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Research Article

Correlation Between the Radiation Fractionation Number and the Major Nursing Problems in Cervical Cancer Patients Undergoing External Radiation

Yulia Kusuma Indah^{1*} | Handayani Handayani² | Yoanita Hijriyati³

¹Dharmais Cancer Hospital,
Jakarta, Indonesia

^{2,3}Department of Nursing,
Faculty of Nursing and
Midwifery, Binawan
University, Jakarta,
Indonesia

***contact**

yuliaumarjafar@gmail.com

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Abstract

Aim: The purpose of this study is to identify the correlation between the radiation fractionation number and the major nursing problems in cervical cancer patients with external radiation.

Method: This research design was quantitative descriptive using the cross-sectional approach. Consecutive sampling was applied to collect data from 45 cervical cancer patients who were undergoing external radiation at Radiotherapy Department of Dharmais Cancer Hospital, taken from January to April 2019. The inclusive respondents fulfilled the instruments including questionnaire to determine the number of radiation fractionation and the problems that the patients were experiencing. Univariate data analysis used frequency distribution technique and bivariate used Spearman's rank correlation.

Result: The study results indicate that the majority of irradiated cervical cancer patients were aged 41-60 years, in advanced stage of III B, and they did not receive surgery therapy before radiotherapy. There is a correlation between the radiation fractionation number and the major nursing problems in irradiated cervical cancer patients where the P value is 0.000 ($r=0.713$). They experienced major nursing problems of distress/coping in the 5th fractionation, nutrition alteration in the 10th fractionation, impaired skin integrity and nutrition alteration in the 15th fractionation, while in the 20th and 25th fractionations, the major problem was impaired skin integrity.

Conclusion: The study depicted a significant and strong positive correlation between the radiation fractionation number and the major nursing problems in irradiated cervical cancer patients, the higher radiation fractionation level, the higher (severe) the nursing problem. The study suggests nurses to conduct further study on the side effects of radiation to improve nursing care for irradiated cancer patients.

Keywords:

Cervical Cancer, External Radiation, Nursing Problem, Radiation Fractionation

INTRODUCTION

Cervical cancer is one of the major causes of death in women. An estimated number of 500,000 new cases of cancer appear each

year, 79% of which occur in developing countries, bringing 233,000 deaths (1). Cervical cancer and breast cancer were cancers with the highest prevalence in Indonesia in 2013; respectively cervical

cancer, 0.8% and breast cancer, 0.5% (2). Cancer poses a double burden in Indonesia due to its wide prevalence and enormously high financial cost. Based on the 2013 Basic Health Research (Riskesdas) the prevalence of cancer in Indonesia was 1.4 per 1,000 population or around 347,792 people, while based on the BPJS-Healthcare report, the costs for cancer treatment as per September 2017 had reached 2.1 trillion rupiah (3).

Data obtained from the Radiotherapy Department of Dharmais Cancer Hospital in 2017 showed 1,413 cancer patients (all types of cancer) undergoing radiotherapy. As per September 2018, 1,075 cancer patients underwent radiation therapy. Meanwhile based on data from the Medical Record Department of Dharmais Cancer Hospital in 2016, there were 314 new cases of cervical cancer and 303 cases that received radiation therapy. In 2017, there were 391 new cases of cervical cancer and 392 patients underwent radiation therapy. In 2018 (as per October 2018) 274 new cases were recorded and 411 patients underwent radiation therapy. It is apparent from the data that the number of cervical cancer patients increases every year, so the need for radiation therapy also arises.

Radiotherapy is an important component in the management of cancer patients (4). The side effects of radiation therapy cause patient responses, which become a nursing problem that must be identified by nurses as early as possible. Nursing problems that often arise include fatigue, impaired skin integrity, changes in nutrition, and sexuality (5). Changes in the frequency of urinating and diarrhea/proctitis are also common (6).

Appropriate nursing interventions are needed to manage arising nursing problems, one of which is by educating patients and families to form adaptive coping. Therefore, the authors are interested in examining the correlation

between the total number of radiation fractionations (5 radiation fractionations) and the major nursing problems that arise in cervical cancer patients undergoing external radiation therapy.

The purpose of this study is to identify the correlation between the number of radiation fractionations and the major nursing problems in cervical cancer patients undergoing external radiation.

METHODS

This research design is quantitative descriptive using the cross-sectional approach. The study was conducted at the Radiotherapy Department of the Dharmais Cancer Hospital, Jl. Letjen S. Parman Kav 84-86, Slipi, West Jakarta. The population in this study were cervical cancer patients who underwent radiotherapy at the Radiotherapy Department of the Dharmais Cancer Hospital in the last three months (July-September) in 2018, namely 57 patients. The sampling technique used was consecutive sampling. One of the efforts to anticipate the possibility of respondents dropping out is to calculate the sample size correction by adding 10% of the sample calculation results. The number of samples to be examined is 45 patients. The data collection instrument used in this study was in the form of a research checklist. Study was conducted after the authors received a certificate of passing the ethical review by the ethics committee team of the Dharmais Cancer Hospital and the respondents were willing and signed the informed-consent form.

Descriptive analysis (univariate) was performed on the variables from the results of study using a frequency distribution to find out the variables studied and analytic analysis (bivariate) was used to find the correlation and prove the hypothesis using the Spearman's Rank Correlation Test.

RESULTS

Table 1. Characteristics of Respondents Based on Age, Disease Stage, and Surgical Procedure (n=45)

Characteristics	Frequency(n)	Percentage(%)
Age		
18-40	6	13.3
41-60	34	75.6
> 60	5	11,1
Disease Stage		
1B	2	4.4
2A	10	22.2
2B	10	22.2
3B	23	51.1
Surgical Procedure		
Surgery	14	31.1
Non-Surgery	31	68.9

Table 2. Distribution Frequency of Radiation Fractionation (n=45)

Radiation Fractionation	Frequency	Percentage
5 th Fractionation	9	20.0
10 th Fractionation	9	20.0
15 th Fractionation	9	20.0
20 th Fractionation	9	20.0
25 th Fractionation	9	20.0
Total	45	100.0

Table 3. Frequency Distribution of Nursing Problem Level (n=45)

Major nursing problems	Frequency (n)	Percentage (%)
Mild	14	31.1
Severe	31	68.9
Total	45	100.0

Based on Table 1, the distribution of age frequency of cervical cancer patients at the Radiotherapy Department of Dharmais Cancer Hospital is mostly within the range of 41-60 years with 34 respondents (75.6%). Likewise, the table also indicates that most of the respondents are at 3B stage, 51.1% (23 respondents), and the majority are not operated on with a percentage of 68.9% (31 respondents). Table 2 shows that the distribution of radiation

fractionation for all respondents has the same frequency in fractionation, respectively 9 patients (20%). On the other hand, based on Table 3 above, the distribution of frequency of nursing problem level presents that most of the respondents have severe nursing problems, i.e 31 patients (68.9%).

Table 4. Correlation between Total Number of Radiation Fractionations and Major Nursing Problems in Cervical Cancer Patients with External Radiation

No	Radiation Fractionation (X)	Major Nursing Problems (Y)							Total	P Value	r
		P1	P2	P3	P4	P5	P6	P7			
1	5 th Fraction	5	0	5	0	0	6	4	20	0.000	0.713
	% Total	25	0	25	0	0	30	20	100		
2	10 th Fraction	5	3	7	5	4	3	6	33		
	% Total	15	9	21	15	12	9	18	100		
3	15 th Fraction	5	8	8	5	2	5	7	40		
	% Total	13	20	20	13	5	13	18	100		
4	20 th Fraction	2	9	6	7	6	4	7	41		
	% Total	5	22	15	17	15	10	17	100		
5	25 th Fraction	4	9	5	7	4	6	7	42		
	% Total	10	21	12	17	10	14	17	100		

Remarks:

P1=Activity Intolerances, P2= Impaired skin integrity, P3= Nutrition Alteration, P4=Change in Defecation Pattern, P5=Change in Urination Pattern, P6=Distress/Coping, P7=Change in Sexual Pattern

Furthermore, Table 4 describes that the respondents mostly often complain about as the major nursing problem. In the 5th fractionation is distress/coping, 6 patients (30%); in the 10th fractionation, nutrition alteration, 7 patients (21%); in the 15th fractionation, impaired skin integrity, 8 patients (20%), and nutrition alteration, 8 patients (20%); in the 20th fractionation, impaired skin integrity, 9 patients (22%), and; in the 25th fractionation, impaired skin integrity, 9 patients (21%).

The result of calculating the Spearman's Rank Correlation between radiation fractionation and major nursing problems is 0.713. This value is interpreted in the category of strong correlation. The correlation between radiation fractionation and major nursing problems is significant, because the significant rate is 0.000 far below alpha (0.05), so the decision that can be taken is to reject Ho and accept Ha. This means that there is a positive correlation between radiation fractionation and major

nursing problems, where the higher the radiation fractionation level, the more (severe) is the nursing problem and vice versa.

DISCUSSION

The results of the study from Table 1 figure that the distribution of age frequency of cervical cancer patients at the Radiotherapy Department of Dharmais Cancer Hospital is mostly within the interval of 41-60 years with 34 respondents (75.6%). This is in line with the studies on the ages of cervical cancer patients in the US and Netherlands which record 30-60 years (7), and it is also the same as the results of a research at dr. Soetomo Surabaya General Hospital which the majority of respondent age was in the range of 40-59 years old (8). Furthermore, the incidence rate of cervical cancer in Indonesia is generally in the age range of 45-50 years (9), is similar to the studies conducted in Cameroon with the highest rate being in the 50-54 years age bracket (10). On the other hand, the incidence of cervical cancer in the UK increase in the adult and middle age (11). In line with the results of a research on conducting primary cervical cancer screening towards thousand women in England showed that the highest rate of positive high risk Human Papilloma Virus (hrHPV) testing was below age 30 (28.0%) (12).

The results of this study in Table 1 depict that the majority of respondents suffer from stage 3B cervical cancer (51.1%). This could be influenced by many factors so that most of the patients come to hospitals when they are already in an advanced stage (13), in line with the results of a research at Dr Soetomo Surabaya General Hospital, respondents with stage IIIB cervical cancer were 91.7% (8). This is also in conformity with the results of a meta-analytic study which state that the majority (> 50%) of cervical cancer patients are in advanced stage IIIB (14). In the study conducted in Cameroon, 47.5% of respondents had cervical cancer in advanced stages (stages

III and IV) (10). This result is also similar with the results in England stated that about 60% (1650/2828) of all detected cervical intraepithelial neoplasia grade 2 or worse were associated with HPV 16/18 infections (12).

The distribution of frequency of surgical operation in Table 1 shows that the majority of respondents were not operated on with a percentage of 68.9% (31 respondents). The respondents who had surgery were directly proportional to their stages of cancer. According to Susworo & Kodrat, 2017, cervical cancer stages IA, IB, and IIA are usually chosen for radical hysterectomy. Under Decree of the Minister of Health of the Republic of Indonesia Number HK.01.07/MENKES/349/2018 concerning National Guidelines on Medical Services for the Management of Cervical Cancer, cancer of stages III and IV is not operated (15).

Table 2 indicates that all respondents have the same frequency in fractionation, each of which 9 patients (20%). The study was made on a multiple of five radiation fractionations. Each respondent will receive external radiation for 25 times of fractionation. In accordance with the guidelines from the Ministry of Health of Indonesia on management of external radiation therapy for cervical cancer, radiation therapy is administered at a dose of 25x200cGy or 25x180 cGy (15). The regiment of standard radiotherapy is around 2 Gy per day, 5 days per week, as a good regiment for dose fractionation (16)(17)(18)(19). Based on Decree of the Head of Nuclear Energy Monitoring Agency Number: 21/Ka-Bapeten/XII-02 concerning the Radiotherapy Installation Quality Assurance Program, evaluation should be performed during the administration of external radiation at least every week (20).

Furthermore, in the distribution of frequency of nursing problems, which respondents most often complained about, describe as the major nursing problems. As in Table 4 shows that distress/coping

(30%) in the 5th fractionation; nutrition alteration (21%) in the 10th fractionation; impaired skin integrity and nutrition alteration each 20% in the 15th fractionation; impaired skin integrity (22%) in the 20th fractionation, and impaired skin integrity (21%) in the 25th fractionation. Then it is classified into criteria of severe and mild, depending on the severity level of the nursing problems experienced by the respondents which is evaluated every 5 radiation fractions. Overall, in these nursing problems, the majority of respondents experience severe nursing problems as 31 patients (68.9%), while those with mild problems are 14 patients (31.1%) (Table 3).

While completing radiation therapy, the respondents complain about the side effects of therapy. The side effects of radiation therapy in cervical cancer patients are: abdominal discomfort/ pain, diarrhea, nausea and vomiting, bladder irritation (radiation cystitis), irritation and pain in the vagina, yeast infection on the vagina or on the skin in radiation area, infertility, sexual side effects, fatigue and decreased number of blood components (21) (22). Moreover, changes in genital and reproductive organs can happen, as well as fistula formation (23). A study on 104 cervical cancer survivors after undergoing various treatment modalities reports poor sexual satisfaction and sexual function (24). Meanwhile, distress/coping problems occur up to 20% in cancer patients, which are characterized by clinical depression, depressed mood, and anhedonia (marked by a loss of interest or pleasure in doing activities) (25).

The results of the study on correlation between radiation fractionation and major nursing problems as shown in Table 4 present a correlation value of 0.713 (strong). This means the higher the radiation fractionation level, the more (severe) is the nursing problem, and conversely the lower the radiation fractionation level, the lower (mild) is the nursing problem. The results of the study also show that there is a positive correlation

between radiation fractionation and major nursing problems with a P value = 0.000, which means a significant correlation.

The results of this study are in line with research which maintains that there is a significant relationship between radiation fractionation in cancer patients with advanced stages (FIGO III-IV) and overall major nursing (overall survival) with a P value of 0.002. Most of the radiation fraction in stage I-II cervical cancer patients show 94% complaining anxiety (distress/coping), while stage III-IV cervical cancer patients show 54% with impaired skin integrity (26). It is supported by a study in China, which explains that the effects of radiation may cause skin changes and skin infections in cervical cancer patients (27). Approximately 95% of patients undergoing radiation will experience radiation dermatitis (28). The common manifestations of radiation dermatitis are epilation (loss of hair on the skin), erythema, dry desquamation and wet desquamation (29). This is evident in Table 6 that there are 29 patients (64%) who experience an impaired skin integrity.

A study examined 263 patients with cervical cancer and endometrial cancer receiving radiation therapy at the Greater Poland Cancer Center, an acute toxicity was found in 51.3% of the total patients examined, and the toxicity in gastrointestinal (33.1%) was greater than toxicity in bladder (22.1%) (30). Radiation cystitis in cervical cancer radiation is experienced by 20-25% of patients (31). Three to 11% of patients receiving radiotherapy to the abdomen and pelvis have reported nutritional problems (6). This is consistent with the results of this study which are shown in Table 6 that changes in nutrition due to nausea/vomiting were experienced by 31 (68.9%) respondents, while urination problems were only experienced by 16 (35.6%) respondents.

The side effects of radiation therapy and its complications depend on the dose and

volume of radiation received by the patient (25). The quality of radiation and the modality used, including the total dose, fractionation, and inter-fraction intervals, have functional and cosmetic effects (32). The results of this study are in line with a study conducted on 138 cervical cancer patients of advanced stages in the Netherlands who received external radiation, 70% of respondents showed moderate-severe symptoms, and reached a peak at the end of external radiation. Diarrhea and stomach cramps increased in the first 3-5 weeks of radiation (33).

In this study at the Dharmais Cancer Hospital, at the 5th fractionation not many respondents lodged complaints of radiation side effects. The more the number of radiation fractions received, the more complaints that appeared. The most complaints were found at the end of radiation, namely the 25th fractionation. This correlation can also be seen in Table 4 showing nursing problems that arise in each multiple of 5 fractionations. The number and type of arising nursing problems also increase.

CONCLUSION

Conclusion

Based on the results of the study and discussion above, it can be concluded that the major nursing problems experienced by most of the respondents in the 5th fractionation is distress/coping; nutrition alteration in the 10th fractionation; impaired skin integrity and nutrition alteration in the 15th fractionation, and impaired skin integrity in the 20th and 25th fractionations. There is a correlation between the total number of radiation fractionations taken and major nursing problems in cervical cancer patients with external radiation at a P value of 0.000 and a correlation value of $r=0.713$. This means radiation fractionations and major nursing problems have a strong positive correlation, where the higher the radiation fractionation level, the higher (severe) the nursing

problem and vice versa. The correlation between radiation fractionation and major nursing problems in cervical cancer patients with external radiation at Dharmais Cancer Hospital is significant, because the sig. is 0.000 far below alpha (0.05).

Recommendations

Nurses are expected to use the results of this study to be able to detect nursing problems in an early manner that may arise in cervical cancer patients undergoing radiotherapy, so that nursing care can be improved. However, further study is still needed to support the success of nurses in providing nursing care to cancer patients undergoing radiation therapy.

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