

# RADIOTHERAPY AND BRACHYTHERAPY IN NURSING: A BIBLIOMETRICAL REVIEW

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**ABSTRACT:** Bibliometric and scientometric study that identified and characterized the nursing publications regarding radiotherapy and brachytherapy in Brazil. Data collection was performed in August 2013, with search in the Nursing Database, Latin American Literature in Health Sciences, Medical Literature Analysis and Retrieval System Online and Scientific Electronic Library Online, using the descriptors "nursing", "radiotherapy" and "brachytherapy". It included 30 publications analyzed by simple descriptive statistics and the results showed that 43.33% of knowledge was produced by M.Sc. graduates and students, mostly linked to educational institutions in the Southeast; 56.66% published in journals classified as strata A1 and B1; 20% covered prevention, identification and treatment of complications and side effects; the studies were predominantly qualitative. The production of knowledge in the investigated area is incipient; therefore, there is the need for more research to improve the care to people subject to these treatment modalities.

**DESCRIPTORS:** Oncologic nursing; Oncology; Nursing care; Nursing research; Bibliometrics.

## RADIOTERAPIA E BRAQUITERAPIA NA ENFERMAGEM: UMA REVISÃO BIBLIOMÉTRICA

**RESUMO:** Esta pesquisa teve como objetivo caracterizar as hospitalizações de crianças menores de cinco anos por condições sensíveis à atenção primária, em Cuiabá, Mato Grosso, entre 2007 e 2011. Estudo descritivo dos registros das hospitalizações obtidas do Sistema de Informações Hospitalares do Sistema Único de Saúde, analisadas por sexo, faixa etária, causas e ano. Registraram-se 16.156 hospitalizações. Dessas, 6.258 (38,7%) foram por condições sensíveis à atenção primária, com maior número em crianças de um a quatro anos (3.697). As principais causas foram pneumonias bacterianas, doenças pulmonares, gastroenterites infecciosas e complicações. Os coeficientes de hospitalizações permaneceram estáveis no período estudado, com discreta redução nos anos de 2010 e 2011. Embora tenha ocorrido redução do coeficiente de hospitalizações por condições sensíveis à atenção primária, os resultados podem indicar deficiência na qualidade da atenção no município estudado.

**DESCRIPTORIOS:** Hospitalização; Saúde da criança; Atenção primária à saúde; Indicadores de qualidade em assistência à saúde; Epidemiologia descritiva.

## RADIOTERAPIA Y BRAQUITERAPIA EN LA ENFERMERÍA: UNA REVISIÓN BIBLIOMÉTRICA

**RESUMEN:** Estudio bibliométrico y cuantitativo que identificó y caracterizó las publicaciones de enfermería acerca de la radioterapia y braquiterapia en el ámbito nacional. Los datos fueron obtenidos en agosto de 2013, con búsqueda en las Bases de Datos de la Enfermería, Literatura Latinoamericana en Ciencias de Salud, Medical Literature Analysis and Retrieval System Online y Scientific Electronic Library Online a través de los descriptores "enfermería", "radioterapia" y "braquiterapia". Hubo 30 publicaciones, analizadas por estadística descriptiva simple cuyos resultados mostraron que 43,33% de los conocimientos fueron producidos por maestros y maestrandos, la mayoría de las instituciones de enseñanza de la Región Sudeste; 56,66% publicadas en periódicos clasificados con A1 e B1; 20% abordaron prevención, identificación y tratamiento de complicaciones y efectos colaterales; predominaron los estudios cualitativos. La producción de conocimiento en el área investigada es incipiente, por eso hay necesidad de más investigaciones para mejorar el cuidado a las personas sometidas a esas modalidades terapéuticas.

**DESCRIPTORIOS:** Enfermería oncológica; Oncología; Cuidados de enfermería; Investigación en enfermería; Bibliometría.

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## INTRODUCTION

Global estimates of the World Health Organization (WHO) referred 14.1 million new cancer cases and 8.2 million deaths from this disease in 2012. For 2030, 21.4 million new cases and 13.2 million cancer deaths worldwide are expected. In developing countries, the increase in its incidence is due to the growth and aging of the population, reduction of child mortality and deaths from infectious diseases. The estimate for 2014 and 2015 in Brazil shows the occurrence of about 576,000 new cases of cancer, revealing the magnitude and importance of treating this issue as a public health problem that must be addressed<sup>(1)</sup>.

Cancer, often associated with pain and suffering in the popular imaginary, generates great emotional instability to patients during the disease experience. In addition, the treatment requires periods of hospitalization, invasive procedures and technologies that increase immunosuppression and have serious side effects. Therefore, nursing, by acting directly in the care for cancer patients, requires emotional and technical skills and scientific knowledge in order to offer safe and quality care to patients and their families, covering biopsychosocial aspects<sup>(2)</sup>.

In the search for appropriate assistance and problem solving, technological developments have permitted the improvement of the techniques, as well as the expansion of ways of treating cancer. Radiotherapy is one of leading therapeutic modalities and consists in the application of ionizing radiation generated by equipments or emitted by natural radioisotopes, applied directly on the site, at distance (teletherapy) or close to the tumor (brachytherapy), where the neoplasia was identified. This application in most cases is performed on an outpatient basis<sup>(3)</sup>.

Technological innovations require that nurses reformulate the ways of thinking, being and acting on the demands and requirements of the care practice and teaching. It is necessary to invest in research that focuses on daily work situations and produces valid knowledge to improve care in different performance scenarios<sup>(4)</sup>. Accordingly, the following question was raised: What are the main characteristics of the nursing publications in Brazil related to radiotherapy and brachytherapy?

This guiding question gave rise to the aim, which was to identify the nursing publications in Brazil related to radiotherapy and brachytherapy and their main features.

## METHOD

In order to achieve the proposed objective, it was decided to use bibliometric and scientometrics searches. The first looks at study books or journals, whose analyses are linked to the management of libraries and databases. The second is concerned with the dynamics of science as a social activity, and the production, circulation and consumption of scientific production as objects of analysis. Both quantify, determine and assign meaning to data, qualifying them so they can have a better use in science and technology policies, knowledge applied to human and health sciences, expanding the vision within certain specialties or research groups, or even in more extensive, regional, national and global contexts<sup>(5-7)</sup>.

For the construction of this review, six stages were covered: selection of terms; definition of search databases; establishment of criteria for sample selection; general analysis of the search results; construction and filling out of a form for registration of collected data; data analysis and results interpretation.

The sources to search publications for carrying out the survey were: Latin American and Caribbean Literature on Health Sciences (LILACS); Brazilian Nursing Database (BDENF); Scientific Electronic Library Online (SciELO); and Medical Literature Analysis and Retrieval System Online (MEDLINE). For the publications search, the terms used were: Radiotherapy AND Nursing and Brachytherapy AND Nursing. The following inclusion criteria were applied to these combinations: scientific production in Portuguese language in order to search the literature produced in the country, available in article format in full by electronic means, and that somehow addressed the theme "Nursing radiotherapy and/or brachytherapy". Publication limit time was not applied in order to characterize all the production on the subject present in the bases. The search was performed in August 2013.

After crossing the terms Radiotherapy AND Nursing and Brachytherapy AND Nursing,

2161 and 220 articles were found, respectively. Through the implementation of the inclusion criteria, 45 articles were selected with the descriptors Radiotherapy AND Nursing and 05 articles with Brachytherapy AND Nursing as descriptors (Table 1 and 2).

The five articles selected for full text reading by means of the crossing between Brachytherapy AND Nursing were also found in the crossing between Radiotherapy AND Nursing and, thus, 45 full texts were read. Next, 15 articles were excluded because they did not address the subject concerned. Consequently, the final sample consisted of 30 articles. To analyze the publications, the data were recorded in a form designed by the authors of this study, as well as entered in spreadsheets of the Microsoft Excel Program. The data analysis was performed using

simple descriptive statistics (absolute and relative frequencies) and presented in table and analytical description formats.

In the publications, the following elements were identified: the origin, the type of study, the Qualis CAPES<sup>(8)</sup> rating of the journal selected for publication, the hierarchy level of scientific evidence<sup>(9)</sup> by means of analysis of the method, the degree and the institution the main author was affiliated with, and the year of publication of the articles.

## RESULTS

Based on the analysis of 30 articles selected for the study, a survey of the variables outlining the characteristics of the productions was carried out.

Table 1 - Steps of articles selection using the terms Radiotherapy AND Nursing. Florianópolis-SC-Brazil, 2013

Databases	Articles found		Excluded/Exclusion criteria						Selected for text reading in full	
			Other languages		Not available in full		Repeated			
	n	%	n	%	n	%	n	%	n	%
BDENF	38	1,85	0	0	19	35,29	0	0	19	45,83
LILACS	78	3,61	19	0,94	27	52,95	16	51,61	16	33,33
SciELO	22	1,02	0	0	0	0	12	38,71	10	20,84
MEDLINE	2023	93,52	2014	99,06	6	11,76	3	9,68	0	0
Total	2161	100	2033	100	52	100	31	100	45	100

Table 2 – Steps of article selection using the terms Brachytherapy AND Nursing. Florianópolis-SC-Brazil, 2013

Databases	Articles found		Excluded/Exclusion criteria						Selected for text reading in full	
			Other languages		Not available in full		Repeated			
	n	%	n	%	n	%	n	%	n	%
BDENF	4	1,81	0	0	3	25	0	0	1	20
LILACS	10	4,54	2	0,99	6	50	0	0	2	40
SciELO	01	0,46	0	0	0	0	0	0	1	20
MEDLINE	205	93,19	201	99,01	3	25	0	0	1	20
Total	220	100	203	100	12	100	0	0	5	100

The institutional affiliations of the main author were shown as 16 different institutions, and a study did not show any institutional affiliation. In relation to this variable, the Ribeirão Preto College of Nursing - University of São Paulo-USP excelled with seven publications (23.33%), followed by the National Cancer Institute (INCA) and the Federal University of Pelotas in the nursing area, both responsible for four studies (13.33%). The School of Nursing at the University of São Paulo published two articles (6.67%). The other institutions, Anna Nery School of Nursing/Federal University of Rio de Janeiro; Federal University of São Paulo; Federal University of São Carlos, in the State of São Paulo; Federal University of Rio de Janeiro; Castelo Branco University, in the state of Rio de Janeiro; Municipal Secretary of Aracaju, in the State of Sergipe - Psychosocial Care Center; State University of Campinas; Radiotherapy Centre of the German Hospital Oswaldo Cruz, in the State of São Paulo; State University of Maringa; State University of São Paulo; Federal University of Piauí and Federal University of Rio Grande-FURG, published one article each (3.33%). The institutions responsible for one article were linked to the Nursing area, and the vast majority of authors were affiliated with graduate programmes, while the others were linked to nursing care areas.

Regarding the degree of the first author, most articles were produced by M.Sc. students, totaling seven publications (23.33%), followed by M.Sc. graduates, with six publications (20%), Ph.D.'s, specialists and graduate students, both were the authors of three publications (10% respectively), Ph.D. students produced two publications (6.66%) and the medical residency degree produced one publication (3.33%). Five authors did not report their degree.

Concerning the area of knowledge production, the Southeast was highlighted with 20 articles (66.66%), followed by the South with seven articles (23.33%). Two articles (6.66%) were produced in the Northeast. This information was not identified in one production.

For the publication of the studies, 13 periodicals were used, according to Table 3.

Of the selected journals, nine (30%) belong to QUALIS Capes rating A1, five (16.67%) A2, eight (26.67%) B1, and four (13.33%) B2 and B3, respectively.

In relation to the scientific evidence hierarchy level, there were no level I studies (systematic review of randomized controlled trials and systematic review of nonrandomized trials), level II (individual controlled trial and not randomized trial) and level III (systematic review

Table 3 - Periodicals with the Brazilian Nursing publications regarding radiotherapy and brachytherapy. Florianópolis-SC-Brazil, 2013

Periodical	Number of publications	%
Latin American Journal of Nursing	9	30
Nursing Journal UERJ	5	16,67
Brazilian Journal of Oncology	4	13,33
Enfermería Global	2	6,68
Brazilian Journal of Nursing	2	6,68
Einstein	1	3,33
Electronic Journal of Nursing	1	3,33
Acta Paulista of Nursing	1	3,33
Anna Nery School Journal of Nursing	1	3,33
Text and Context Journal	1	3,33
Nursing Journal of Rio Grande do Sul	1	3,33
Nursing School of USP Journal	1	3,33
Science, Care and Health	1	3,33
Total	30	100

of correlation/observation studies). Three articles (10%) were classified as level IV (correlation/observation study), five articles (16%) as level V (systematic review of descriptive studies/qualitative/physiological studies), 21 articles (70%) as level VI (descriptive/qualitative/physiological individual study) and one article (4%) as level VII (opinions of authorities, experts committees).

The productions were published between 1996 and 2012 (Table 4).

The investigated themes were clustered into 10 groups based on the aim of the studies, presented in decreasing order according to research interest (Table 5).

Regarding the type of study, 19 productions (63.33%) had a qualitative design, 10 quantitative (33.33%), and one publication (3.33%) used a mixed design.

Table 4 - Year of publication of the articles. Florianópolis-SC-Brazil, 2013

Year of publication	N	%
1996	1	3,33
2002	1	3,33
2003	3	10
2004	0	-
2005	1	3,33
2006	1	3,33
2007	2	6,67
2008	6	20
2009	7	23,34
2010	2	6,67
2011	3	10
2012	3	10
Total	30	100

Table 5 - Research themes. Florianópolis-SC-Brazil, 2013

Research themes	N	%
Prevention, identification and treatment of complications/side effects	8	26,67
Experiences/life experiences of cancer patients	6	20
The cancer experience of patients and their family	4	13,33
Nursing care practice	3	10
Life quality of patients undergoing radiotherapy/brachytherapy	3	10
Psychological effects related to radiotherapy/brachytherapy treatment	2	6,68
Nursing consultation to the patient undergoing radiotherapy	1	3,33
Care needs of the patient undergoing radiotherapy	1	3,33
Epidemiological profile	1	3,33
Alternative therapies	1	3,33
Total	30	100

## DISCUSSION

Since the 70s, there has been a gradual expansion of graduate courses in nursing in Brazil. In 1974, the country had only two Master's courses. In 1998, there were 14 graduate nursing courses. In 2009, that number had increased to 41 graduate programmes. In 2014, there were 96 graduate nursing courses, with 49 academic Master's, 32 Ph.D. and 15 professional Master's<sup>(10-11)</sup>.

This study shows that the highest degree of the first author in percentage terms corresponds to Master's students, followed by M.Sc.'s and, subsequently, an equivalent number of Ph.D.'s, graduate students and experts. This reality reveals that the sum of *stricto sensu* graduate students (M.Sc. and Ph.D.) exceeds 50% of the authors, which can be explained by the reality of the graduate programmes, whose requirements include scientific production. The dissemination of knowledge production is an essential factor for admission in most graduate programmes.

By analyzing the distribution of the articles published per Brazilian region, a significant discrepancy could be identified in the number of productions per state. As discussed previously, the production of knowledge is closely associated with graduate courses, so this is an important element related to the predominant production in the Southeast, with the largest concentration of higher education institutions in the country<sup>(12-13)</sup>, as well as many national and multinational companies that are major financial funders of research programmes<sup>(14)</sup>. The higher education institutions attract public and private investments to carry out research projects with the aim of producing new technologies. The quantity and the quality of the final products built and disseminated in the scientific community permit greater incentives for new projects, which creates a cycle of research and knowledge production.

In the studies performed, the authors mainly chose the qualitative method. This method is widely used in research dealing with human sciences, in order to understand the collective or individual meaning of certain phenomena<sup>(15)</sup>. It is used in nursing research in order to describe a certain reality by means of stories and narratives, as well as experiences, perceptions and beliefs. It is believed that, by being focused on care,

nursing is greatly concerned with the subjective issues involving human beings in order to interpret the care reality, to achieve empathy and benefit professional practice. By means of qualitative research, nursing professionals can understand, describe and explain how the human being experiences cancer, its treatment and side effects, and all other complex phenomena that cancer patients and their family may go through in the confrontation with the disease.

The qualitative research shows a perspective different from nursing practice since it enhances the perspectives by considering the complexity and diversity of human beings. Through the perception of the other person's subjectivity, it is possible to understand the phenomena of interest to nursing that will help in the expansion and construction of knowledge, as well as strengthen its social role<sup>(16)</sup>.

As an example of qualitative publication that composes the sample of this study, a study is mentioned that was conducted with six women with breast cancer who were undergoing radiotherapy treatment and their perceptions about family and family relationships in view of the cancer context. From the subjects' discourse, it is possible to understand the impact of the diagnosis for the patient's family, which can be a source of support and care for the patient. The results contributed to emphasize that the family must be an ally in the care for cancer patients by providing support, care and strength. Therefore, one of the actions of nurses when taking care of women affected by breast cancer, is also to provide care for the family, since they are also under disease condition, and to enable them to care<sup>(17)</sup>. By means of qualitative research, it is possible to identify aspects hardly visualized during the daily work and understand the feelings permeating those experiencing the health-disease process.

On the other hand, quantitative studies are important because they permit the establishment of the correlation among variables in the occurrence of certain phenomenon<sup>(18)</sup>. For example, one of the sample publications concerns a prospective study of 86 women with breast cancer, operated in early stages, undergoing adjuvant radiotherapy at the Federal University of São Paulo and in the German Hospital Oswaldo Cruz. Radiotherapy was performed in the breast region, with tangential and parallel opposed

fields, total dose of 5.040 cGy (180 cGy dose/day), with 6 MV linear accelerator. In addition to collecting the personal data, the size of the breast was measured, based on its contour drawing. The distance between the separation of the fields and the breast height was measured. The evaluation of the skin of the treatment area was performed weekly and the reactions were classified according to the Radiation Therapy Oncology Group (RTOG). The study demonstrated that the chance of occurrence of grade 3 skin reactions increase 2.61 times for each increase of one unit of breast height (cm). This study was important because it showed that, the higher the breast height, the greater the chances of occurring grade 3 skin reaction<sup>(19)</sup> and, from this result, nurses can study and program care to treatment optimization and reduction of side effects of radiotherapy in breast cancer treatment.

Currently, theorists who study the phenomenon of the development and dissemination of ideas prioritise the need for evidence-based practice as essential to improve the health treatments, and the best scientific evidence emerges from rigorous research findings and methodologically appropriate to the proposed question. On top of the hierarchy of evidence that classifies the data sources according to the power of the information provided is the systematic review of randomized controlled trials and the systematic review of nonrandomized trials. These are followed by an individual randomized controlled trial and nonrandomized trial (level II) and systematic review of correlation/observation studies (level III)<sup>(18)</sup>, not present in this study sample. The paucity of nursing production as part of radiotherapy and brachytherapy has been proven, requiring greater investment in the development of research and training of researchers so that, in the future, the nursing production yields better scientific evidence to base their professional practice.

It is noteworthy that regarding the Periodicals Qualis CAPES<sup>(8)</sup> Rating, the Brazilian system of journals evaluation, a greater number of publications in journals classified as strata A1 and B1 is highlighted. As the strata are divided into eight levels in decreasing quality order (A1, A2, B1, B2, B3, B4, B5 and C), the present results demonstrate the production quality from this perspective.

Among the productions, there was a

predominance of studies aiming to contribute to the nursing care of patients undergoing radiotherapy, including the prevention, identification and treatment of complications and side effects, and life experiences of the patients and their family to confront the diagnosis and treatment of cancer. These themes have troubled nurses during their daily work, so they should be encouraged to be alert and sensitive in patient care, in order to base questions about their professional practice, leading to the desire to produce new knowledge, contributing to organizational changes and dissemination of new technologies.

There has been a significant progress of the productions from 2008, with a significant increase in 2000 due to the expansion of graduate courses in Brazil. Therefore, as shown by the National Cancer Institute, it is necessary to improve the skills of health professionals in oncology by means of education in their services of origin, M.Sc. and Ph.D. program offers<sup>(20)</sup>, in order to favor research, production and consumption of scientific knowledge, as well as increase and impact of publications in care nursing practice.

## FINAL CONSIDERATIONS

Although the scientific papers of Brazilian nurses in the area of radiotherapy and brachytherapy in oncology have increased in recent years, it is demonstrated that the research is not yet consolidated, since this study has shown gaps in the knowledge production. An increased availability of high quality research data is necessary, with the inclusion of clinical trials. This requires greater investment in the training of researchers of educational and assistance institutions, with focus on the questioning of improvements in nursing care practice, aiming for access to critical information and analysis of scientific literature available in journals, building new knowledge and skills to disclose the discovered technologies.

The research in Brazilian oncology nursing is committed to providing expertise that promotes the qualification of care, improvement of technical care, development of new technologies, evaluation of services and training of professionals, with the aim to provide increasingly effective and safe care for the patient.

As one limitation of this study, the non-operation of the international literature search is appointed, which could contribute to the development of new strategies both for care and research in the area. Studies are suggested that compare the national with the international production.

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