Present Situation and Problems in Information Utilization by Head Nurses

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***Abstract*—This study was undertaken to clarify the present situation and problems of the utilization of electronic medical records by head nurses, the types of nursing information that they process, and the ways to use the information. Five head nurses who worked in one of four acute care hospitals where electronic medical records had been introduced were recommended by their directors of nursing as high performers. After explaining the purpose and method of the study in writing, we interviewed them. We asked the participants to state their opinions freely from perspectives of gathering, organizing, analyzing, managing, using, and disseminating information that they processed on a daily basis. Results revealed that they were able to make active use of electronic medical records, but they suffered inconvenience from insufficient environmental improvement. Head nurses were found to be groping to ascertain what they should read from the large amount of information that they processed, what analyzable and usable data were included, and how to analyze the data concretely.**

***Index Terms*—Management, head nurse, nursing information, information literacy.**

I. Introduction

At medical sites in Japan, the introduction of Diagnosis Procedure Combination (DPC) and similar methods has led to the wide expansion of the following to local communities: a further shortening of the number of days of in patients' hospital stays, greater emphasis on home medical care, and the large amount of information surrounding patients within conventional hospitals. The 2010 report of IT Strategic Headquarters stated that to achieve the goal of "implementing seamless community-collaborated medical services," "the introduction of IT into hospitals, i.e., the introduction of electronic medical records will become increasingly important. The introduction rate of electronic medical records in hospitals was 22% as of February 2013 (56% of which had 400 or more hospital beds) [1]. To advance computerization of medical care in the future, enhancing information literacy in staff is urgently needed and poses and pressing issues. Head nurses in a unit of hospital facility process widely diverse nursing information on a daily basis. However, results revealed that because they belong to a generation for which information education was not provided [2]-[5], they feel indifference in relation to ICT equipment and a lack of understanding of appropriate means to gather information. For that reason, this study was undertaken to clarify the present situation and problems related to the utilization of electronic medical records by head nurses, the types of nursing information that they processed, and ways of using that information.

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II. Method of the Study

This study surveyed five high-performing head nurses who worked in one of four acute - care hospitals with fewer than 800 beds where electronic medical records had been introduced. All of the nurses had been recommended by their directors of nursing.

The survey was administered during March and April 2014. We asked participants to talk freely for approximately 30–50 min from the perspectives of the types of information that they processed on a daily basis and the gathering, organization, analysis, management, utilization, and dissemination of information. The interviews were recorded with an IC recorder; "the content of head nurses' actual activities" was analyzed.

For ethical reasons, we explained the following matters in this study both orally and in writing. We inferred participants' consent to the study when they accepted our interview.

Subjects' cooperation with the survey is based entirely on free will. Results are used only as data for the study and not for any other purpose. Participants were told that they would not suffer from any disadvantageous treatment because of their cooperation with the study.

We will report the results through academic societies or study groups. In that case, anonymity is strictly protected. This study was screened and approved by the Ethical Committee of Morinomiya University of Medical Sciences.

III. Results and Desiccations

A. Attributes of Participants

A summary of the participants' information is presented below (Table I).

The head nurses' ages were 43–51 years. The years of nursing experience were 22–29 and the experience as a head nurse was varied, ranging from one year to nine years. With regard to whether or not they had received education in information science none of the five head nurses had received any education in that field other than the nursing information theory for the first level in the certified nursing administrator training [6] provided by the Japanese Nursing Association.

Three head nurses worked at hospital facilities founded by independent administrative institutions. One each worked in a facility founded by a municipality and by Social Welfare

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Organization Saiseikai Imperial Gift Foundation. Their electronic medical record systems differed depending on the establishing body and the number of hospital beds. The facilities with numerous hospital beds had developed the environments, such as the function of the DPC operation. One head nurse worked in operation rooms. The other four worked in wards. The document retrieval system had been introduced into all the facilities and had been used actively, which is consistent with study results showing the utilization of article search databases [7], which reported that "ward nursing administrators tended to show higher experience rates of utilization of article search databases." Whenever coming across something that they did not know, all head nurses immediately investigated it using the internet on their own initiative. They showed no hesitation when using ICT. They actively used it.

A department of medical information management had been established at all facilities, providing results of information analysis related to the hospital and ward either at desired times or on a regular basis. Head nurses conveyed the results to the staff.

TABLE I: ATTRIBUTES OF PARTICIPANTS

Head nurse ID	A	B	C	D	E
Age	50	51	43	45	43
Number of hospital beds	317	500	768	500	315
Experience in nursing (Year)	29	29	22	23	23
Experience as head nurse (Year)	9	6	4	3	1
Basic educational background	High school	High school	High school	4-year univ.	2-year univ.
Special educational background	Vocational school	Vocational school	Vocational school	Vocational school	2-year univ.
workplace	Ward	Ward	Ward	Op room	Ward
Certified nursing administrator training	Received	Received	Received	Received	Received
Hospital has dedicated information department?	yes	yes	yes	yes	yes
Hospital has document retrieval system	yes	yes	yes	yes	yes
Uses document retrieval system	yes	yes	no	yes	yes
Uses the internet	yes	yes	yes	yes	yes

B. Utilization of Electronic Medical Records

The utilization of electronic medical records is described below (Table II).

1) Patient information

All head nurses actively used electronic medical records. Before going to a patient's bedside, they always

Gathered information such as that for the patient, the patient's family, and diseases from electronic medical records. It is considered that by grasping information about patients in advance, they can build smooth communication and relationships of trust with patients. In operation rooms, because the time to contact with patients is only at patient visits before and after the operation and on the day of operation, the amount of information about patients is scarce. Although electronic medical records had been introduced into operation rooms where a head nurse worked, the system peculiar to operation rooms was not reflected. Consequently, the head nurse made efforts independently using spreadsheet software and adding a calculation formula for the number of operations, the hours of patients in operation rooms, staffing, and work schedules. Her computer skills were assumed to be high.

2) Hospital and ward information

As nursing administrators, all head nurses used the medical information management departments to obtain the utilization and the occupation rates of hospital beds, admission, discharge, admission reservation, and examinations. Head nurse C tallied and evaluated the obtained data on a weekly, monthly, and yearly basis, and another nurse collected the same data on a daily basis. The ways to disseminate information to staff varied among individuals. Some head nurses did so after data were provided from the information management departments. Others did it every day and in a timely manner. Head nurses A and C did not analyze data effectively.

3) Labor information

None of the facilities operated with electronic medical records alone, they all and combined them with paper medical records. Head nurses created work schedules with computers other than those used for electronic medical records, which

was troublesome. Additionally, bulletin boards containing information related to management of wards cannot be seen unless the nursing management journal in the electronic medical record is specifically opened. Environmental improvement is necessary.

4) Infectious diseases information

In terms of infection and matters that should be known to staff in a timely manner, all facilities used bulletin boards. However, it is difficult to say whether the system is in use at all times. Future environmental improvement is needed.

TABLE II: UTILIZATION OF ELECTRONIC MEDICAL RECORDS

Head nurse ID	Content of interview
A	(1) Medical service information, such as occupancy rates, inpatient days of stay, are reported monthly by clerical staff. (2) I input nursing rosters electronically, but then use only the printed version
B	(1) I transfer the information in electronic medical records to a software spreadsheet and analyze the necessary data. (2) Using one integrated program has made monthly tasks, such as rosters, recording overtime and staff attendance, more convenient.
C	(1) When visiting a patient, first I grasp the patient's condition with electronic medical records and then Proceed to the patient's bedside. (2) I output a patient information list from electronic medical records once a week to check the names of patient diseases, family background, examinations, treatments, admission and discharge dates. (3) I open and click electronic medical records to see the occupancy rates. Then, I sort the rates on a monthly basis and transfer them to a software spreadsheet to calculate the use rate
D	(1) Electronic medical records have not yet been operated as they are operated in wards. (2) I created a document function to manage and use post-operation data separating from the ordering system.
E	(1) The utilization rate and the nursing care needs are reflected in nursing management journals in electronic medical records. (2) Nursing care needs are entered by each nurse in charge. The members of the record committee audit whether the needs are assessed appropriately. (3) I share information within the hospital using a bulletin board function, but it is impossible to check the figures necessary for management in a timely manner.

C. Daily Data Processing and Management by Nursing Staff

The types and utilization of information that head nurses process on a daily basis are presented below (Table III).

1) Patient information

Head nurses talked about their grasp of conditions of DPC, patient transfer for examination, nursing care needs, and medical examination results. In particular Head nurse E checked patients' care records and discharge support. She is considered to have a high awareness of patient management because the most important part of nursing management in wards is patient management.

2) Hospital and ward information

All head nurses described hospital bed management, the numbers of admissions and discharges, the utilization and the occupation rates of hospital beds, and the days of hospital stay. In particular, Head nurse C placed importance on "what unable us to maintain optimal occupancy whilst still allowing for the arrangement of admission and discharge" She stated that the head nurse is responsible for giving a lot of feedback to staff nurse. The occupancy rate of hospital beds was 101% last year. We achieved great recognition and were awarded by the hospital for this result.

The staff nurses were also recognized for their efforts and came to view new admissions positively.

Head nurse D mainly described the number of operations and the length of stay. She said, "At any rate, without recording I cannot show data for various things. Because we work with doctors, it is necessary to produce a database of the number and hours of operations and staffing to the greatest extent possible." This information includes figures that reflect directly on the management. We think that head nurses incorporate consideration of the awareness towards business cost management and the maintenance of smooth relations with doctors.

3) Labor information

All head nurses place importance on labor management of staff, including preferred schedules, the availability of paid leave, the amount of night work, and the hours of overtime work. Head nurse are regarded as being aware of what makes a pleasant working environment how to minimize staff turnover.

4) Information about infection, safety, in-room accidents, and bed sore occurrence

Head nurse A talked about patient infection in the most concrete manner among head nurses, mentioning the rate of MRSA occurrence, urinary tract infection, the rate of bed sore occurrence, the frequency of in-room accidents, and the number of the incidents. This is regarded as resulting from her long experience as a head nurse.

5) Nursing profession information

With regard to the staff background, the less-experienced Head nurse E asked staff members what they wanted to report in regards to their work and what career they hoped for in the future, and gave them roles on committees or in workplace training plans. She learned staff members' personal life background and future goals, which she used when she considered training and scheduling. In doing so, she understood needs for sudden absence because of illness or other personal reasons, and mitigated their affect on their

duties. Despite her inexperience, Head nurse E placed importance on nursing care and nursing records.

6) Organization, analysis, and dissemination of information

Most head nurses struggle with information analysis. Particularly, Head nurse A, who had the longest experience of being a head nurse, described information of many types and said that she was struggling with methods of analyzing the data. Head nurses were groping to ascertain what they should interpret from the large amount of information that they processed, what analyzable and usable data were, and how concretely to analyze the data.

TABLE III: TYPES OF INFORMATION THAT HEAD NURSES MUST PROCESS ON A DAILY BASIS

Head nurse ID	A	B	C	D	E
Experience as head nurse (year)	9	6	4	3	1
Hospital/ ward information	Utilization rate of hospital beds, days of hospital stay, number of emergent hospital admission, admission reservation, goods management (damage, repair)	DPC, utilization rate, use rate, severity rate, goods management	Annual use rate of hospital beds, weekly utilization rate of hospital beds, occupation rate, hospital bed management, parts management, DPC	Number of operations, hours of presence in operating room (patient), utilization rate	Utilization rate, days of hospital stay, admission and discharge rates, use rate, number of patients, patient severity categories, short-term path, DPC, goods management
Nursing profession information	Nurse background, years of experience, average age, staff's personal information, training	Staff personal information, clinical ladder training	Staff personal information	Staff personal information	Staff personal table, career needs, training plan, division of roles
Labor information	Number of nurses (staffing), number of annual paid leave, number of times of night work, hours of overtime work, committee activity, number of annual paid leave, work schedule, number of times of sick leave	Preferred work, work schedule, hours of overtime work	Preferred work, work schedule, workload on weekdays, out from room for examinations and day of week, acquisition of designated holidays	People, time, and movements in terms of management, number of times of night work, number of times of night duty, number of times of working on a holiday, work schedule, staffing, number of times of later start	Work schedule, hours of overtime work, overtime information, staffing, division of roles, acquisition rate of paid leave
Patient information	Nursing care needs	Nursing care needs, information about patient care	Patient information, examination, discharge arrangement, admission arrangement	Nursing care needs	Nursing care needs, patient's nursing record, care record, how to write records, discharge support, discharged patient conference
Infection	Infection rate, CV catheter, MRSA occurrence rate, urinary tract infection, multidrug resistant bacteria			Infection rate, CV catheter, MRSA occurrence rate, urinary tract infection, multidrug resistant bacteria	Source of MRSA and hospital bed map
Medical safety			Number of incidents		Number of incidents and accidents
Turning over/ falling down	Occurrence rates of turning over and falling down		Turning over	Occurrence rates of turning over and falling down	Patient age and diseases, rates of turning over and falling down
Occurrence rate of bed sores	Occurrence rate of bed sore			Occurrence rate of bed sore	

IV. Conclusion

For this study, we conducted an interview survey of five high-performer head nurses who worked in four facilities on the utilization of electronic medical records and the information that head nurses processed on a daily basis. Head nurses actively used the electronic medical record as an information system that supported nursing management. They are regarded as having high computer skills.

Although the information that head nurses processed was varied, they emphasized the utilization and the occupation rates of hospital beds because they directly influence hospital organizational management. However, head nurses are struggling to analyze the data that they process and groping for what they should interpret from information and what analyzable and usable data are. The organization and analysis of information remain as a future challenge for this research.

References

[1] Ministry of Health, Labor and Welfare. (June 2014). Summary of static/dynamic surveys of medical institutions and hospital report. [Online]. Available: www.mhlw.go.jp/toukei/list/79-1.html

[2] M. Kimura and Y. Kawaguchi, "Chukibo byoin no kango kanrisoshiki ni motomerareru iryojoho sukiru," *Byoinsetsubi*, vol. 54, no. 3, pp. 284-285, 2012. (in Japanese)

[3] Y. Maekawa and Y. Majima, "Kango kanrisya no nizu kara mita joho kyoiku no arikata ni kansuru kenkyu," in *Proc. the 36th Annual Conference of Japanese Society for Information and Systems in Education*, 2011, pp. 284-285.

[4] T. Izumi, Y. Majima, Y. Maekawa, and S. Shimada, "Eraningu o katsuyo shita shinjin kangoshi kyoiku hoho: Chukan kango kanrisha no jinzai ikusei no genjo to kadai," *Research Report of Japanese Society for Information and Systems in Education*, vol. 26, no. 1, pp. 77-80, 2011.

[5] A. Shirakase *et al.*, "Kango joho ryoiki ni okeru keizoku kyoiku ni motomerareru rinsho kangoshi no ninshiki oyobi nizu," in *Proc the 30th Japan Journal of Medical Informatics*, Supplement, pp. 264-266, 2010.

[6] Japan Nursing Association. (June 2014). Nintei kango kanrisha seido fuasuto reberu karikyuramu kijun. [Online]. Available: http://nintei.nurse.or.jp/nursing/wp-content/uploads/2012/09/1st-taisho.pdf

[7] Y. Endo *et al.*, "Byoto kango kanrisha ni okeru kagakuteki konkyo no joho shushu no jittai oyobi kenkyu seika katsuyo no sogai yoin ni kansuru ninshiki tono kanren," *Journal of the Faculty of Nursing*, Iwate Prefectural University, 2009, ch. 11, pp. 1-12.

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