not have remote monitoring systems, especially for patients who are at risk for suicide. This study revealed that nurses secured patient visibility both by changing bed placement and using the structure of the patient's room. In future, hospital rooms need to have an environment that allows nurses to observe patients while ensuring patient privacy.

3. The importance of securing sufficient space for mobility and installing equipment

Some cases involved the intention of securing space for mobility or setting up required furniture and medical equipment (No. 4-6, 8-11). The use of a walking assistant device, such as a walker, is recommended for patients with a walking disorder and at risk of turnover[19]. Sufficient space for an assistant to support the transfer of a patient from the bed to a wheelchair is necessary[11,25]. Furthermore, it is estimated that transferring patients to a wheelchair or stretcher sometimes requires four or five assistants[26]. Even though assist belts[27] and robots for transferring patients[28] have been developed, sufficient space is still required for the process. Patients who are not able to walk independently need a wheelchair or assistants to move them, which requires a relatively larger space. Therefore, it is possible that bed placement was changed for patients with mobility problems.

Some medical equipment is also brought to the bedside when it needs to be used. For instance, an X-ray or sonography, which was previously conducted in inspection rooms, is now conducted at patients' bedside[29]. Therefore, in future, patient room designs should secure space not only

for the permanently installed medical equipment but also to accommodate other non-permanent medical equipment such as testing equipment.

4. The need for nurses to be involved in the design of hospitals with evidence.

Although research has been done on the aspects of architecture[4], the actual situation of how nurses arrange the bed space to provide care in a certain patient room space remains unclear. Clarifying the use of space from the perspective of nurses, as in this study, will lead to the construction of hospital room spaces that are easy to provide nursing care that is, spaces that are more comfortable and safe for patients. Furthermore, even in the use of existing architecture, sharing common practices, such as devising tools and constructing layouts to prevent falls in patients with a high risk of falling from one side of the bed, may improve the quality of care. Based on the results of this study, creating an algorithm for a layout that takes into account the structure of each ward, may be beneficial in improving the efficiency and quality of nursing care.

5. Limitations

There is a limit to the generalizability of the data. First, we do not know whether the bed space utilization results only apply to TFRs or to all patient rooms, because we did not compare them with other types of patient rooms such as a square one. Second, we have not been able to verify whether these patterns occur in other functions such as chronic care wards. Third, we were only able to collect data from one facility that uses type B rooms. However, at this point, we were able to collect enough data on how nurses conducted bed placement changes for patients with various conditions from type B rooms. Furthermore, as there are commonalities between types A and B, such as use of walls and curtains, the results from combining their findings may have some generalizability. Fourth, whether these bed placement changes are beneficial to patients has not been tested. For example, it is unknown whether placing one side of the bed against the wall is effective for patient safety. It is also unclear whether the required functionality could have been achieved without changing the bed placement because this study did not analyze how nurses used spaces for which the bed placement remained unchanged. Furthermore, features of different types of TFR could not be fully captured because the researchers focused only on two types of TFR. Finally, the extent to which these specific changes in bed placements occur in clinical practice is unclear. Further studies should explore the bed placement changes identified in this study as well as how nurses utilize bed space in other types of patient rooms.

Conclusion

This study examined how and why nurses conduct changing bed placement, especially in the aspect of nursing assessment for patients' conditions. In this study, the intentions for changing bed placement included securing patient safety such as "For inducing patient to get down from one side", sufficient space for nursing care, and installing medical equipment such as "For securing space where nurse can care for patient". Each bed placement could meet one or more intentions simultaneously. The nurses moved the bed to either side or rotated the head position in order to realize their respective intentions. In some cases, nurses had to consider not only bed placement but also the walls and the whole shape of the patient room to achieve their intentions. Furthermore, fixed furniture and pillars caused nurses to place beds diagonally or over the bed space. The visibility of patients, sufficient space at the bedside for nursing care, and installing medical equipment and preventing patients from falling are crucial concerns for nurses, which they struggled to deal with. Understanding the specific details of the concerns that nurses focus on and how they correspond to them can contribute to future hospital design.

Conflict of interest

There is no conflict of interest to be disclosed.

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急性期病棟の多床室におけるベッド配置変更のパターンとその理由

田中　慎吾[1)]，國江　慶子[2)]，武村　雪絵[1)]，市川　奈央子[1)]，木田　亮平[1)]

[1)] 東京大学大学院医学系研究科健康科学・看護学専攻看護管理学
[2)] 東京女子医科大学看護学部看護管理学

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要　旨

目的：急性期病棟の多床室において、看護師によるベッド配置変更の実態とその意図を解明する。
方法：４つの急性期病院の15病棟で質的観察研究を行った。９件の直接観察と37名の看護師へのインタビューから、144件の患者状態を含む看護師の意図を反映したベッド配置のスケッチデータを収集し、重複回答を統合した92件のデータを分析した。
結果：14種類のベッド配置変更パターンを確認した。同じパターンでも患者状態や病室形状によって複数のベッド配置の変更方法があった。一つの意図で構成されるパターンもあれば、２つ以上の意図を組み合わせたパターンもあった。柱などが最適なベッド配置変更を妨げる場合もあったが、看護師は壁や病室形状を利用し、患者安全やケア空間の確保などの意図を達成していた。
結論：看護師は限られたベッドスペースを工夫して、それぞれの患者に必要な環境を構築していた。具体的なベッド配置変更の方法やその理由を理解することは、急性期医療の現場におけるより良い病院の建築計画に貢献できると考えられる。