■ Original Article

Nursing interventions taken by radiotherapy nurses and the difficulties faced by these nurses

Hiromi SAKUDA[1] **Naoko ARAI**[2] **Ryu ARAI**[3] **Momoko SAKAGUCHI**[1]
Lee Miau SHIN[1] **Yukari MURAKAWA**[1]

Key words：radiotherapy nursing, nursing intervention, difficulty

Objective: To clarify the nursing interventions provided by radiotherapy nurses to patients and their families and also the difficulties they are facing when caring for the patients.

Method: A self-administered questionnaire was sent via mail to 800 nurses who were working in randomly selected hospitals which had 300 or more beds within the Kinki area. Researchers used the data provided by the nurses［in the form of comments or descriptions］to clarify the specific roles/interventions of the nurses, the difficulties they faced when giving these interventions and how they felt when administering care to the patient.

Results: 438 questionnaires were collected via mail from the participants［53.5%］and categorized. In the category "Nursing Interventions" the following points were extracted for analysis; 'Assist in daily activities', 'Physical assessment before and after treatment', 'Care for relieving the symptoms accompanied by radiotherapy diagnosis and treatment', 'Responds to the questions from the patients and also provide information to them', 'Collaboration and adjustment with other professionals in the medical team', 'Make a nursing care plan' and 'Protection for the patient and nursing staffs'. Two additional categories addressed issues related to the difficulties in implementing these interventions with the following information being extracted for analysis; 'Anxiety when caring caused by deficiency of knowledge about radiation therapy and radiotherapy nursing', 'Anxiety in safety management caused by deficiency of knowledge regarding radiation protection'.

Discussion: The results suggest nurses have no confidence due to a lack of knowledge which leads to difficulties. Current education and training is insufficient and needs to be re-evaluated at all levels.

Ⅰ. Introduction

Radiation treatment and radiotherapy nursing in Japan was first introduced by nurses from Hiroshima and Nagasaki. They provided care for atomic-bomb survivors. Following on from this, radiation has been widely utilized in medical setting and radiotherapy nursing has been further developed. Recently, nurses specializing in oncology actively participate in radiation therapy and there are now certified radiation oncology nurses. However, there are obvious inequalities between institutions when implementing nursing interventions showing the general structure of skills and knowledge acquisition in radiation nursing care are insufficient and not standardized.

Radiation therapy is considered one of the three main cancer treatments along with surgery and chemotherapy. However, in Japan, the treatment of cancer still focuses on surgery. As such it is difficult to clearly measure the degree of development in the clinical use of chemotherapy, radiation therapy and palliative care and how this development compares to other countries. Evaluating clinical use of radiotherapy is particularly difficult as there are very few patients in Japan, compared to America and Europe, who will choose this method as a first line treatment. Even today, the clinical concept of 'cancer treat-

1 Osaka City University
（Hiromi SAKUDA Contact address: sakuda@nurs.osaka-cu.ac.jp）
2 Teikyo University
3 Showa University Hospital

投稿受付日 2014 年 10 月 22 日
投稿受理日 2015 年 1 月 21 日

ment＝surgery' strongly influences the nursing system. This has inevitably caused an imbalance in the way nurses are trained, with the emphasis, at all levels of education, being firmly grounded in 'operative' nursing methods and to this day remains the main subject in basic nursing training. This has led to a significant delay in the systemization and education of radiotherapy nursing. Education and training specific to radiation treatment is mentioned almost in passing with only a small number of opportunities for nurses to specialize in the subject and even in these cases, the number of hours dedicated to training is insufficient. [1, 2)]

The Cancer Control Act was established in 2006 and started to be implemented from 1st April, 2007. This act is aimed at: 1. Prevention or early detection of cancer（to promote prevention of cancer and to improve the quality of screening for cancer）, 2. To promote the elimination of disparities in cancer care（training of doctors or others medical staff so that they have knowledge and skills in specialized fields, the maintenance of medical institutions and to improve the quality of life of cancer patients during their recuperation period）, 3. To promote research and to pick up from the main point[3)] of issue 2 which is to promote radiation therapy and to train the doctors and medical staff who will be specialized to implement it. The Japanese Nursing Association in response, specified radiotherapy oncology nurses in certified nursing fields on 19th May, 2008. Following this, 3 institutes in Japan began to train certified oncology radiotherapy nurses which, as of 2014, numbers 177.[4)] Certified oncology radiotherapy nurses are required to obtain high quality professional knowledge and skills in order to maximize the effects of radiation therapy, work to support the patients to solve their physically, mentally or social problem during their periods of receiving radiation therapy and to enable patients to voluntarily continue and complete the treatment during long term treatment.[5)] However, as mentioned above, insufficient radiotherapy nursing education means that most nurses do not receive appropriate basic training. In addition, in clinical settings, nurses' roles are focused on operative nursing, although certified oncology radiotherapy nurses have been introduced, expectations from other medical staff continues to remain very low. Researchers also investigated patients and their experiences of fighting the disease, measuring the relationship between the patients awareness of knowing how to fight the disease and the support they are given. Additionally, professionalism of radiotherapy nursing was investigated.[6)] Results showed that although there was a need by doctors and patients evidence based radiotherapy and nursing had not been expanded. It is predicted that there will be an increasing need for radiation therapy and a need for an increased number of appropriately trained nursing staff to deal with the demand. Current issues should be addressed beyond simply dealing with adverse effects. Nurses must also have the skill sets to allow them to support the patients' own decision making process and improve the patients' QOL. Detailed clarification of the current issues needs to be addressed with a view to establishing new methods of education designed to help nurses implement treatments and better support patients with their individual requirements.

This research aims to clarify the current situations mentioned in order to conduct further research on how best to deliver a revised, systematic education structure for radiotherapy nursing.

Ⅱ. Objective

The objective of this research is to clarify the nursing interventions provided by radiotherapy nurses to patients and their families and also the difficulties they are facing when caring for the patients.

Ⅲ. Method

1. Participants

800 nurses who are working in randomly selected hospitals which have 300 or more beds within the Kinki area.

2. Research period

November 2013 to February 2014

3. Data collection

Self-administered questionnaires to be collected from the participants within 1 month.

4. Data analysis

The researchers used the comments or descriptions re-

garding their nursing interventions written by the nurses as the data base to summarize the contents and also categorize the contents according to their similarity and dissimilarity. From the description of the radiotherapy nurses, the researchers extracted the nursing interventions provided by the nurses and the difficulties they are facing when caring the patients.

5. Ethical consideration

Participants' rights were clearly written and explained, assuring them that the data would only be used for research purposes and that their confidentiality would be protected. Participants were informed that they were free to refuse or withdraw at any time. Completed questionnaires returned to the researchers was seen as having received fully informed consent. The research was approved by the Ethical Review Board of Osaka City University, Graduate School of Nursing.

Ⅳ. Results

438 questionnaires were collected from the participants［53.5%］. Participants' backgrounds are shown in Table 1.

1. Nursing interventions that provided by radiotherapy nurses to patients and families

From the data received, researchers were able to make the following 7 categories: 'Assist in daily activities', 'Physical assessment before and after treatment', 'Care for relieving the symptoms accompanied by radiotherapy diagnosis and treatment', 'Responds to the questions from the patients and also provide information to them', 'Collaboration and adjustment with other professionals in the medical team', 'Make a nursing care plan' and 'Protection for the patients and nursing staffs'（Table 2）.

The following is an explanation of each category:

1） 'Assist in daily activities'

'Assist in daily activities' refers to assisting the patients who are receiving radiation diagnosis or therapy in their daily activities. 4 subcategories were formed; 'Special care for hygiene for treatment', 'Care for fatigue', 'Care for insomnia' and 'Choice of food'. 'Special care for hygiene for treatment' refers to protecting the markings, mouth care to protect ulcers, care for hair loss and skin care for patients who have symptoms of itchiness and heat sensation. 'Care for fatigue' refers to the efforts to help in massaging and positioning their body when receiving radiation therapy. 'Care for insomnia' refers to collection of information to find out the factors causing insomnia. 'Choice of food' refers to collaboration with nutritionist in order to serve the food for patients who have severe mouth ulcers and odynophagia or patients who appear with abnormal sense of taste.

2） 'Physical assessment before and after treatment'

'Physical assessment before and after treatment' was structured using 2 subcategories which are 'Observation for the general condition' and 'Observation for the treatment'. 'Observation for the general condition' refers to vital signs monitoring and overall observation of patients' condition. 'Observation for the treatment' refers to treatment focused questions which aimed for collecting information and also assessment and palpation at the part of skin which is irradiated. It also includes physical assessment based on patients' complaints.

3） 'Care for relieving the symptoms accompanied by radiotherapy diagnosis and treatment'

This category is formed by 'Relieve the heat sensation at the part of skin of irradiation', 'Prevent and relieve ulcers in the mouth and odynophagia', 'Care for nausea and vomiting' and 'Care for headache' and refers to the ef-

Table 1. Background of respondents

Gender	Male（17, 4.0%）, Female（408, 96.0%）
Average age	30.7 years old
Position	Not management（314, 74.2%）, Vice chief nurse（33, 7.8%）, Chief nurse（7, 1.7%）
Employment status	Staff（407, 95.5%）, Temporary staff（same working time as staff）（1, 0.2%）, Dispatched staff（0, 0%）, Part time（16, 3.8%）
Average years of working experience	9.1 years
Average years of working in current department	4.3 years
Working place	Radiotherapy clinic（14, 3.3%）, Ward（402, 94.8%）, Others（8, 1.9%）
The feature of the working place: Diagnostic imaging only	Yes（11, 2.6%）, No（275, 65%）, Unknown（137, 32.4%）
The feature of the working place: Therapeutic department	Yes（369, 87%）, No（2, 0.5%）, Unknown（53, 12.5%）

Table 2. Nursing interventions that provided by radiotherapy nurses to the patients and families

Category	Subcategory
Assist in daily activities	Special care for hygiene for treatment Care for fatigue Care for insomnia Choice of food
Physical assessment before and after treatment	Observation for the general condition Observation for the treatment
Care for relieving the symptoms accompanied by radiotherapy diagnosis and treatment	Relieve the heat sensation at the part of skin of irradiation Prevent and relieve ulcers in the mouth and odynophagia Care for nausea and vomiting Care for headache
Responds to the questions from the patients and also provide information to them	Inform the patient about prospect of the treatment period Explain the feature of irradiation period and also the place they will receive the treatment Explain the adverse effects Answer the enquiry of the patients
Collaboration and adjustment with other professionals in the medical team	Collaboration with physician in radiation therapy department Collaboration with physician in-charge Collaboration with radiotherapist Collaboration with nutritionist Collaboration with pharmacist
Make a nursing care plan	Nursing care plan Implementation based on the plan Evaluation and correction after implementation
Protection for the patients and nursing staffs	Protection for the patients Protection measures for the nursing staffs

forts made to relieve these symptoms.

4) 'Responds to the questions from the patients and also provide information to them'

'Responds to the questions from the patients and also provide information to them' is structured by 'Inform the patient about prospect of the treatment period', 'Explain the feature of irradiation period and also the place they will receive the treatment', 'Explain the adverse effects' and 'Answer the enquiry of the patients'. 'Inform the patient about prospect of the treatment period', 'Explain the feature of the irradiation period and also the place they will receive the treatment' and 'Explain the adverse effects' refer to provision of information after preparation based on patient's condition and treatment plan. 'Answer the enquiry of the patients', because of patients' various enquiries, nurses appear confused. Patients' enquiries are: 1. Basic knowledge about radiation (will the body condition becomes worse if it is exposed to radiation every day, does radiation have color, can radiation be seen or not, want to know more about medical exposure, explanation of adverse effects, the reason for adverse effects and also the mechanism). 2. Enquiries about the conformity of the therapy (will it affect the fetus for pregnant woman). 3. Enquiries regarding the treatment fee (is it covered by insurance, what is the overall cost). 4. Enquiries regarding adverse effects (when adverse effects appear, what symptoms will appear, can they be treated, will pigmentation disappear, will hair grow again after experiencing hair loss, will going out be forbidden if bone marrow suppression happens). 5. Enquiries regarding the treatment (chemotherapy and radiation therapy which one will have better effects, adverse effects not totally appeared when used with anticancer drugs, if adverse effects did not appear, does it mean that there are no treatment effects). 6. Enquiries regarding precautions in daily life (which food should be avoided, is it better to rest quietly, which type of shampoo to choose, why baby shampoo will be better, hope to know more about methods of skin care, hope to know about recommended wig, is it fine to hold grandchildren even during period that receiving brachytherapy, what to do if radiation source is missing). 7. Enquiries regarding work (is it fine to con-

tinue working, do people still work during treatment period). 8. Others (I have to go back alone, but I am worried that after the treatment I cannot stand up properly). Nurses are struggling when they need to answer these types of enquiries based on patients' condition, treatment and ability to understand.

5) 'Collaboration and adjustment with other professionals in the medical team'

This category is formed by 'Collaboration with physician in radiation therapy department', 'Collaboration with physician in-charge', 'Collaboration with radiotherapist', 'Collaboration with nutritionist' and 'Collaboration with pharmacist' aimed at solving patients' problems regarding therapy and symptoms by discussing with patient appropriately.

6) 'Make a nursing care plan'

This category is structured by using 3 subcategories which are 'Nursing care plan', 'Implementation based on the plan' and 'Evaluation and correction after implementation'. In particular, it refers to nursing intervention for the patient who is admitted to the ward for radiation therapy.

7) 'Protection for the patients and nursing staffs'

'Protection for the patients and nursing staffs' is formed by 2 categories which are; 'Protection for the patients' and 'Protection measures for the nursing staffs'. 'Protection for the patients' refers to response to patients' enquiries and explains the general precautions before inspection. 'Protection measures for the nursing staffs' refers to wearing protective apron when assisting in treatment if necessary, leave the patient and come out from the room when the patient is irradiated.

2. The difficulties faced by nurses when implementing nursing interventions

The difficulties faced by radiotherapy nurses when implementing nursing interventions were placed into 2 further subcategories based on the description written by the participants (Table 3).

Explanation of categories;

1) 'Anxiety when caring caused by deficiency of knowledge about radiation therapy and radiotherapy nursing'

'Anxiety when caring caused by deficiency of knowledge about radiation therapy and radiotherapy nursing' is formed by 4 subcategories which are; 'Was not included in basic education', 'Do not have in current education program', 'Patient's more conscious towards radiation since atomic-bomb incident' and 'Lack of confidence when caring for the patients due to deficiency of knowledge'. 'Was not included in basic education' refers to (the current condition that although the nurses had studied about diagnostic imaging as one of the methods to diagnose, they did not learn in a systematic way, the nurses had been taught that treatment of cancer basically focused on operations, if an operation was not applicable, chemotherapy or radiotherapy will be chosen. Therefore, it is difficult to imagine that radiation therapy can be utilized, the knowledge obtained was the same as that which had been learnt during nursing student time). 'Do not have in current education program' refers to (current education program is completed but there is no program about radiotherapy nursing, because the need of bringing the patient for the radiation therapy, the participants only had a very modest degree of education about radiation therapy). 'Patient's more conscious towards radiation since atomic-bomb incident', (there are more questions come from patients, the questions that patients asked be-

Table 3. The difficulties faced by nurses when implementing nursing interventions

Category	Subcategory
Anxiety when caring caused by deficiency of knowledge about radiation therapy and radiotherapy nursing	Was not included in basic education Do not have in current education program Patient's more conscious towards radiation since atomic-bomb incident Lack of confidence when caring for the patients due to deficiency of knowledge
Anxiety in safety management caused by deficiency of knowledge regarding radiation protection	Lack of knowledge regarding medical exposure Lack of knowledge regarding principles of medical exposure protection Criteria of exposure protection management was not clarified

comes more professional, mostly the patients' enquiries will be answered by radiotherapist). As a result, it caused 'Anxiety when caring caused by deficiency of knowledge about radiation therapy and radiotherapy nursing'.

2) 'Anxiety in safety management caused by deficiency of knowledge regarding radiation protection'

This category is structured by using 3 subcategories which are 'Lack of knowledge regarding medical exposure', 'Lack of knowledge regarding principles of medical exposure protection' and 'Criteria of exposure protection management was not clarified'.

'Lack of knowledge regarding medical exposure' (I had not learned enough about medical exposure, after becoming a nurse, although I had worked in the department which has the opportunity to utilize radiation by portable imaging, guidance for protection was not established and I was not given a film badge, I imitated the actions of senior nurses regarding medical exposure protection). It is the same as 'Lack of knowledge regarding principles of medical exposure protection'. 'Criteria of exposure protection management was not clarified' (there might be a department which is responsible for the crisis management and managing medical exposure protection in the hospital but I had never seen the criteria of management, I am nervous because I do not know what to do as protection in the radiotherapy department when an earthquake happens, I had never attended any course or been trained for medical exposure protection). Since the incident at the Fukushima nuclear power supply plant, there are lots of information about radiation being shared through the media, I can feel that patients and families have more enquiries about protection than before. Therefore the nurses have to be more conscious about giving the correct information about protection. However, the problems appear as a lack of knowledge and anxiety about safety management.

Ⅴ. Discussion

1. Nursing interventions provided by radiotherapy nurses to the patients and families

Nursing interventions provided by generalist radiotherapy nurses to the patients and families are 'Assist in daily activities', 'Physical assessment before and after treatment', 'Care for relieving the symptoms accompanied by radiotherapy diagnosis and treatment', 'Responds to the questions from the patients and also provide information to them', 'Collaboration and adjustment with other professionals in the medical team', 'Make a nursing care plan' and 'Protection for the patients and nursing staffs'. These categories are formed after consideration of general nursing intervention and the unique nursing intervention for radiation therapy. 'Assist in daily activities', 'Physical assessment before and after treatment' and 'Make a nursing care plan' are based on nursing methodology that has been learnt in a faculty. The nursing interventions are arranged and implemented according to the basic principles of methodology, adverse effects caused by radiation therapy and the changing of ADL. 'Care for relieving the symptoms accompanied by radiotherapy diagnosis and treatment' are formed by the mixture of knowledge of radiation therapy and the skills of assistance in nursing methodology. 'Responds to the questions from the patients and also provide information to them', because different questions come from different patients, 'Collaboration and adjustment with other professionals in the medical team' such as doctors and radiotherapists are important to answer patients correctly.

As mentioned above, the basis of clinical nursing action will be systematic education. This is because education is the base for changing nursing interventions to be more specialized and professional in their nursing actions. Following this, researchers evaluated the difficulties faced by the nurses after discussion on the basics of radiotherapy nursing and clinical experience.

2. The difficulties when implementing nursing interventions

The difficulties when implementing nursing interventions were extracted from the descriptions that were written by the participants. There are 2 categories which are 'Anxiety when caring caused by deficiency of knowledge about radiation therapy and radiotherapy nursing' and 'Anxiety in safety management caused by deficiency of knowledge regarding radiation protection'. When radiation use in a medical setting is expanded, nurses will participate more in radiotherapy nursing, they currently feel that their knowledge about radiation and radiotherapy

nursing is deficient so there are additional concerns about the future.

The researchers had discussed education and clinical nursing interventions. They also addressed issues about nurses confidence levels which was seen to be strongly related to their knowledge levels.

The basic nursing education course which was established in 1951, was fully revised in 1967. In this revision nursing subjects had been divided into basic nursing subjects and specialized field nursing subjects. In the specialized field subjects nursing science is set as a main subject and other minor subjects include general nursing, adult nursing, pediatric nursing and obstetric nursing. The course was separated again in adult nursing according to the symptoms. Although radiotherapy nursing was not included, the word 'radiation therapy' appears and a lot of nursing schools planned 15 to 30 hours for students to take the course. The next revision was in 1989 which is also known as the Heisei curriculum. This revision changed the education course in order to achieve the motive that includes basic nursing education in university education. However, radiotherapy nursing was only being categorized as 'radiation therapy and nursing' under 'nursing according to treatment' which is included in clinical nursing science in minor subjects of basic nursing. Following this, psychiatric nursing and home nursing were added into the curriculum in the 1997 revision of the education course but it seems there was still no position for radiotherapy nursing. The content of radiotherapy nursing was established in the basic nursing textbook in 2014 but is not systematic and there are only a few pages.

It can be considered that due to an aging of population and increase of cancer patient, radiation therapy is expected to be developed and the protection from radiation exposure accompanied by serious disasters is important. Wide ranges of clinical nursing actions taken by generalist nurses are required. It can be assumed that the generation of requiring professors who can support the development of systematic knowledge will be coming.

Ⅵ. Recommendation

Nursing is known as science of practice because it inductively systematizes the knowledge from practice and also applies that knowledge in the practice which forms a cycle. This is to aim for improving quality of care. In Japan, the Radiological Nursing Society of Japan has been established and the third conference has been held. This society needs to gather radiotherapy nurses who work in clinical setting and also researchers to edit textbook and formulate clinical guidance which is important.

Acknowledgements

We would like to thank those involved for their co-operation.

Funding assistance

No financial assistance.

Conflicting interests

There is no conflict of interest.

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