失智症特別照護中心之環境因子對於阿茲海默氏症老人尋路行為之影響研究

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摘 要

缺乏空間方向感係阿茲海默氏症患者第一個被發現的徵狀，其對患者日常生活能力有很大的負面影響。9 位罹患中度失智症的老人與其照顧者由 3 個失智症特殊照護中心被遴選出來參與本次的研究，本研究針對失智老人每天性的活動行為進行 1 星期 2 次的追蹤觀察，為期 1 個月；而對於非每天性的活動行為進行 1 星期 1 次的追蹤觀察，為期 2 個月。質性研究的描述性分析方法被用來記錄分析追蹤觀察的結果，追蹤觀察的內容包含失智老人由餐廳或公共活動空間在用完餐或活動結束後經由走廊回到自己居住房間門口以及由房間門口走到自己床位的移動路徑。環境因子影響個案尋路辨識能力之評量係透過個案尋路路徑之描繪記錄以及失智個案照護者之訪談來進行綜合分析。研究結果發現：有三分之一的失智個案迷失方向而無法找到自己的居住房間，環境因子如護理站、緊急安全門出口、傢俱、走廊端點、居住房間門口的照片、圖片、居住房間門口與電梯門口等因子已被失智老人在尋路過程引用為有用的參考點。其中，護理站的位置、房間門口或緊急安全門出口的形狀與材料、住民個人所屬的物品以及傢俱安排等將是未來環境設計主要的課題。然而由於失智老人精神徵狀的複雜性，本研究並無法證明在尋路過程被認為有效的環境因子對於每一位失智老人均是有用的參考點。

關鍵詞：關鍵詞：環境因子、尋路、老人、阿茲海默氏症

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The Influence of Environmental Factors on the Wayfinding of the Elderly with Alzheimer's Disease in Special Care Units

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Abstract

Spatial disorientation is one of the first recognizable symptoms of patients with Alzheimer's disease because of the negative effect it has on daily function. Nine elders with moderately severe dementia and their caregivers from three special care units participated in this field study. A survey was conducted, monitoring daily activity twice weekly for one month and monitoring non-daily activity once weekly for two months. A qualitative description was applied to record the results of the survey monitoring the subjects' movement from the dining room or from the public activity space through the corridor to the entrance of their bedrooms and from the bedroom entrances to each subject's bed. The assessment of environmental factors affecting the individuals' identification ability was made through the record of tracing travel route and the caregivers' interviews with the demented elders. The results showed that about one-third of the participants got lost and failed to find their bedrooms. Environmental factors, such as the nursing station, emergency exits, furniture, ends of corridors, photos, pictures, doors and elevators have been employed as useful reference points on the wayfinding of demented elders. The location of the nursing station, the shape and material of doors or exits, residents' personal belongings and furniture arrangement were major issues for environmental design in the future. Nevertheless, because of the complexity of the psychiatric symptoms in the demented elderly, it cannot be proved that the use of environmental factors as reference points would be effective for every demented patient.

Keywords: Environmental Factors, Wayfinding, Elderly, Alzheimer's Disease.

Introduction

Alzheimer's disease and related disorders are some of the most common and debilitating chronic illnesses which affect older persons (Roughan, 2003). Among the different disorders, the major symptoms experienced by the elderly are memory loss, wandering, spatial disorientation, aggression, delusion, hallucination, depression, misplacing and repeating questions, etc. (Teresi & Dichter, 1997). Disorders in spatial orientation in the elderly with Alzheimer's disease are regularly reported (Rainville et al., 2004). Spatial disorientation is also one of the first recognizable symptoms of patients with Alzheimer's disease because of the negative effect it has on daily function (Strub & Black, 2008). Studies have found the disorder to be a predictable burden in caregiving, and the difficulty of managing the disorder is a common cause of stress leading to caregiver burnout (Sheridan et al, 2002). In addition to clinical drug, caregiving and therapy program, environmental factors may play a major role in decreasing the frequency of behavioral problems (Kirby & Lawlor, 2005). Based on this concept, a growing number of special care units for the demented elderly with a specially designed environment have been established. Nevertheless, even though spatial disorientation has become one of the highly prevalent behavioral problems among the demented elderly, few consequences of environmental research have been addressed.

In the early stage (stage 3), elderly individuals with Alzheimer's disease may get lost when traveling in an unfamiliar area. During the later stage (stage 5), elderly individuals are frequently disoriented in familiar areas (Reisberg et al., 1996). Passini et al. (1998) identify wayfinding abilities and difficulties in dementia patients residing in a typical nursing home. However, they also point out that patients with moderate dementia may still be functional with respect to certain wayfinding abilities. Although demented elderly with Alzheimer's disease are associated with "lower-order" decision-making and impairment in making complex order decisions, the findings show that the demented elderly at the early and intermediate stages of their illness are capable of making certain decisions based on simple architectural and graphic information (Rainville et al., 2001).

Passini (1984a) defines the process of wayfinding as being composed of the development of a plan (or cognitive map), transformation of the plan into behaviors at the correct place, information gathering and treatment during the process. Wayfinding incorporates the cognitive links between the individual and the environment, and requires the basis of a cognitive map. Any useful information or specific information in the environment to develop and to transform the cognitive map will be very important. Passini et al. (2000) suggest that the wayfinding problems should be adjusted or made easier through proper architectural and graphic design by respecting the user's wayfinding abilities. It is believed that this knowledge might lead to supportive design interventions to achieve optimal mobility and quality of life for the demented elderly.

An articulate and differentiated environment provides the basis for people to create reference points. Reference points are distinctive elements in the environment that are remembered or recognized. A nursing station will be a good example of how a place can be made distinctive and recognizable through its architecture, by having open space, a special shape of counter, different floor coverings and a variety of seating arrangements. Passini et al. (2000) pointed out that furnishing personal rooms in the same way throughout the nursing home did not help the residents to distinguish their own rooms from others, but some of the features facilitating recognition were differences in the furniture and wall painting. The demented elderly can obtain required

information or cues from identifying the features of the setting, features related to the spatial organization of the setting, environ- mental elements created by architectural or interior design and any distinctive objects in the environment, such as floor layout, graphic signs or furniture arrangements, etc. Providing the wayfinding person with information necessary for the decision-making process will assist the demented elder's wayfinding ability and facilitate his/her mobility.

Many phenomena emerging from the survey of local institutions have been addressed. The majority of demented elders were found to have difficulties in identifying their own room. Many signs such as drawings, decorations, numbers and color were installed to assist elders, and the concept of simplifying the corridor with no junction or no turn was applied in the planning of special care units in the Taiwan area (Lin & Chen, 1994). Most of the caregivers agreed that corridors with many junctions or many turns and dark corridors would cause confusion in spatial orientation for demented elders (Hwang, 1998). From the local survey on existing environment, the findings showed that an interesting name for the individual's room, a lovely drawing of animal, a photo of the patient, a special toy, flower, plant or painting were popular elements to assist elders to distinguish the location of their rooms. Although a directional sign was recognized as explicit information leading to a decision without any additional cognitive requirements (Rainville et al., 2001), only some caregivers thought partial signs useful; most caregivers agreed that using environmental factors for identification required demonstration (Hwang, 1998). Passini et al. (2000) also showed that demented elders tended to identify the correct side of the corridor but could not distinguish among the doors, even if the name and sometimes the photo of the occupant were shown on the door.

In recent years, to establish group home for the elderly with Alzheimer's disease has been the major policy in Taiwan and institutions were encouraged to become group homes that created a home-like environment. Nevertheless, many existing special care units were set by nursing homes and hospitals for the caregiving of demented patients. How to improve the existing environments and to play a major role in decreasing the frequency of spatial disorientation on the wayfinding of the elderly with Alzheimer's disease by environmental design will become an important issue in the caregiving quality before a special care unit renovating as group home. The purpose of this research was to study the influence of environmental factors on the wayfinding of demented elders as well as to determine what kinds of environmental cues would be useful in improving wayfinding ability when demented elders reached a destination in an unfamiliar environment. The method and content of this research differed from those of previous studies. With respect to the limitation of verbalization and the difficulty in verbalizing decision- making process for residents with Alzheimer's disease, the travel route was traced to record the process of wayfinding by an observer instead of only asking the participant, and the participant was interviewed by a caregiver who walked with the participant after wayfinding while finding his/her particular behavior during the process of wayfinding. The content of this study was limited to the "home floor" of the participant in order to avoid the participant having complex travel to other floors by using an elevator. In fact, residents were generally allowed free movement on their "home floor" and they were not encouraged to independently go to other floors by the elevator or staircase since they might become lost.

Methods

Participants

Nine moderately demented elders, represented as subjects A, B, C, D….from three typical special care units established in Taipei City, Taipei County and Chiayi City, participated in this experiment. Special care units, represented as units A, B and C, were authorized by the local government. All of the caregivers participating in this experiment had more than three years' experiences in caring for the demented elderly and had worked at the special care unit for at least one year. Every subject was a new resident unfamiliar with the environment of the special care unit and the families of the subjects approved their participation in this study. Neuro-psychiatric doctors applied MMSE (Mini Mental Status Exam), CDR (Clinical Dementia Rating) and MBPC (Memory and Behavior Problem Checklist) to diagnose the symptom and severity of the dementia as well as the behavior problems in the nine subjects. In regard to the living arrangements of the subjects in the special care unit, their bedrooms included a variety of multi-bedded rooms ranging from a double- bedded room to an eight-bedded room. The policy of the special care unit allowed residents to move freely without any restrain even though they were disoriented.

The Setting

The sample of the setting was selected according to the accommodations of the care units (large or small scale), different floor layouts (straight corridor or corridor with junctions) and the linking of public spaces, such as the relationship between the nursing station and the dining room or public activity space.

Special care unit A accommodates sixty-three residents on a floor. The floor layout is shown in Figure 3. The dining room connects to the public activity space as an open space in the middle area of the unit.

The nursing station is located around the open space. Corridors linking two sides of the open space orient to the bedroom area, and the bedrooms are located on both sides of the corridor. Special care unit B accommodates fifty-four residents on a floor. Bed-rooms are located on both sides of the corridor, public activity space faces the elevator and the main staircase is located at the junction area of the floor plan. The dining room on the same side of the corridor as the public activity space is located in the middle part of the bedroom area. The nursing station, located at the end of the corridor, is situated away from the dining room and the public activity space (see Figure 5). Accommodating only twenty-four residents on a floor, special care unit C is a smaller unit compared to special care units A and B. Bed-rooms are located on both sides of the corridor; the dining room, public activity space and nursing station facing the elevator and staircase are located in the center of floor plan. Public activity space does not connect to the dining room as an open space (see Figure 7).

Survey

The wayfinding survey focused on how demented elderly patients returned to their bed-rooms without any assistance after their activities in the indoor space of the special care unit. Subjects were accompanied by caregivers during their wayfinding. Caregivers considered a subject to be lost when the individual returned to his or her starting point or entered the incorrect bedroom or stopped and was incapable of knowing where to go

after the caregiver asked. However, the caregiver had to be careful not to suggest solutions by giving verbal or behavioral cues. Lunch and dinner were recognized as the most regular daily activities, and observation of the behavior of subjects after their lunch and dinner in the dining room was conducted twice a week for one month in each special care unit. As for non-daily activities, including therapy, interesting games and group reading, the behavior of each individual after non-daily activities in the public activity space was observed once weekly for two months. It took nine months to complete the schedule of survey by observing an individual care unit for three months.

Description and Analysis

A qualitative method was applied to record the results of wayfinding survey of each subject from the dining room (or public activity space) through the corridor to the entrance of the bed room and from the entrance of the bedroom to the individual's bed. The description showed the tracing of the subject's travel route and the other behaviors in route during the wayfinding process, including staying, watching, talking and wandering. Wayfinding was judged successful when the subject returned to his/her correct bedroom and his/her own bed regardless of the travel time. Owing to the problem of talking and the other behavioral problems, subjects were interviewed by their caregivers only after their wayfinding episodes. The assessments in terms of environmental factors affecting the subjects' identification and orientation abilities were made through interviewing the subjects to clarify the influence of environmental factors on their staying, watching and talking, in addition to the observations by the researchers.

Every description showed the tracing of the travel route on the floor plan; dot signs along the route were represented as staying, watching or talking. For the legibility of records and figure integration, the records tracing an activity related to the same subject were reflected in a figure (see Figures 1 and 2), and all records pertaining to an individual subject were integrated by representing a tracing of the travel route, which included eight timed travel routes and behaviors (see Figure 3). In regard to the comparison of different subjects in the same special care unit, travel routes for the same activity were incorporated into a figure (see Figures 3, 4, 5, 6, 7 and 8 on next page).

Results

Demographic and Clinical Features

Ages of subjects ranged from 68 to 93 with a mean age of 84.8; 66.6 % were females. Diagnosis of disease indicated that 100 % of subjects had Alzheimer's disease. In terms of severity of dementia and behavior problems, 100 % of the subjects had moderate dementia and spatial disorientation. Living arrangements ranged from double-bedded rooms (22.2%), three-bedded rooms (33.4%), four-bedded rooms (11.1%) and five-bedded rooms (11.1%) to eight-bedded rooms (22.2 %).

Figure 1: Tracing the travel route for subject C after dinning in special care unit A

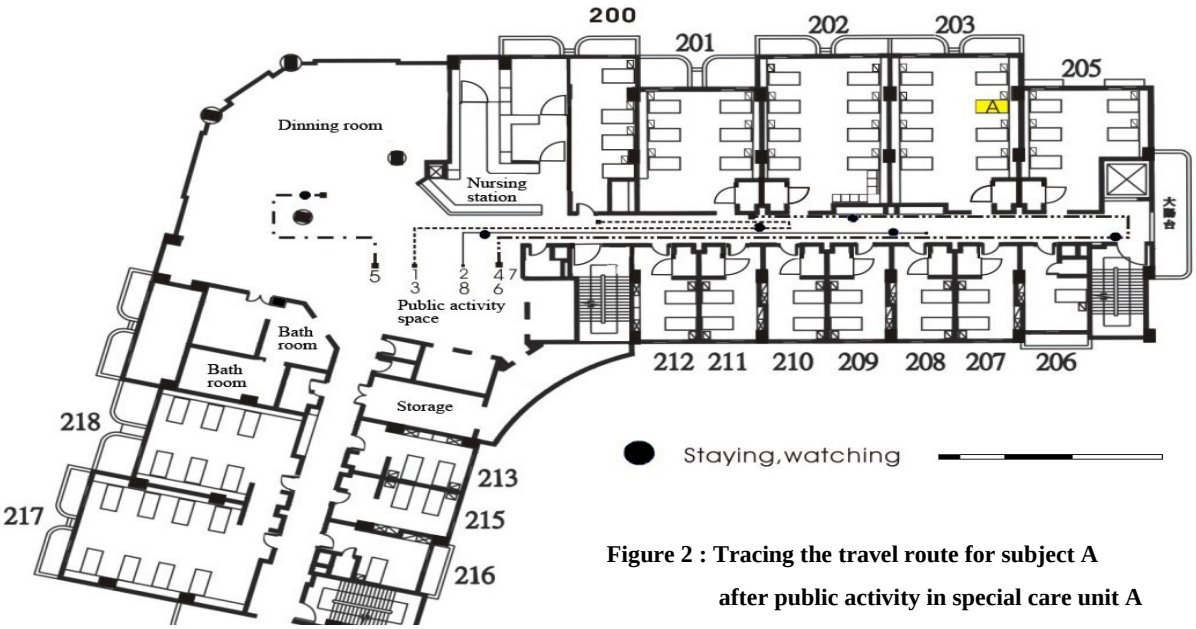

Figure 2 : Tracing the travel route for subject A after public activity in special care unit A

Description of wayfinding and Environmental Factors for orientation

Four subjects represented as subject A, B, C and D were in the care unit A; subject A, B and C are female; subject D is male. Subjects A, B and C were accommodated in the eight-bedded room and subject D in the four-bedded room. With respect to the result of wayfinding, subjects C and D were successful in wayfinding either from the dining room or from the public activity space to their bedrooms. As shown in Figure 3, subject C stayed at the nursing station at the beginning and watched the sofa set at the entrance of her bed room every time during her wayfinding after dining; she followed the same pattern during her wayfinding after public activities (see Figure 4). As shown in Figure 3 and Figure 4, subject D stayed at the nursing station and at the entrance of his bedroom; then he watched the door of the emergency exit on the opposite side of the corridor during his wayfinding process following every dining or public activity.

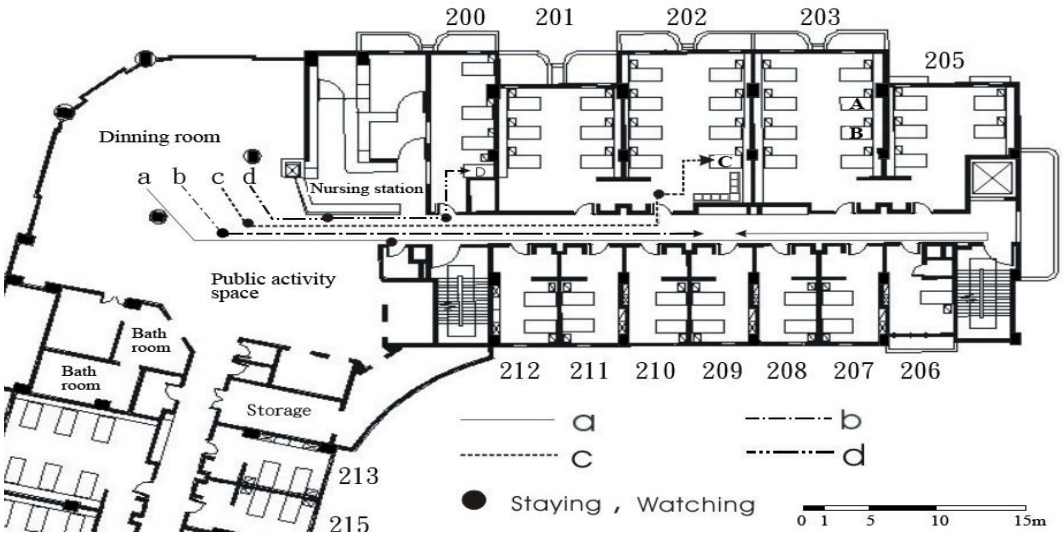

Figure 3: Tracing the travel route of subjects after dining in unit A

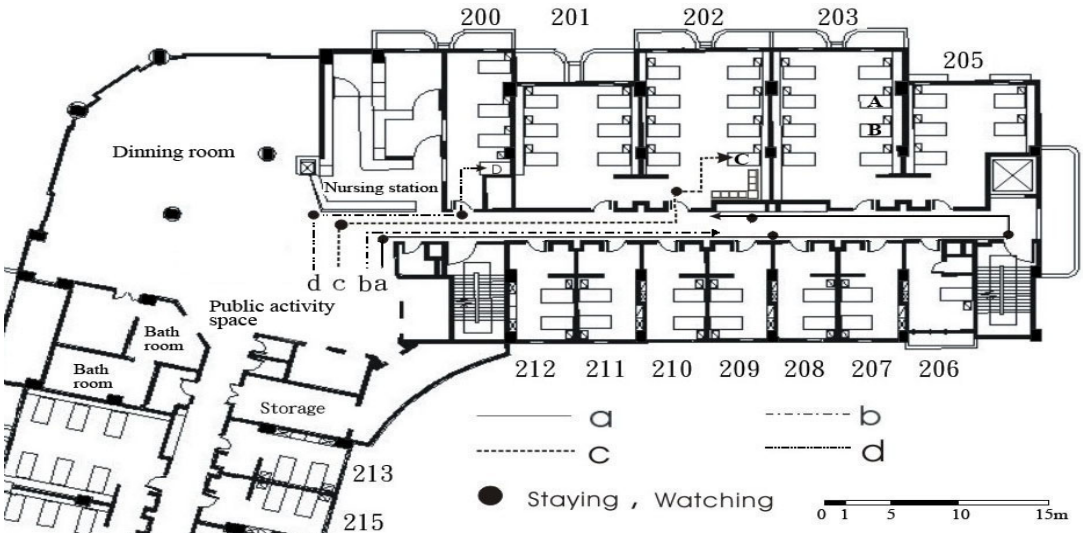

Figure 4: Tracing the travel route of subjects after public activity in unit A

The caregiver described that subject C seemed to understand that the nursing station was located between the open space and the bedroom area, and her bedroom had a sofa set, “Station and continue….walking….. here….seat….” (subject C pointed with her hand in the direction of movement orienting forward when she stood before the nursing station and subject C stopped at the entrance of the bedroom when she saw the sofa). Nevertheless, the caregiver explored that subject C couldn’t show how to identify her bed after entered bedroom. The caregiver described that subject D clearly remembered the door of his bedroom facing to the door of the emergency exit and his shoes being in front of his bed, “My door facing that door⋯.different and lighting bar….” (subject D pointed to the door of emergency exit door when he stood in front of the nursing station. He knew the emergency exit was near the nursing station and that its door had a steel push bar with the phenomena of reflection and glare), “Shoes…here….on the ground….my bed…. ” (subject D stood before his bed, he some- times put on the pair of shoes his family had bought several years before subject D moved into

the special care unit). The caregiver explored that subject D moved very fast every time owing to his clear cognition of whatever object he was looking for.

There were three subjects in care unit B. Subjects A and C are female; subject B is male. All of the subjects lived in the three-bedded room. With respect to the results of wayfinding, subject A and B were successful in wayfinding either from the dining room or from the public activity space to their bedrooms after their activities. As shown in Figures 5 and 6, subject A sometimes stayed at the nursing station and then she turned back to face the door of her bedroom before she entered her bedroom. On the other hand, subject A looked for her photo on the wall above her bed every time before she found her bed. Figures 5 and 6 show that subject B stayed at the nursing station and turned back, going to the next door of the nursing station every time; then he entered his bedroom without any hesitation. Subject B looked at the scenic picture on the small desk beside his bed every time before he walked to the bed. Subject C was successful in wayfinding only after dining; she failed to find her bedroom after a public activity. As shown in Figure5, subject C walked across the corridor from the dining room to her bedroom without staying or watching and quickly found her bed.

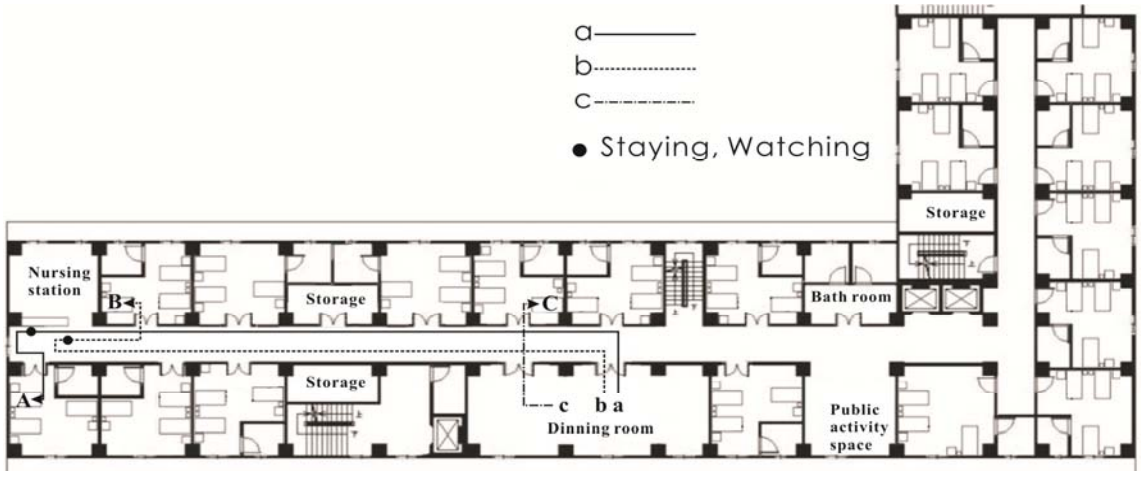

Figure 5: tracing the travel route of subjects after dining in care unit B

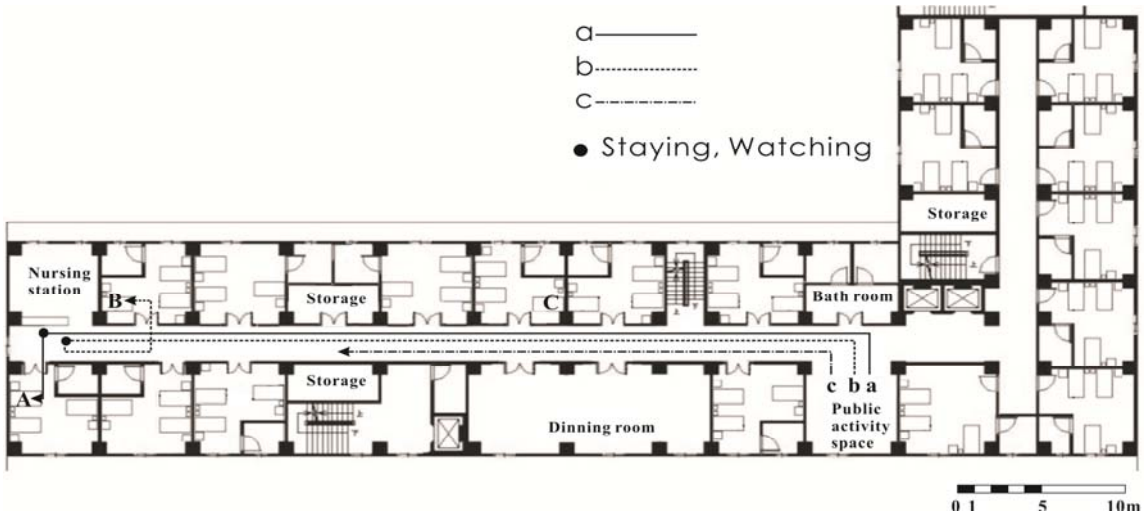

Figure 6: Tracing the travel route of subjects after public activity in care unit B

The caregiver described that subject A seemed to understand that her bedroom faced the nursing station and that her photo with her family was on the wall. She would say, " Bedroom…. over there, ….door and station…."(subject A pointed with her hand toward the door of her bedroom and the counter of the station); "This …my photo…."(subject A touched the photo on the wall above her bed). Subject B's caregiver described that subject B clearly remembered that his bedroom was at the end of the corridor and the door located next to the nursing station; "Just walked to end …door…beside there….many care- givers..." (subject B meant that the nursing station had many caregivers and the door of his bedroom was beside it); "I liked this picture…. " (the family of subject B brought one of his favorite pictures to the bedroom). The caregiver described that subject C remembered the door of her bedroom faced to the door of the dining room and there was only one bed on the side of her bed in the bedroom. "Just walked across….from door to door…. " (subject C pointed with her hand from the door of the dining room toward the door of her bed room and walked across the corridor); "This side….one bed….my bed…." (subject C entered her bed room; then she pointed toward the right side). The caregiver noted that subject C had ever walked from the central door of the dining room across the corridor directly to the door next to her bedroom, and she turned back to the dining room when she founded two beds on the right side of the bedroom. Subject C was confused and tried another door (left door) of the dining room to find her bedroom.

Two subjects, represented as subjects A and B, were in the care unit C. Subject A is male; subject B is female. Subject A was in the five-bedded room and subject B was in the double-bedded room. With respect to the results of wayfinding, both subjects A and B were successful in wayfinding either from the dining room or from the public activity space to their bedrooms after their activities. As shown in Figures 7 and 8, subject A easily found his bedroom and bed without staying and watching. Figure 7 shows that subject B stayed at the nursing station and at the entrance of her bedroom; she then watched the door of the entrance for a moment from the dining room to the bedroom. Figure 8 shows that subject B moved in a different direction from her bedroom area and stayed at the nursing station, she then watched the elevator that faced the nursing station and turned back to the corridor, orienting herself toward her bedroom area after a public activity.

The caregiver of subject A described that subject A could not show how to identify his bedroom after his activities, but he seemed to understand that his bed faced to the door of the bedroom. "This bed….toward door…." (subject A stayed in front of his bed and pointed toward the door of the bedroom). The care- giver described that subject B clearly remembered she should move past the nursing station and entered in the corridor to her bedroom area; she moved first toward the nursing station during her wayfinding process from the public activity space to the bedroom. Subject B remembered her photo on the door of her bedroom and she looked at it every time before entering her bedroom, but she could not show how to identify her bed. "No big space…. only corridor…. ." (subject B stayed at the nursing station without continuously moving through the open space of the dining room and then turned back to the corridor during the wayfinding process from public activity space to her bedroom). "This ….it's me…. " (subject B stayed at the entrance of her bedroom, not only looking at her photo on the door for a while but also touching it)

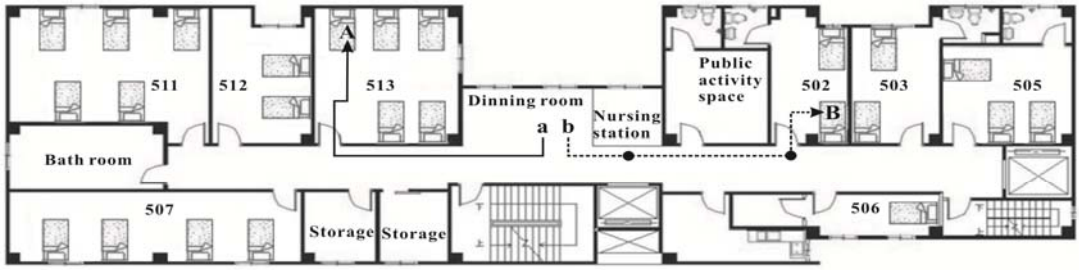

Figure7: Tracing the travel route of subjects after dining in care unit C

Figure8: Tracing the travel route of subjects after public activity in care unit C

Description of wayfinding and Spatial Disorientation

Figures 3 and 4 show that subject A in special care unit A was disoriented and failed to find her bedroom either from the dinning room or from the public activity space. Although she had several staying incidents, including stopping in front of the nursing station and in front of the staircase and bedroom doors and looking at the surroundings, she did not stay in front of her bedroom. Figures 3 and 4 show that subject B only walked ahead; she didn't stay and entered the other resident's bedroom either from the dining room or from the public activity space. The caregivers of subject A and B noted that both subjects A and B could not show how they got lost and why subject A stayed and watched.

In special care unit B, as shown in Figure 6, subject C failed to find her bedroom after public activities, but she was successful in finding her way from the dining room to her bedroom (see Figure5). The care- giver described that subject C as being, confused with the different experience of walking caused by the longer distance between the public activity space and the bedroom. "Did I need…. continuous walking…." (subject C stopped and hesitated to walk).

Subject A in special care unit C failed to find his bedroom once from the dining room to the bedroom due to a bed being in front of the door to his bedroom. The caregiver described how subject A came to and stayed in front of his bedroom several times, but he did not enter the bedroom because he was confused by the obstacle in front of the door; the bed changed the look of the door to something unrecognizable and unfamiliar. The altered look was different from his understanding of the door.

Discussion

If subjects could find their ways from the dining room to their bedrooms, they were almost all successful in wayfinding from the public activity space to their bedrooms, except for subject C in special care unit B. Nevertheless, the successful wayfinding to the bedroom did not correspond to the wayfinding to the subject's own bed. Most of the subjects could not clearly state how they found their bedrooms, but some of the subjects could show the environmental factors affecting their wayfinding process. The wayfinding of the elderly with Alzheimer's disease was obviously difficult to study due to the defective verbalization of the demented patient.

Spatial disorientation is one of the major behavioral problems in the psychiatric symptoms of moderately demented patients. However, as long as a resident could use environmental clues to find the way to his/her room without assistance, spatial disorientation, although a serious challenge, was not that hopeless a condition. Even if there was a difference between the path of daily activity and the path of public activity, the distance of the path and the frequency of activity did not seem to become factors affecting the spatial orientation of subjects in this study. The severity of dementia was rated from mild to moderate to severe. A higher standard assessment might be applied in the initial diagnosis of the subject in this study and mild dementia being recognized as moderate dementia. This was probably the reason that the results showed a higher ratio of successful wayfinding.

From the description of the identification process, we found that the nursing station, emergency exit, sofa, shoes, end of the corridor, photo, picture, door and elevator were effective environmental factors to use to find their bedroom and bed. The nursing station, emergency exit, furniture (sofa), end of the corridor (corridor shape), door and elevator were references for finding their bedrooms. They used shoes, photos and pictures as points of reference to identify their beds. The location of the nursing station, the shape and material of the emergency exit, and the door and furniture arrangement are major issues for environmental design. As for the arrangement of photos and pictures, hanging them on the wall or placing them beside the bed was the typical design for the cues to assist in the wayfinding of the resident trying to locate his/her bed. Although the aforementioned environmental factors and their arrangement have been recognized as effective elements of design, several factors applied to assist some of the subjects challenged by spatial disorientation still failed to improve the subjects' identification ability. Given the complexity of psychiatric symptoms, it cannot be proved that environmental factors would be effective for every demented patient.

The limitation of taking a picture of a subject or of a setting circumstance has made it difficult to show the process of wayfinding. The special care units' privacy protection concerns for the demented residents limited the extent of the environmental factors that could be described and visually presented, as well as what could be included as reportable in the statements of the participants. However, to sketch the demented patient or surroundings instead of taking a picture might be a possible method if caregivers could permit. No doubt, the issue of descriptive technique in terms of the observation correlated to demented patient's disorders needs to develop in the future.

In general, travel time was recognized as one of the most important factors in assessing the effectiveness of wayfinding, but this research considered only the reaching of the destination as an assessment item since the elderly with Alzheimer's disease are incapable of controlling their travel. Of course, a greater number of

residents in each special care unit participating in the wayfinding study would have been more helpful in generating findings.

However, from the findings that subject A went to many places without finding her bedroom and that subject B didn't stay and entered any bedroom in special care unit A, bedroom area arranged as a corridor might make them confused with surroundings which was different from their experiences of home although both subjects A and B could not show how they got lost. Furthermore, several environmental factors being recognized as effective elements applied to assist some of the subjects challenged by spatial disorientation still failed to find their bedrooms in special care units B and C. It showed that the assistance of environmental factors still had the limitation on the wayfinding of the elderly with Alzheimer's disease in the corridor setting and how to arrange bedroom area as a home-like environment would be an important issue.

Conclusion

Based on the results of the experiment, three points of conclusion were drawn pertaining to the influence of environmental factors on the wayfinding of the elderly with Alzheimer's disease in special care units: (a) If subjects could find their way from the dining room to the bedroom, they were also successful in wayfinding from the public activity space to their bedrooms. Nevertheless, successful wayfinding to the bedroom did not correspond with successful wayfinding to their beds. (b) The distance of the path and the frequency of activity did not seem to be factors affecting the spatial orientation of subjects in this study.

The location of the nursing station, the shape and material of the door, and furniture arrangement were major issues for environmental design. As for the arrangement of photos and pictures, hanging them on the wall or placing them beside the bed was the typical design for the cues to assist in the wayfinding of the resident trying to locate his/her bed. (c) Most of the subjects could not clearly state exactly how they found their bedrooms. Obviously, the research on wayfinding was difficult owing to the limited verbalization of the demented patients. The limitation of taking a picture of a subject or of a setting circumstance has made it difficult to show the process of wayfinding and has restricted the ability to describe the specific environmental factors via visible information because of the special care units' request for the protection of the demented residents' privacy.

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