EXPERIENCE OF XEROSTOMIA, MANAGEMENT AND OUTCOME IN PATIENTS WITH HEAD AND NECK CANCER POST RADIATION

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ABSTRACT

The purpose of this descriptive research was to describe experiences of xerostomia, management and outcome, and their relationship in patients with head and neck cancer, post radiation. The model of symptom management revised by Dodd, et al. (2001) was applied as the conceptual framework of the study. The participants included 100 patients with head and neck cancer post radiation, recruited by means of purposive sampling from Otolaryngology at the In and Outpatient Department, Department of Radiology, at a university hospital. Data were collected using a set of questionnaires, which included a patients' profile form, xerostomia-related quality of life questionnaire, xerostomia questionnaire, and a symptom management strategies questionnaire, during January to April 2008. Descriptive statistics and Pearson Product Moment Correlation were used in data analysis.

Results showed that the majority of the participants were male (70%), ages between 18 to 77 years, had nasopharyngeal cancer (41%), and had received combination treatment with chemotherapy and radiation therapy. The actual range of experiences of xerostomia score were 5 to 95 (mean=51.45, SD. = 22.32). The top five most favorable methods for management were: 1) foods containing water, sipping water (99%); 2) avoiding spicy food, and salty tasting food (98%); 3) mouth rinsing and avoiding alcoholic drinks and tobacco (96%); 4) brushing teeth after meals (95%); and 5) following up with dentist (92%). The sources of knowledge in managing the symptom were physicians (84%) and nurses (61%). More than half (57%) reported that their xerostomia had gained improvement**.** The overall xerostomia related quality of life actual score was 1 to 56 (Mean=17.61, S.D =11.13). There were significant correlations between xerostomia and quality of life, xerostomia and nutritional status, in addition to xerostomia and dose of radiation.

The findings suggest that all patients had mild to severe xerostomia. There are baseline data to develop the practice guideline and other management strategies to relieve the symptoms.

KEY WORDS: XEROSTOMIA/ HEAD AND NECK CANCER/ SYMPTOM EXPERIENCE, SYMPTOM MANAGEMENT AND SYMPTOM OUTCOME

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ประสบการณ์การมีภาวะน้ำลายแห้ง วิธีการจัดการ และผลลัพธ์ของผู้ป่วยมะเร็งศีรษะและคอภายหลังได้รับรังสีรักษา
(EXPERIENCE OF XEROSTOMIA, MANAGEMENT AND OUTCOME IN PATIENTS WITH HEAD AND NECK CANCER POST RADIATION)

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บทคัดย่อ

การศึกษานี้เป็นการวิจัยเชิงบรรยาย เพื่อศึกษาประสบการณ์การมีภาวะน้ำลายแห้ง วิธีการจัดการ และผลลัพธ์ของผู้ป่วยมะเร็งศีรษะและคอภายหลังได้รับรังสีรักษา และความสัมพันธ์กัน โดยใช้กรอบแนวคิดของดอดด์และคณะ กลุ่มตัวอย่างเป็นผู้ป่วยมะเร็งศีรษะและคอหลังได้รับรังสีรักษาครบจำนวน 100 ราย ที่ได้รับการคัดเลือกแบบเฉพาะเจาะจงจากหน่วยตรวจผู้ป่วยนอกหู คอ จมูก หน่วยรังสีรักษาและเวชศาสตร์นิวเคลียร์ หอผู้ป่วยจักษุโสตฯของโรงพยาบาลมหาวิทยาลัยแห่งหนึ่ง เก็บรวบรวมข้อมูลโดยใช้แบบสอบถามข้อมูลพื้นฐานส่วนบุคคล แบบสอบถามคุณภาพชีวิตภายหลังได้รับรังสีรักษา แบบประเมินภาวะน้ำลายแห้ง แบบสอบถามการจัดการกับภาวะน้ำลายแห้งและผลจากการจัดการ ระหว่างเดือนมกราคม ถึงเมษายน 2550 วิเคราะห์ข้อมูลโดยใช้สถิติบรรยายและสัมประสิทธิ์สหสัมพันธ์ของเพียร์สัน

ผลการศึกษาพบว่ากลุ่มตัวอย่างส่วนใหญ่เป็นเพศชายมีอายุระหว่าง 18-77 ปี วินิจฉัยว่าเป็นมะเร็งโพรงหลังจมูก(41%)ได้รับการรักษาด้วยรังสีรักษาร่วมกับเคมีบำบัด (55%) มีความรุนแรงของภาวะน้ำลายแห้งแตกต่างกันตั้งแต่น้อยที่สุดจนถึงมากที่สุด 5-95 คะแนน (mean=51.45, SD.22.32) วิธีการจัดการกับอาการที่ใช้มากที่สุด 5 อันดับได้แก่ 1) รับประทานอาหารที่มีน้ำมากขึ้น (99%) 2) หลีกเลี่ยงอาหารที่มีรสจัด (98%) 3) บ้วนปากบ่อยๆด้วยน้ำเปล่า (96%) 4) แปรงฟันหลังรับประทานอาหาร (95%) 5) พบทันตแพทย์ (92%) ผลของการจัดการพบว่าอาการน้ำลายแห้งมีอาการดีขึ้น (57%) พบความสัมพันธ์ระหว่างภาวะน้ำลายแห้งกับคุณภาพชีวิต, ภาวะน้ำลายแห้งกับภาวะโภชนาการ, ภาวะน้ำลายแห้งกับปริมาณรังสีที่ได้รับ อย่างมีนัยสำคัญทางสถิติ

ผลการศึกษานี้พบว่าผู้ป่วยกลุ่มนี้ทุกรายมีอาการน้ำลายแห้งรุนแรงมากน้อยต่างกัน สามารถใช้เป็นแนวทางพัฒนาการดูแลเพื่อบรรเทาอาการน้ำลายแห้งให้มีประสิทธิภาพยิ่งขึ้นต่อไป

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CHAPTER I
INTRODUCTION

Background and significance of the study

Cancer is one of the chronic and life-threatening diseases. It is a major barrier to socioeconomic development in the country because it is one of the causes of death of people. The World Health Organization predicts that in the year 2563 B.E. the amount of deaths will increase to 11 million people with 7 million of them come from developing countries (Siriraj Cancer Center Tumor Registry, 2004). In Thailand, cancer was the third most common cause of death from 2541 B.E. to 2542 B.E. After that, it became the first leading cause of death, whereas the second and the third were heart diseases and accidents in 2543 B.E. (Public Health Statistics, 2001) to present. Cancer is increasing every year from 2545 B.E. onwards and the mortality rate was 73.3 per 100,000 populations increasing to 83.1 per 100,000 populations in 2549 B.E. (Public Health Statistics, 2007).

Head and neck cancer in Thailand accounts for 20% of all malignancies and it was found in males more than in females. The peak is reached in the interval of ages from 40 to 70 years. (Savitree Maoleekoonpairoj, B.E. 2541). Out of the 10 types of cancer, head and neck cancer is ranking the fifth most common cancer in men and the ninth in women. The statistics of cancers in 2005 showed 275 new cases of head and neck cancer in the National Cancer Institute (NCI Cancer Registry, 2005), 703 new cases in Siriraj hospital (Siriraj Cancer Center Tumor Registry, 2005) and 354 new cases in Ramathibodi hospital (Ramathibodi Cancer Registry, 2005).

The major treatment for head and neck cancers primarily involves three modalities: surgery, radiation therapy, and chemotherapy, administered alone or in combination. The choice of modality depends primarily on site of lesion, tumor stages, opinions of physician, and patients'factors (Sarawut Santidamrongkul & Nuchanaj Opilunch, B.E. 2550). Radiation therapy and surgery are the main treatment modalities for head and neck cancer (Langendijk, 2005; Jemal, 2006) because most of them are

squamous cell carcinoma that is sensitive to radiation, especially in the early-stage disease. Radiation therapy alone is the most common treatment for certain types of head and neck cancers, such as cancer of the nasopharynx, oral cavity, larynx, and oropharynx (Hoffman, 1998; Thongchai Bhongmakapat & Boonchu Kulapaditharom, B.E. 2550). Radiation therapy is more likely to preserve structure function in the head and neck cancer when compared with surgical resection of the tumor (Fu, 1997; Ladawan Narkwong, B.E. 2550). Despite the fact that it is an effective treatment, complication from radiation should be taken into consideration.

Radiation therapy of the head and neck region needs to pass the mucous membranes of the oral cavity that are highly sensitive to the radiation field. Therefore, this treatment modality leads to both acute and late complications after completion. Acute complications occurred in the short time after start receiving radiation such as oral mucositis, erythema, and desquamation of the skin. Late complications are developing gradually over several months or years. It is the results of chronic injury to vasculature, salivary glands, mucosa such as xerostomia, and dental decay. These symptoms may need to be treated repeatedly for recovering of the functions or maintain the functions if such function could not be recovered (Ladawan Narkwong, B.E. 2550).

Oral complications after radiation therapy for head and neck cancer can occur in almost all patients (Feber, 2000; Sonis, 1993; Strohl, 1999). These include oral mucositis, xerostomia, oral discomfort or pain, taste change, dental caries, trismus, gingivitis, dysphagia, and dysphonia (Cooper, 1995; Epstein, 1999; Trotti, 2000). The most common complications are mucositis and xerostomia (Strohl, 1999) which have negative effects on the patient's quality of life (Trotti, 2000). Loss of taste lowers the patient's quality of life both during and after the completion of radiation.

There are a number of factors determining the severity of oral complications related to radiation therapy of head and neck cancer. Radiation factors include the total dose of radiation delivered, the treatment field and pathway of radiation beams, the dose per fraction and number of fractions per day, the volume of tissue treated, and the duration of the treatment course. Patient and cancer treatment related factors include the patient's baseline medical condition, the patient's age, and the use of

chemotherapy or surgery before, after, or concurrent treatment with the radiation therapy (Louis, et al., 2004).

Radiation therapy for definitive treatment of head and neck cancer is conventionally given in daily fractions of 1.8 Gy to 2.0 Gy in 5 days per week up to total doses of 66 to 70 Gy over 6 or 7 weeks (Ang, & Gorden, 2002; Savitree Maoleekoonpairoj, B.E. 2541). It is an effective treatment for head and neck cancer. However, traditional treatment fields frequently include the major salivary glands. Subtherapeutic dose of radiation in the range of 22 to 24 Gy in 2 Gy fractions result in permanent injury to the salivary glands, including fibrosis, dysfunction and hyposecretion and resulting in xerostomia or dry mouth. It is a common and significant consequence of head and neck radiation therapy. (Eisbruch, & Ship, 2001; Ladawan Narkwong, B.E. 2550).

Xerostomia is the subjective feeling of dryness of the mouth. This is usually the result of a decrease in the volume of saliva secreted (Berk, 2005; Sreebny, 1996). The common causes of xerostomia are medication, autoimmune diseases (Sjogren's syndrome, rheumatoid arthritis), water loss/dehydration, altered renal function (diabetes insipidus, diabetes mellitus), and radiation therapy to head and neck cancer. Xerostomia is a common and significant, distressing side effect of radiation therapy for head and neck cancer. The treatment fields of head and neck cancer frequently include the salivary glands. Salivary gland injury and salivary flow typically decreases by 50% to 60% during the first week after receiving radiation 25 Gy to 30 Gy resulting to xerostomia at 3 to 4 weeks after that (Sarawut Santidamrongkul, B.E. 2550; Chambers, Rosenthal, & Weber, 2007). Patient feels the decrease of saliva, thickened saliva, and difficulties/discomfort with talking, swallowing, eating, sleeping, taste change, and dry lips (Harrison, Sessions, & Hong Waun Ki, 2004).

Ladawan and colleagues (2005) reported a survey of common symptoms of cancer patients in southern Thailand. The results found that head and neck cancer is the first rank of cancer in male, and indicated that dry mouth/throat is the second commonly symptom next to pain. Patients suffer from oral discomfort, difficulty to chew or swallow, which can lead to loss of appetite, decrease of nutritional intake and weight loss (Dirix, et al., 2006).

Sujira Foongfaung (B.E. 2550) study experience of certain symptom, symptom management, and outcomes of patients with head and neck cancer undergoing concurrent radiation. The finding showed that symptom of xerostomia is the second ranked. There were 66.3% of patients who have undergone head and neck radiation therapy for cancer reported that they had stress from dry mouth/throat, and 65% had difficult to swallow result from dry throat and thickened saliva (Praiporn Saetaou, B.E. 2544).

Epstein and colleagues (1999) conducted a study of 65 patients with head and neck cancer receiving radiation therapy which was completed after 6 months. The results indicated that the most frequent factors effect to quality of life were xerostomia (91.8%) and loss of taste (70.5%). Xerostomia interferes with lubrication of the mouth. Oral mucous membranes become more susceptible to infection, especially candidiasis, bacterial infection, and food particle debris leads to dental plaque formation to tooth decay (Samuels, 2004: Prayut Rajpornpradit, B.E. 2541; Sarawut Santidamrongkul, B.E. 2550).

Xerostomia influences physical functions. Thus, it can cause a feeling of social isolation such as having dinner with family and friends, difficulty in talking, a feeling of low self-esteem, and in general result to lower quality of life (Naroemon Sahtsuk, B.E 2541; Hay, 2005; Chambers, 2006).

Symptom management for patients with xerostomia can be separated into two parts: prevention and treatment of xerostomia. For prevention of xerostomia, they are use Three Dimensional Conformal Radiation Therapy (3D-CRT), Intensity Modulated Radiation Therapy (IMRT) to salivary gland sparing radiation therapy, and surgical relocation of the submandibular gland to the submantal space, before radiation therapy (Chembers, 2007). Treatment of xerostomia involves oral preparation before, during, and after radiation therapy. It was suggested to have followed up a dentist, moistened oral mucosa, for example taking frequent sips of water or other liquids throughout the day, mouth rinsing with normal saline or sodium bicarbonate solution, and sour, sugar-free tart candy or sugar-free chewing gum to stimulate residual saliva production. Artificial saliva preparations act as substitutes for the lubricating and hydration. Amifostine is a drug that has a protective effect on salivary gland. Pilocarpine is efficient in relieving symptoms of post radiation xerostomia (Harrison, Sessions, &

Hong Waun Ki, 2004; Hawthorne, & Sullivan, 2000; Louis, et al., 2004). Humidifier must be used whenever possible and especially at night. According to Hay and Morton (2005), the use of the nocturnal humidification for xerostomia results to increase oral comfort and decrease of cough. Another management used is noninvasive transcutaneous electrical nerve stimulation (TENS).

Niramon Pojdoung (B.E. 2550) analyzed the published articles/ research to develop a nursing practiced guideline for oral care in radiation induced xerostomia for patients with head and neck cancer. It is consisted of three parts as follow assessment of xerostomia by nurse; xerostomia management includes education, counseling and oral hygiene care, and multidisciplinary health care team (radiotherapist, dentist and other physician) approach to xerostomia management.

Xerostomia is a common and significant complication after radiation therapy in patients with head and neck cancer. It leads to discomfort and many health problems with digestion, swallowing and speech, and an increase risk of dental caries, nutritional status, and affect to quality of life. There is a variety of management strategies reported for xerostomia. Patients with head and neck cancer might get symptom management by the physician’s prescription, suggestion from dentists, nurses, or other professional or non professional.

The researcher had nine years experience working with this group of the patients and found that many of the patients still had suffering of xerostomia symptom. So far, there are no reports, especially in Thailand that focus to xerostomia in terms of the existing of the symptom, how much of its severity, how is the management used, whether the symptom relief or not and what is its impact or outcome. The purposes of this study are to describe symptom experience, symptom management strategies and outcomes of xerostomia in patients with head and neck cancer after radiation in Ramathibodi Hospital.

The results would be useful for nurses in order to be bases for better planning of care to relief the symptom and to improve the quality of life of the patients.

Conceptual framework

This study uses a model of Symptom Management by Dodd and colleague (Dodd, Janson, Facione, Faucett, Froelicher, Humphreys, et al., 2001) from the University of California, San Francisco (UCSF) School of Nursing which was

adjusted/ and revised from the model of Larson, et al. (1994). It includes three dimensions: symptom experience, management strategies, and outcomes. The researcher adopted this model to investigate symptom experience, symptom management strategies, and outcomes of xerostomia in patients with head and neck cancer post radiation. In the revised model, the recognized domains of nursing science are person, health/illness and environment.

Person domain is a basic condition of an individual includes psychological, sociological, demographic, physiological variables, and the level of development or maturation that responds to the symptom experience (Dodd, et al., 2001:670).

Health and illness domain in this domain are the factors that have direct and indirect effects on symptom experience, management and outcomes, including as fellow variables unique to illness state or health of an individual and includes injuries, disabilities, or risk factors, (Dodd, et al., 2001:670).

Environment domain includes variables of social, physical, and cultural. The physical environment may relate with the place such as, home, and work place. Social support network and interpersonal relationships is the social environment. Beliefs, values and practices are the environment of cultural that are unique to one's identified ethnic, racial, or religious group (Dodd, et al., 2001:671).

The details of the dimensions are as follows:

1. Symptom experience. It is a dynamic interaction part of an individual's perception, evaluation, and response to a symptom.

Perception of symptom refers to the consideration a change of behavior or feel from general.

Evaluation of symptom refers to the determination of their symptom by making judgment about the severity, cause, treatability and the effect of symptom on their lives.

Response to symptom is the components that occurring of behavioral physiologic, psychological, and sociocultural.

The overall symptom experience is bi-directional relationship when person perception and evaluation of their symptoms urge them to seek the ways for management.

2. Symptom management strategies. They begin with an individual's perspective assessment of the symptom experience, followed by identifying the focus on intervention strategies. The intervention strategies may be targets of one or more components of the individual's symptom experience to achieve one or more desired outcomes (Dodd, et al., 2001:673). The goal of symptom management is to avert or delay a negative outcome through biomedical, professional and self-care strategies, including the specifications of who, what, when, where, why, how much, to whom and how.

After a person finds the ways to manage and try to do it, he can see the outcomes of management.

3. Outcomes arise from symptom management strategies and the symptom experience and focus on eight factors (Dodd, et al., 2001:674). They include symptom status, self-care, costs, quality of life, morbidity and co-morbidity, mortality, emotional status and functional status.

To summarize this model, each person has a different person domain, health and illness domain, and environment domain. These factors are a direct or indirect influence to symptom experience, symptom management strategies and outcomes. (See Figure 1)

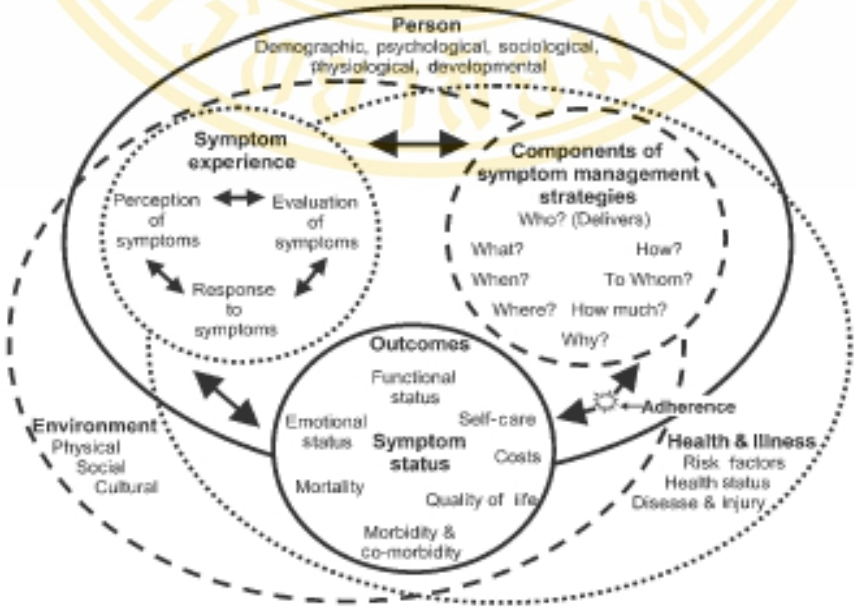

Figure 1: The revised symptom management conceptual model (Dodd et al., 2001:668-676)

In this study, the researcher adopted the symptom management model as the conceptual framework to investigate symptom experience, symptom management strategies, and outcomes of xerostomia in patients with head and neck cancer post radiation as follows:

Experience of xerostomia

Experience in this study is defined as the subjective sensation of dryness in the mouth/throat, called “xerostomia”, in patients with head and neck cancer post radiation. Patients perceive and evaluate the symptom and they make judgments about the level of severity. Does it interfere to daily living and how?

Symptom management strategies

Symptom management begins after the patients’ perception of xerostomia and evaluation of severity. In this study, symptom management strategies focus on ‘what’, which refers to the methods used to decrease, reduce or solve the problem of xerostomia, ‘who’, which refers to persons assisting to manage their symptom and sources of knowledge in these strategies, ‘where’, which refers to the places for practice of management, ‘when’, which refers to time, when to use them, and ‘why’ which refers to reason of using strategies to relieve symptom.

Outcomes

This study includes outcomes of the xerostomia and management strategies. The outcomes of xerostomia chosen from the literature are the ones that report the nutritional status, dental caries, and quality of life. Outcomes of management strategies include symptom status, functional status, emotional status, cost of management and morbidity & co-morbidity.

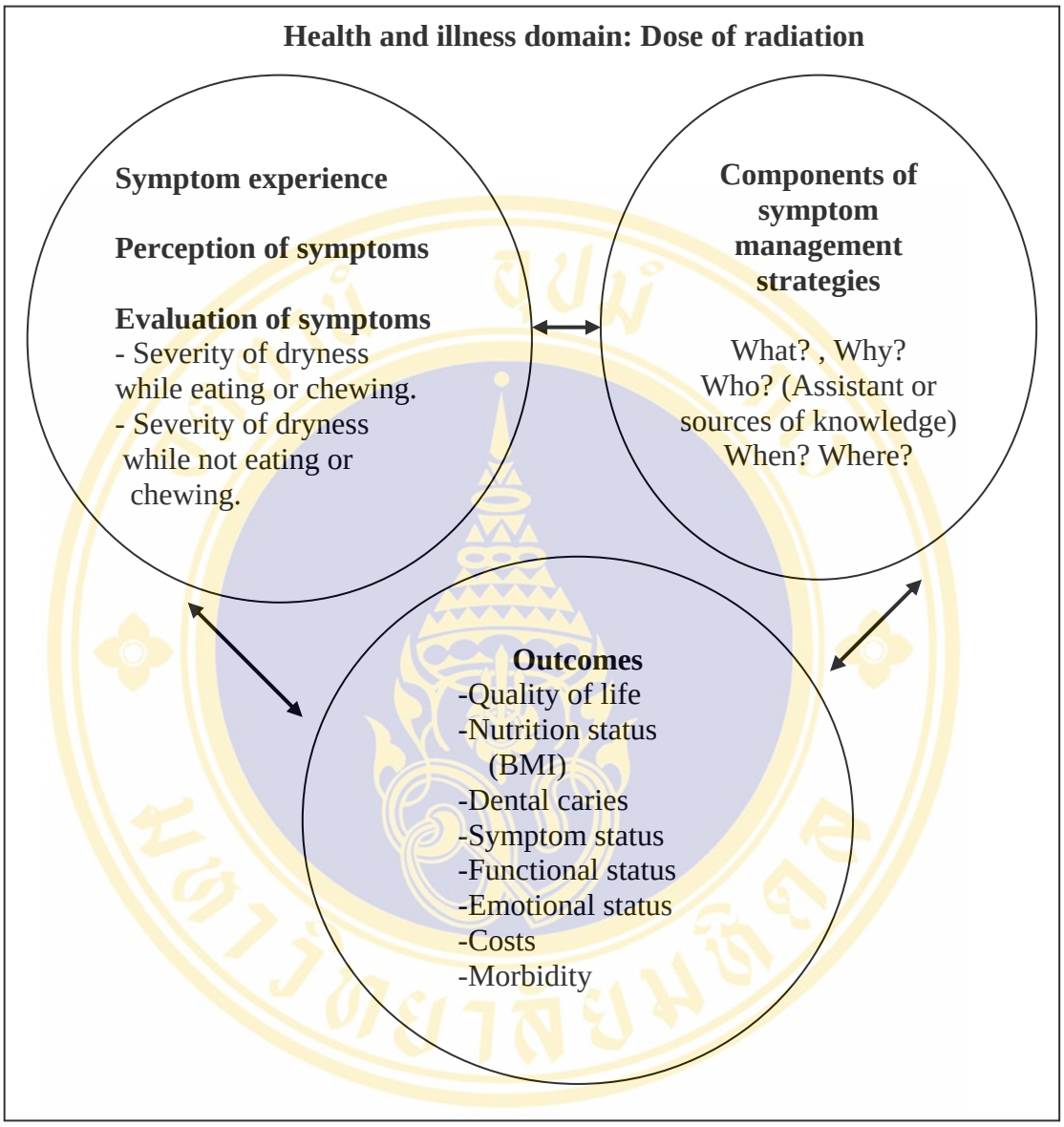

Figure 2: Conceptual framework of this study

Research Objectives

1. To investigate experience of xerostomia related to radiation.

2. To explore symptom management strategies of xerostomia in patients with head and neck cancer post radiation.

3. To explore outcomes of xerostomia: nutritional status, dental caries, quality of life related quality of life and outcomes of management strategies: symptom status, functional status, emotional status, cost of management and morbidity & co-morbidity.

4. To study the relationship between experience of xerostomia and the duration of post complete radiation in patients with head and neck cancer.

5. To study the relationship between experience of xerostomia and nutritional status in patients with head and neck cancer post radiation.

6. To study the relationship between experience of xerostomia and quality of life in patients with head and neck cancer post radiation.

Research Questions

1. What is the experience of xerostomia related to radiation?

2. What are the management strategies used by patients with head and neck cancer post radiation?

3. When do patients with head and neck cancer post radiation use symptom management strategies?

4. Who are the sources of knowledge and assisted patients in symptom management strategies with head and neck?

5. Where do patients with head and neck cancer use symptom management strategies?

6. Why do patients with head and neck cancer use symptom management strategies?

7. What are the outcomes of xerostomia: nutritional status, dental caries, quality of life and outcomes of management strategies?

8. Is there relationship between experience of xerostomia and the duration of post complete radiation in patient with head and neck cancer?

9. Is there relationship between experience of xerostomia and nutritional status in patients with head and neck cancer post radiation?

10. Is there relationship between experience of xerostomia and quality of life in patients with head and neck cancer post radiation?

Scope of the study

This descriptive study aimed to describe the experience of xerostomia, symptom management strategies, and outcomes of xerostomia in patients with head and neck cancer post radiation. Data were collected by using hospital records and

questionnaires. The participants consisted of 100 adults head and neck cancer of Ramathibodi Hospital after completed the radiation to two years.

Study Assumption

The information obtained from the hospital records and the questionnaires completed by the patients were considered accurate and reliable.

Expected Outcomes and Benefits

1. For nursing practice, to understand that xerostomia related radiation is a subjective experience that varies in severity, management strategies and outcomes in patients. This knowledge would help nurses plan appropriate interventions for this patient population.

2. For nursing researcher, to conduct further research as a clinical trial of the intervention for improving xerostomia.

3. For nursing education and administration. Knowledge gains from the study would be used to evaluate nursing students and nurses personels.

Definition of Terms

Experience of xerostomia referred to subjective sensation of patients with head and neck cancer defined as patients' evaluation of xerostomia symptoms and responses to such symptom. It referred to individuals' feeling of the severity of dryness in the mouth/throat, thick saliva, and oral discomfort resulting to disturbance of daily activities. It was measured by xerostomia questionnaire which constructed by Eisbruch and college (Eisbruch, et al., 2001), and Panwadee and colleague (B.E. 2550) translated into Thai. Subjects were rated for each symptom on an 11-point ordinal Likert scale from 0-10, 0 score means no xerostomia, the score from 1 and over refer to as having experience of xerostomia, with the higher scores indicate greater xerostomia symptom.

Symptom management strategies of xerostomia referred to the methods or strategies that the patients with head and neck cancer post radiation have used to control and relieve xerostomia. The components of symptom management strategies included the specification of why, where, when, who (delivering or giving information for head and neck cancer post radiation). It was measured by using the symptom management strategies form modified from the questionnaire of Aphiradee Ladawan and college (B.E. 2547) and Busakorn Sangkaew and colleague (B.E. 2549) and from

literature review based on the revised symptom management conception model of Dodd et al. (2001:668-676).

Outcomes referred to and outcomes of symptom management strategies and outcomes of xerostomia.

Outcomes of xerostomia include;

Dental caries referred to record about dental health in dentist record

Nutritional status referred to the state of a person's health in terms of the nutrients in his or her diet evaluate from Body Mass Index (BMI). Body mass index (BMI) is calculated by the individuals body weight in kilograms divided by the square of their height in meter. The body weight and height before and after radiation get from hospital record and at the time of data collection value was measured and recorded by the researcher.

Quality of life related xerostomia referred to perception of the patient to well being in physical, psychological and social functioning and discomfort evaluated by xerostomia-related quality of life questionnaire constructed by Henson and college (Henson et al., 2001) and translated into Thai by the researcher.

Outcomes of symptom management strategies focus on symptom of xerostomia, functional status, emotional status, costs, and morbidity that five factors were five of eight factors of outcomes in the model of Dodd, et al. (2001:674). The assessment form was modified by the researcher from the questionnaires constructed by Aphiradee Ladawan and colleague (B.E. 2547) and Busakorn Sangkaew and colleague (B.E. 2549) which was constructed based on the revised Dodd's symptom management conception model (Dodd et al., 2001:668-676).

CHAPTER II
LITERATURE REVIEW

The present study was a descriptive research aimed to describe the symptom experience, symptom management strategies, and outcomes of xerostomia in patients with head and neck cancer post radiation. In this chapter, the literature review encompassed the following topics:

1. Head and neck cancer
2. Radiation therapy in head and neck cancer
3. Xerostomia
4. Effects of xerostomia
5. Symptom management strategies of xerostomia

Head and neck cancer

Definition

Head and neck cancer originating from the upper aerodigestive tract, including nasal cavity and paranasal sinus, nasopharynx, oral cavity, oropharynx, hypopharynx and cervical esophagus, larynx, salivary gland, thyroid gland, orbit and ocular structure (Louis, et al., 2004; Haas, et al., 2007; National Cancer Institute, 2006). Most head and neck cancers begin in the cells that line the mucosal surface in the head and neck area. They are often referred to as squamous cell carcinomas. Some head and neck cancers begin in other types of cells. For example, cancers that begin in glandular cells are called adenocarcinoma, and other types include mucoepidermoid, adenoid cystic carcinomas, and melanomas. More than 90% of head and neck cancers are squamous cell carcinoma (Louis, et al., 2004; Haas, et al., 2007).

The incidence of disease

The incidence of head and neck cancers in the United States is about 4% of all cancers. It was estimated that there were 29,000 new cases and over 7,400 deaths in 2006 with peaks in the fifth and sixth decades of life, and higher in male more than

female, as the ratio of 2:1 (American Cancer Society, 2006, Jemal, Siegel, Ward, Murray, Xu, Smigal, & Thun, 2006). In Thailand, head and neck cancers accounting for 20% of all malignancies. The data from National Cancer Institute in 2549 B.E. found that new cases of these cancers were the first rank in male (18.5%) and the fourth rank in female (4.03%). The most common site is nasopharyngeal cancer (NCI Cancer Registry, 2006). In 2005, there were 354 new cases of head and neck cancer in Ramathibodi hospital, which were the second rank in male and the third rank in female cancer patients (Ramathibodi Cancer Registry, 2005).

Causes and risk factors of head and neck cancer

Several risk factors make a person more likely to develop head and neck cancer:

Tobacco. It is refers to cigarette smoke and chewing tobacco, pipe smoke, and cigars. Smokers is a major factor to increase risk of cancer related to cancer of larynx or hypopharynx 5-35 times of nonsmokers (Iwamoto, 2001).

Alcohol consumption. Increase one's chance for laryngeal cancer approximately 2-5 times that of non drinkers, and in combination with tobacco use has been shown to have almost a multiplying effect on the risk. (Iwamoto, 2001).

Virus. Human papillomavirus (HPV) infection is the possible cause of oral cavity carcinoma and oropharyngeal carcinoma. Epstein-Barr virus (EBV) is specially associated with nasopharyngeal carcinoma (Gillison, 2004).

Environmental irritants. Exposure to inhaled drugs, toxic dry cleaning solvents or pain fumes, wood dust, and asbestos are considered risk factors for cancer of larynx, paranasal sinus, and nasal cavity and nasopharynx (Iwamoto, 2001).

Diet. It was believed that high dietary intake of salty cured fish and meat is high risk for nasopharyngeal cancer (Haas, et al., 2007).

Cancer staging

Staging describes the extent of cancer, especially whether the disease has spread from the original site to other parts of the body. Staging is important in cancer diagnosis because it assists the physician with determining the progression of a disease in order to choose an appropriate method of treatment and to accurately assess a prognosis.

The TNM Staging System is one of the most commonly used staging systems. This system was developed and maintained by the American Joint Committee on Cancer (AJCC) and the International Union Against Cancer TMN committee (UICC [Union Internationale Contre Cancre]). It is based on the extent of the tumor (T) the extent of spread to the lymph nodes (N), and the presence of metastasis (M).

Once the T, N and M are determined a “stage” of I, II, III or IV is assigned by the physician, it mean that:

Stage I Cancers are small, localized and usually curable.

Stage II and III Cancers typically are locally advanced and/or have spread to local lymph nodes.

Stage IV Cancers usually are metastasis (have spread to distant parts of the body) and generally are considered inoperable (American Joint Committee on Cancer, 1997; Haggood, 2001).

Treatment of head and neck cancer

The three main types of treatment for managing head and neck cancer surgery, radiation therapy, and chemotherapy. The treatment depends on the site of the cancer and the stage of the disease.

1. Surgery is an important part of the treatment of head and neck cancers and aims to remove them completely, especially in patients with early- stage head and neck cancers. The surgeon may remove the cancer and some of the healthy tissue around it, lymph nodes in the neck may also be removed if the doctor suspects that the cancer has spread. The surgery around these areas often changes the patient’s ability to chew, swallow, or talk (Eng & Vokes, 2003; Hoffman, 1998).

2. Radiation therapy is the use of high energy x-rays and similar rays such as electrons to treat the disease. Patients with early-stage head and neck cancers are treated with one modality or combination. Radiation therapy (RT) alone is the most common treatment for certain types of head and neck cancers, such as cancer of the nasopharynx, larynx, and oropharynx (Hoffman, 1998).

3. Chemotherapy is the use of anti-cancer (cytotoxic) drugs to destroy cancer cells. They work by disrupting the growth of cancer cells, which may be used before or after surgery or radiation therapy to make treatment that is more effective.

Sometimes chemotherapy may be given at the same time as radiation therapy. It may also be given to people whose cancer has spread to other parts of the body or whose cancer has relapse after radiation therapy (Eng & Vokes, 2003; Hoffman, 1998).

The selection of appropriate treatment for a specific cancer depends on a complex of variables including tumor site, relative morbidity of various treatment option, patient performance and nutritional status, health problems, social and logistic factors, and previous primary tumors. Treatment planning generally requires a multidisciplinary approach involving specialist surgeons and medical and radiation oncologists.

Radiation therapy for head and neck cancer

Radiation therapy is the most commonly modality used for head and neck cancer, definitive treatment of them is conventionally given in daily fractions of 1.8 Gy to 2.0 Gy, up to total doses of 66 Gy to 70 Gy over 6 or 7 weeks (Ang, & Gorden, 2002).

Mechanism of radiation to cancer cell

Radiation therapy may also be called radiotherapy, x-ray therapy, or irradiation. It uses ionizing radiation to kill cancer cells and shrink tumors. Radiation therapy injures or destroys cells in the target tissue by damaging their genetic, making it impossible for these cells to continue to grow and divide. Radiation damages both cancer cells and normal cells. Most normal cells can recover from the effects of radiation and function properly. The goal of radiation therapy is to damage as many cancer cells as possible, while limiting harm to nearby healthy tissue (National Cancer Institute, 2004).

Radiation therapy may be used alone, instead of surgery. It can also be use after an operation, to destroy small areas of cancer that could not be removed by the surgery, or may also be given in combination with chemotherapy (chemo-radiotherapy).

Radiation therapy methods: can be given in one of two ways;

1. External Beam Radiation Therapy is the most common form of radiation therapy, a beam of radiation is directed through the skin to the cancer and the immediate surrounding area in order to destroy the main tumor and any nearby cancer

cells. A machine called a linear accelerator, or linac usually generates the radiation beam. It is capable of producing high-energy x-rays and electron, but gamma ray beams from cobalt unit and lower energy x-rays. Types of equipment are Cobalt-60 machines and Linear accelerators.

2. Internal Radiation Therapy also called brachytherapy, interstitial radiation therapy, or implant therapy. It involves putting a radio active material directly into the cancer, given by inserting radio active needles or wires into the cancer site, under a general anesthesia.

Side effect of radiation therapy

Side effects and potential complications of radiation therapy are often found and, when they do occur, are typically limited to the areas that are receiving treatment with radiation. The radiation side effects experienced by the normal body tissue during and after radiation therapy can be loosely divided into acute and late effects.

1. Acute Radiation Side Effects constitute the acute reaction occurring during radiation and in the immediate weeks and months following treatment.

1.1 Fatigue, the combination of nutritional factor, anemia, self-care demands, and insomnia are likely play a role in fatigue development. Fatigue is insidious and accumulated over the course of treatment, peaking 1 to 3 weeks after completion of treatment (Strohl, 1999).

1.2 Skin reaction, patients being treated for head and neck cancers develop skin reaction beginning 3 to 4 weeks during treatment. It is a temporary expected part of the treatment process and is experienced by nearly everyone treated with radiation (Haas, et al., 2007).

1.3 Xerostomia, the subjective experience of dryness in the mouth, is a common and often irreversible effect of head and neck irradiation (Chang, Liu, & Komika, 2005). Low radiation doses can cause noticeable changes. A radiation dose as little as 10 Gy at approximately 1 week after starting can lead to xerostomia (Madeya, 1996).

1.4 Taste change, related to radiation therapy is first noticed during the second week of treatment. Taste alterations are believed to result from both the loss of saliva and the direct pathological effect of radiation on taste cells. Taste buds show

signs of degeneration and atrophy at 1 Gy and at 3 Gy the patient begins to notice a loss of taste (Strohl, 1995)

1.5 Oral mucositis is especially severe in patients receiving radiation to the head and neck because the majority of the oral and pharyngeal mucosa is directly in the path of the radiation beam. The severity of mucositis increase as the dose of radiation escalates. As irradiation continues to total dose of 5 to 6 Gy the worst mucosal reaction, occur (National Cancer Institute, 2002).

1.6 Nutritional deficit, The structures of the head and neck; oral cavity, oropharynx, and pharynx mucosa are often received directed from radiation therapy within the treatment fields. It was lead within a negatively affect ability's patients to eat, food intake and nutritional status (Haas, et al., 2007).

2. Late Radiation Side Effect is developing gradually over several months or years. Side effects are usually temporary and resolve once the radiation is completed.

2.1 Xerostomia, which begins during the acute phase of radiation therapy, continues throughout the remainder of patients' lives. The degree of dryness is variable, but leads to an increase risk of cavities and bone damage after radiation treatment (Madeya, 1996).

2.2 Osteoradionecrosis (ORN) describes a condition of impaired healing and necrosis of the jawbone after radiation therapy. It can occur in 5% to 15% of patients receiving radiation therapy, and typically presents after a tooth extraction from the mandible (Madeya, 1996).

2.3 Hypothyroidism is resulted from effects of radiation therapy on the thyroid gland itself, occurring in approximately 15 % of patients treated for advanced head and neck cancer (Haas, et al., 2007).

2.4 Trismus is defined as the contraction of the muscles of mastication, restriction in ability to open the mouth. Radiation doses greater than 60 Gy. directed to the temporomandibular joint (Haas, et al., 2007).

2.5 Dysphagia or difficulty swallowing after treatment for head and neck cancers, negatively affects patients' quality of life. It is estimated that more than 25% of patients with nasopharyngeal carcinoma have significant dysphagia (Haas, et al., 2007).

From the review literature, the most common side effects anticipated with treatment to the head and neck area include fatigue, oral mocositis, osteoradionecrosis, dental problem, taste alterations, and acute and chronic xerostomia.

Xerostomia

Definition of xerostomia has many meaning, the person who definition of xerostomia such as:

Xerostomia is defined as “the subjective sensation of dryness of the mouth”. It is usually the result of decrease in the volume of saliva secreted, associated with hyposalivation (Sreebny, 1996).

Xerostomia or a dry mouth is the subjective experience, subjective sensation and distressing feeling of dryness in the mouth (Nederfors, 2000).

Xerostomia is a common, distressing side effect of radiation therapy for head and neck cancer, occurring to some degree in up to 100% of patients undergoing such treatment (Chember, 2007). Hyposalivation and the subjective perception of oral dryness occur predictably when the major salivary glands are included in the radiation field. Saliva has a number of functions, and hyposalivation may result in oral discomfort and problem with taste, mastication, deglutition and speech. It may also predispose to dental caries and other oral infections such as Candida albicans.

In patients with advanced cancer, the cancer itself may cause xerostomia, e.g. destruction of the salivary glands, related to cancer treatment, e.g. drug treatment for example chemotherapy: cisplatin, caboplatin, radiation therapy.

Common cause of xerostomia

Medications

Xerogenic drugs can be found in 42 drug categories and 56 subcategories (Sreebny, & Schwartz, 1997). More than 400 commonly used drugs can cause xerostomia. The main culprits are antihistamines, antidepressants, anticholinergics, anorexiants, antihypertensives, antipsychotics, anti-Parkinson agents, diuretics and sedatives, antiemetics, antianxiety agents, decongestants, analgesics, antidiarrheals, bronchodilators and skeletal muscle relaxants (Astor, Hanft, &Ciocon, 1999; Kuntz, & Allen, 200).

Disease and other condition

The most common disease causing xerostomia is Sjogren's syndrome, a chronic inflammatory autoimmune disease that occurs predominantly in postmenopausal women. Sarcoidosis and amyloidosis are other chronic inflammatory diseases that cause reduced salivary flow result in development of xerostomia HIV-salivary gland disease occurs in some individuals infected with HIV results in enlargement of the parotid glands and, occasionally, the submandibular glands, resulting in xerostomia (Greenspan, 1996).

Water loss/dehydration

The people who have impaired consciousness status or damage to hypothalamus resulting to reduced water intake. Loss of water through the skin such as fever, sweating, and burns. Altered renal function: diabetes insipidus, diabetes mellitus) can lead to dry mouth or xerostomia.

Cancer therapy

Xerostomia is the most common toxicity associated with standard fractionated radiation therapy to the head and neck. Acute xerostomia from radiation is due to an inflammatory reaction, while late xerostomia, which can occur up to one year after radiation therapy, results from fibrosis of the salivary gland and is usually permanent (Hensley et. al., 1999). Certain cancer chemotherapeutic drugs can also change the composition and flow of saliva, resulting in xerostomia, but these changes are usually temporary (Greenspan, 1996).

Radiation induced xerostomia is a common occurring in acute and late side effect may be irreversible and progressive among patients with head and neck cancer because the radiation damages to the salivary glands in the exposed region.

Salivary gland

Normal function of salivary glands is governed by the nervous system. Gland stimulation occurs with the sight, smell, or taste of food. The basic secretory units of salivary glands are clusters of cells called acini. These cells secrete a fluid flow out of the acinus into collecting ducts. Within the ducts, the composition of the secretion is altered, much of the sodium, potassium, and bicarbonate.

Small collecting ducts within salivary glands lead into large ducts, eventually forming a single large duct that empties into the oral cavity. The glands are found in

and around mouth and throat call major salivary glands and the glands located in lips, buccal mucosa, and extensively in other linings of mouth and throat called minor salivary glands.

Major salivary glands: that includes the three largest glands of the oral cavity that also secrete most of the saliva.

1. Parotid glands are a pair of glands located in the subcutaneous tissue of the face overlying the mandibular ramus and anterior and inferior to the external ear. The secretion produced by the parotid glands is serous in nature, and enters the oral cavity through the stensen's duct after passing through the intercalated ducts which are prominent in the gland. Despite being the largest pair of glands, only approximately 25% of saliva is produced by the glands.

2. Submandibular glands are a pair of glands located beneath the floor of the mouth, superior to the digastric muscles. The secretion produced is a mixture of both serous and mucous and enters the oral cavity via Wharton's ducts. Approximately 70% of saliva in the oral cavity is produced by the submandibular glands, even though they are much smaller than the parotid glands.

3. Sublingual Glands are a pair of glands located beneath the floor of the mouth anterior to the submandibular glands. The secretion produced is mainly mucous in nature; however it is categorized as a mixed gland. Unlike the other two major glands, the ductal system of the sublingual glands do not have striated ducts, and exit from 8-20 excretory ducts. Approximately 5% of saliva entering the oral cavity comes from these glands.

Minor salivary glands: are found throughout the upper aerodigestive tract, concentrated in the oral cavity and oropharynx. There are over 600 minor salivary glands located throughout the oral cavity within the lamina propria of the oral mucosa, is usually a number of acini connected in a tiny lobule. A minor salivary gland may have a common excretory duct with another gland, or may have its own excretory duct. There secretion is mainly mucous in nature includes: lingual glands, palatine gland, buccal gland, labial gland (Haas, et al., 2007).

Saliva components

Saliva is produced in and secreted from salivary glands. The production of saliva is stimulated both by the sympathetic and parasympathetic nervous system. It is

the viscous, clear, watery fluid secreted from the parotid, submaxillary, sublingual and smaller mucous glands of the mouth. Saliva contains two major types of protein secretions, a serous secretion containing the digestive enzyme ptyalin and a mucous secretion containing the lubricating aid mucin. The pH of saliva falls between 6 and 7.4. Saliva also contains large amounts of potassium and bicarbonate ions, and to a lesser extent sodium and chloride ions. In addition, saliva contains several antimicrobial constituents, including thiocyanate, lysozyme, immunoglobulins, lactoferrin and transferring, all of which the average person produces approximately 1 to 1.5 L. per day (Thibodeau, 1996).

Physiological functions of saliva

1. Lubricant: protects against mechanical irritation, aids in speech & swallowing. The mucus in saliva is extremely effective in binding masticated food into a slippery bolus that (usually) slides easily through the esophagus without inflicting damage to the mucosa.

2. Contains calcium and phosphate ions: facilitate the remineralisation of the teeth

3. Contains antibacterial proteins: stop the adhesion of specific bacteria to the oral tissues. Saliva also contains lysozyme, an enzyme that lyses many bacteria and prevents overgrowth of oral microbial populations.

4. Contains carbonate & phosphate buffers: Maintain the intraoral pH near neutrality preventing the demineralization of teeth after eating.

5. Clears food debris from teeth and the oral mucosa. The oral cavity is almost constantly flushed with saliva, which floats away food debris and keeps the mouth relatively clean.

6. Contains amylase: starts the digestion of carbohydrates. The serous acinar cells secrete an alpha-amylase which can begin to digest dietary starch into maltose. Amylase is not present, or present only in very small quantities, in the saliva of carnivores or cattle.

7. Dissolves food to allow for the sensation of sweet, sour, salty and the bitter tastes.

Saliva has two parts, a thin serous component secreted primarily from the parotid glands when stimulated and a mucous component secreted near continuously

by the minor salivary glands found throughout the oral mucosa. The serous secretion is most affected by radiation therapy, and so patients' first complaint is often that their saliva is becoming thickened and sticky (Bruce, 2004).

Mechanism of salivary gland damage

Radiation therapy is an effective treatment for head and neck cancer. However, the major salivary glands: parotid glands, submandibular glands and sublingual glands are frequently included in treatment fields. The parotids appeared more radiosensitive than the submandibular and sublingual glands (Berk, Shivami, & Small, 2005).

The exact mechanism of radiation induced salivary gland damage is unknown. Actually, at least three mechanisms to explain the phenomenon have been hypothesized. One is radiation direct damage to the DNA of the salivary gland cells. The second the salivary gland cells is damaged by cytotoxic.. The third is the induction by radiation of apoptosis by an intracellular mechanism (Nagler, 2002; Fox, 1998).

Xerostomia occur in both of acute and late side effect. Low radiation dose can cause noticeable changes. A radiation dose of as little as 10 Gy or approximately 1 week of treatment causes salivary output decreases of 60% to 90% (Ship, & Ku, 2004). Subtherapeutic doses of radiation in the range of 22 to 24 Gy in 2 Gy fractions result in permanent injury to the salivary glands, including fibrosis and hyposecretion, and resulting in xerostomia (Eisbruch, Ship, & Kim, 2001). If the total dose to salivary tissue is 26 Gy or less, recovery of salivary function is possible; however, the typical total dose of 60 Gy or more used for head and neck cancers ensures permanent damage to salivary gland (Haas, et al., 2007).

Burlage (2001) studies of patients receiving definitive radiation therapy have shown a rapid diminution of salivary flow during the first 2 weeks of radiation therapy. After 2 weeks of radiation therapy at dose of 20 Gy, the parotid and submandibular salivary glands accomplished only 20% of their original salivary flow; the function did not recover after 6 weeks of radiation therapy.

Irradiation causes both quantitative and qualitative change in salivary gland function and saliva. Serous acini, found predominantly in the parotid glands, are the main contributors of stimulated salivary flow and appear to be particularly susceptible

to radiation damage. As a result, saliva becomes more viscous and ropy (Chember, David, Rosenthal, & Weber, 2007).

Xerostomia commonly develops during radiation therapy; it is usually severe and often permanent.

The severity of xerostomia following radiation therapy depends on the quantity of salivary gland included in the treatment field (how many salivary glands are irridatee), radiation dose and individual patients' variation (Shih, Miakowski, Dodd, Stotts, & MacPhail, 2003).

Salivary function continues to decline for up to several months to years and may or may not recruit after Radiation therapy (RT) (Valdez, 1991; Johnson et. al., 1993). Thereafter, some recovery is possible until 12 to 18 months after RT, depending on the dose received by the salivary glands and the volume of the gland tissue included in the irradiation fields (Roesink, Moerland, & Battermann, 2001).

Wijers and colleagues (2002) study a survey in the investigators observed that 64% of long term survivors at least three years after convention radiation therapy about of the dry mouth syndrome in long term survivors found they have an experience of xerostomia in level of moderate to severe degree.

Evaluation of xerostomia

The evaluation of xerostomia can be measurement of salivary gland function of salivary flow that separate two ways including;

1. Objective measurements: of salivary flow can be measured directly and indirectly (Murdoch-Kinch, 2006).

1.1 Unstimulated or resting flow of whole saliva is a directly measurement involves collection of either whole mouth saliva or saliva from the individual glands. Whole mouth saliva often is measured by having the patient collect saliva in the mouth without swallowing for a set period, such as 5 minutes, and then spitting out the saliva into a preweighed cup.

1.2 Stimulated flow of whole saliva is an indirect measurement of salivary flow. It primarily measures the uptake of a radionuclide, such as technetium 99 m pertechnetate, into the salivary glands.

1.3 Stimulated and Unstimulated flow of individual salivary gland.

2. Subjective measurements: questionnaires were evaluated perception of patients to xerostomia includes Visual analog scale questionnaire xerostomia and Self-report xerostomia instrument (Satishchandra, Ghezzi & Ship, 2001).

Visual analog scale developed by Paiet et. al. (2001) eight separate visual analog scores that evaluated issues such as “rate the dryness of your mouth” and “rate the level of your thirst” were measured for each patient and found a good correlation between measured salivation and a subjective feeling of xerostomia in normal subjects given on antisialagogue.

The questionnaire used by these systems investigates multiple domain, including pain, appearance, and mood. It directly asks about saliva such as “My saliva is of normal consistency.” “I have too little saliva.” It also indirectly evaluates salivary function by asking questions about swallowing, chewing, and taste (University of Washington Surgical Outcomes and Reseach, 2005).

Effects of xerostomia

Sufferers of xerostomia commonly experience problems including;

Increased risk of dental caries

Loss of saliva’s production and its protective properties leads to dental caries. The risk of dental caries increases secondary to a number of factors, including shifts to a cariogenic flora for example increased colonization with streptococcus mutans and Lactobacillus, loss of mineralizing components, and make to poor fit of dental appliances (dentures, obturators) (Spak, Johnson, & Ekstrand, 1994).

Oral infection

Hyposalivation increases the risk of oral infection including fungal and bacterial especially candidiasis because reduction of the salivary pH, altered immunoglobulin composition (Spak, Johnson, & Ekstrand, 1994).

Difficulty to speech

Radiation induces damage to the salivary glands alters the volume, consistency, and pH of secreted. Saliva changes from thin secretions with a neutral pH to thick, tenacious secretions with increased acidity. Patients suffer from oral discomfort or pain and find it difficult to speak. They could not talk for any length of time and some subjects avoided talking to people (Nguyen, & Ang, 2002).

Nutritional status

Xerostomia results in difficulty in chewing and swallowing dry food, a continuous parched feeling and burning sensation of oral cavity. The patient may experience loss of taste, mucosal sensitivity to acidic or spicy foods, or loss of appetite and weight loss. Patients' nutritional status and their intake of fluid and nutrients essential for tissue healing can be compromised (Bruce, 2004; Atkinson & Baum, 2001). Some subjected no longer enjoyed eating out because of the limited range of food they could eat and because they had to eat slowly, drink lots and they felt embarrassed.

Quality of life

Quality of life (QOL) in health care, meaning a negative and positive outcomes that illness or trauma and there subsequent treatments on well-being or satisfaction with life, as evaluated from a patient's perspective (Schultz & Winstead, 2001). Padilla and Grant (1985) defined QOL as a multidimensional, subjective concept. Patients with head and neck cancer may have side effect from disease or treatment such as impaired to communication, swallowing, and nutritional status. Those problems may affect to activity daily living of the patients.

Rose and Yates (2001) developed the five dimensions of QOL in patient with head and neck cancer base on Cella and colleagues (1993) and Ferrell (1996). This instrument was evaluated QOL in patients with head and neck cancer during and after a course of radiation. The dimensions include physical well-being, social well-being, emotional well-being, function well being, and site-specific symptom and toxicities of treatment.

The effect of xerostomia can cause significant alterations in quality of life for the head and neck patient. In patients who are treated for head and neck cancer is influenced strongly by xerostomia (Epstein, Emerton, & Kolbinson, 1999). Patients experience difficulties/discomfort with eating, mastication, talking, swallowing, and sleep disturbances are evident due to severe dryness, frequent awakening secondary to dryness, as well as choking sensation during nighttime (Berk, Shivani, & Small, 2005). Patients describe a feeling of thickened saliva and often carry water bottles with them at all times. The chewing of dry foods such as crakers may be very painful for

them (Bruce, 2004; Atkinson & Baum, 2001). The severity of their effect on patients' QOL, are often misunderstood and underestimated.

Henson and colleagues (2000) were developed xerostomia related quality of life scale include four domains physical functioning, pain/discomfort issue, personal/psychological functioning, and social functioning. It measures the impact of salivary gland dysfunction and xerostomia. This instrument has four domains base on QOL in patients with head and neck cancer

In Thailand, have studies about QOL in head and neck cancer. Nidtaya Takviriyanun (B.E. 2534) reported relationship between self-care agency and quality of life while receiving and after the completion of radiation therapy in head and neck patients showed a significant positive relationship. In addition, the xerostomia related quality of life in patients with head and neck post radiation still not to report.

Symptom management strategies of xerostomia

According to Dodd et al. (2001:668-676), symptom management strategies consists of symptom management strategies by self and others such as healthcare team members including doctors, nurses and radiologist. A review of literature on symptom management strategies of xerostomia had separate 2 parts: prevention to xerostomia and treatment of xerostomia as follow:

Prevention to xerostomia

From the review, literature in preventing radiation induced acute and late xerostomia. There are various methods including;

Salivary gland sparing Radiation Therapy

The extent of the damage caused by radiation therapy depends both on the volume of tissue that is irradiated and on the dose of radiation that is delivered. Therefore, improved targeting of the radiation beam to avoid unnecessary irradiation of salivary gland tissue. Three Dimensional Conformal Radiation Therapy (3D-CRT) and Intensity Modulated Radiation Therapy (IMRT), it has recently become possible to spare a portion of the parotid gland (Maes et al., 2002; Pacholke et al., 2005).

Eisbruch et. al. (1996) used beam's eye view displays to construct conformal beams to cover the tumor of 15 patients as they spared one parotid gland. Three months following radiation therapy, the spared parotid retained 50% of

stimulated and unstimulated salivary flows; no saliva flow was seen in the unspared parotid gland in these patients. In all, 67% of these patients reported mild or absent xerostomia.

Salivary gland transfer

This strategy found less wide spread approach is salivary gland transfer. One approach to preserve salivary function is the surgical autotransplantation of a submandibular salivary gland outside of the radiation field. The parotid glands contribute just 20% of unstimulated saliva, whereas 65% of this flow arises from the submandibular glands and 8% from sublingual glands (Berk, Shivnani, & Small, 2005).

Jha and others (2003) reported on a prospective in 60 patients who underwent transfer of the submandibular gland to the submental space before beginning radiation therapy (RT). The researchers measured completely salivary flow rates preoperatively, 2 weeks before surgery, at the end of RT, and at regular intervals up to 24 months after RT. In all, 19% of patients developed moderate to severe xerostomia immediated after RT; the effect was seen in 35% of patients at 6 months.

Cytoprotectants

Amifostine as the radioprotective agent is another way to protect the salivary gland. The ability of its thiol containing components to protect normal tissue damage from radiation. The Amifostine has been approved by the United States' Food and Drug Administration (FDA) to be used in the postoperative setting to minimize xerostomia in patients receiving radiation therapy for head and neck cancer. It is administered either IV at a dose of 200 mg/m^2 in time 15 to 30 minutes before receiving their radiation treatment, and wait for 30 to 45 minutes after subcutaneously administration at 500 mg/m^2 (Gosselin, & Pavilonis, 2002).

Treatment of xerostomia

The management of radiation induced xerostomia had several strategies include had and no had research support. From the literature review therapeutic options for many head and neck radiation therapy patients. Currently are limited and include pharmacologic agents, such as cholinergic agonists and complementary methods including;

Water

Sipping or drinking water, patients with xerostomia commonly use water as saliva substitute. Olsson & Axell (1991) study in a double blind study, the effectiveness of water was compared with that of artificial saliva in patients with xerostomia of varying actiology. The patients were given 15 mL. of the solutions to rinse their mouth with, and both subjective and objective, mucosal friction measurements, effects records. The mean duration of subjective improvement with water was 12 minutes, whilst the mean duration of objective improvement was 5.5 minutes. These values are about half the values seen with artificial saliva.

Artificial saliva

The most commonly prescribed saliva substitute are the artificial salivas.There are complex substance, usually based on either mucin or carboxymethylcellulose (Andrew, 1997). In the Olsson study the mean duration of subjective improvement in xerostomia with mucin based artificial saliva was 18 minutes, whilst the mean duration of objective improvement in mucosal friction was 11.5 minutes (Olsson, & Axell, 1991).

The artificial salivas are available in a varity of forms including sprays and lozenges, and have been incorporated into swab sticks and reservoirs in dentures.

Pilocarpine hydrochloride (Salagen)

It acts directly on parasympathetic nerves to increase salivary flow. The response to pilocarpine appears to be better for non radiation induced xerostomia in which its action is almost always immediate (Fox, Arkinson, & Macynski, 1991), whereas it may take as long as 12 weeks to detect a response in radiation induced xerostomia (Johnson, Ferrerri, & Netheray, 1993). As compared with artificial saliva, pilocarpine is found to be more effective in patients with radiation induced xerostomia (Davies, & Singer, 1994).

Chewing gum

Chew sugarless gum or suck on sugarless hard candy to stimulate saliva; citrus, cinnamon or mint-flavored candies are good choices (National Institute of Dental and Craniofacial Research). Chewing gum appears to increase salivary flow, mainly as a result of stimulation of taste receptors. The study that has shown that chewing gum increases salivary flow in patients with xerostomia, the objective

improvement in salivary flow was associated with subjective improvement in xerostomia, and when asked 56-79% of patients wanted to continue using the chewing gum at the end of the study (Aagaard et. al., 1992).

Acupuncture

It is part of a complete medical system developed in China. The mechanism of action of acupuncture is believed to be the release of neuropeptides and stimulation of the autonomic nervous system to enhance salivary secretion. These results occur in both healthy subjects and those with xerostomia. The salivary levels of vasoactive intestinal polypeptide and calcitonin gene-related peptide are both increased. In addition, acupuncture increases the blood flow to the skin overlying the parotid gland (Morganstein, 2005).

Investigators from Sweden examined the potential role of acupuncture in treating radiation induced xerostomia. Blom et. al. (2000) reported results from randomizing 38 patients with xerostomia to receive acupuncture or placebo acupuncture following radiation therapy. Twenty patients in the experimental group and eighteen patients in the control group received 12 acupuncture sessions, which lated 20 minutes over 6 weeks; after a 2 weeks break, the patients received another 12 sessions, both groups had improvements observed in salivary flow rates.

Dietary advice

Patients with xerostomia can often be greatly helped by simple dietary advice, including the types of food to try the types of food to avoid, and increasing fluid intake while eating. Commonly avoided foods: spicy food (such as curry, chili) acidic food/fruit (such as oranges, pineapple). Common easy to eat foods: soup, yoghurt, cooked vegetables, eggs, custard, banana, fish, moist food, soft food. (Shakes nutrition.otago.ac.nz/__data/assets/file/0004/1966/DTP_JShakes.pdf)

Oral hygiene

Frequent oral care with normal saline or sodium bicarbonate mouthrinses to oral moisturizers. Antimicrobial mouthwashes, such as chlorhexidine and hexitidine, play a central role in reducing the bacterial load and inhibiting cariogenesis (Epstein, 1991). Careful to keep teeth healthy; brush teeth at least twice a day, use toothpaste with fluoride, and visit dentist for a check up at least twice a year and might

received a special fluoride solution to rinse with to help keep teeth healthy (National Institute of Dental and Craniofacial Research, 2006).

Nursing care in xerostomia

Davies (1997) is oncologist nurse reviewed the management of xerostomia involves the use of both saliva substitutes and saliva stimulants. The other of guideline and other review of literature of nursing care can summary as follow (Bruce, 2004).

- Cleaning the mouth well at least 2 times per day,
- Rinsing the mouth immediately after every meal,
- Using fluoride toothpaste to brush the teeth,
- Sipping water frequently,
- Avoiding foods and liquids containing large amounts of sugar, avoid dry foods and have moisten foods,
- Using moisturizer on the lips,
- Using saliva substitutes to help relieve discomfort; artificial saliva,
- Using a sialogogue such as pilocarpine (Salagen), which can stimulate saliva from the remaining salivary glands,
- Applying a prescription-strength fluoride gel daily at bedtime to clean the teeth.

Hawthrone and Sullivan (2000) study to examine the use of pilocarpine hydrochloride for radiation induced xerostomia in 401 patients with head and neck cancer. The outcome of study measurement were both quatitative and qualitative. The study reported subjective improvements in feelings of oral dryness, speaking and chewing.

The study in nursing of Thailand, Patcharaporn Tassanakowit (B.E. 2545) study effect of normal saline solution, sodium bicarbonate, and chlorhexidine on oral complication of 45 head and neck cancer patients receiving radiation therapy the result showed no different mean score of xerostomia among three mouth washs.

Summary of literature review

According to the review of related literature, Radiation therapy is a modality of treatment in patient with head and neck cancers may be use only or may combined

with another. Xerostomia is a common side effect from radiation; occur in both of acute and late complication. Xerostomia is a subjective experience, subjective sensation and distressing feeling of dryness in the mouth. Patients suffer from oral discomfort or pain; find it difficult to speak, chew, or swallow and run an increase risk of dental caries or oral infection. From this lead to decreased nutritional intakes and weight loss. And significant reduced quality of life for many patients who were received radiation.

The severity of xerostomia depends on the volume of radiation, the total radiation dose, individual patients' variation and field of salivary gland of radiation. However, xerostomia can evaluate by objective and subjective measurement. In this study the researcher evaluated xerostomia of the subjects by the subjective measurement questionnaire.

The symptomatic management of xerostomia involves the use of both prevention and treatment. Prevention strategies such as salivary glands sparing radiation therapy, salivary gland transplantation, treatment strategies include saliva substitutes and saliva stimulants.

Related research, many patients suffer from radiation induced xeroatomia, the purpose of this study was to describe symptom experiences, management strategies and outcomes of xerostomia and would be useful for nurse in order to evaluate and plan to relieve the symptom and to improve the quality of life of the patients.

CHAPTER III
MATERIAL AND METHODS

Research Design

Non experimental: descriptive, cross sectional study design was used to explore symptom experience, symptom management strategies, and outcomes of xerostomia in patients with head and neck cancer post radiation. The duration from post radiation to the time of data collection was different and each participant was collected data one time.

Population and Sample

Population of the study

The target population in this study was persons who were diagnosed with head and neck cancer who had complete radiation therapy. They come to be inpatients or outpatients for followed up or received another treatment at Ramathibodi Hospital, Mahidol University during a four month period, from January to April, 2008.

Sampling

The purposive sampling method was used to obtain qualified participants in this study, with inclusion and exclusion criteria as follow.

Inclusion criteria

1. Man and woman who were at the age of 18 years and older were diagnosed and knew their diagnosis of head and neck cancer,
2. Were received radiation therapy since just completed to 2 years post radiation by single or combined with surgery and/or chemotherapy,
3. Were able to speak or read or understand the Thai language,
4. Agreed to participate in the study,
5. Without history of mental disorder (such as depression)

6. Were not in critical status, good orientation to time, place, and person. Participants who were older than 60 years, they were tested for cognitive function by Mini-mental state examination (MMSE-Thai 2002)

Exclusion criteria

Had history of radiation therapy more than one course.

Sample size

A sample size in this study was calculated according to Yamane's formula (Yamane, 1973:1088)

$$n = \frac{N}{1+Ne^2}$$

Where n is the sample size, N is the population size, e is the level of precision.

In this study, calculation of population size with number (N) referred to the total records of 120 head and neck cancer undergoing single radiation therapy and combination therapy with surgery, chemotherapy the statistic from Department of Radiology, Faculty of Medicine, Ramathibodi Hospital in 2006. The calculation was made to the result of 95% confidence interval, and error accepted in estimation referred to 5% (e =.05).

$$n = \frac{120}{1+120(.05)^2}$$

$$n = 92.30$$

According to Yamane's formula, a sample size is 92 cases. A hundred cases were used in this study to ensure an adequate minimum sample size.

Settings

This study was conducted in four settings at Ramathibodi Hospital including:

Outpatient of the Department of Otolaryngology. The service time starts from 8.00 a.m. to 4.00 p.m., and special clinic starts 5.00 p.m. to 8.00 p.m. on Monday to Friday and on Saturday from 9.00 a.m. to 3.00 p.m. The patients with head and neck cancer visited the physician for followed up and they got health education from physicians and nurses.

There are two Otolaryngology wards for male and female patients. Patients with head and neck cancer would be admitted for chemotherapy, surgery, or radiation therapy**.**

Outpatients Department of Radiology, Faculty of Medicine, Ramathibodi Hospital. The service times start from 8.00 a.m. to 4.00 p.m. on Monday to Friday.

Research Instruments

There were five instruments used in this study, as follows

1. A Patients' Profile Form. This tool was constructed by the researcher comprised of two parts.

1.1 Demographic characteristic information which include age, gender, marital status, educational level, occupation, income, methods of medical fee payment, tobacco smoking history, alcohol drinking history, domicile, address.

1.2 Illness and treatment information which includes diagnosis of the disease, stages of the disease, co-morbidity, history of treatment (such as radiation therapy, chemo therapy, surgery), radiation therapy technique, dose of radiation therapy, duration of radiation therapy, field of major salivary gland, dental status, body weight, high, drug/treatment of oral complication received during radiation.

1.3 Mini-mental state examination (MMSE-Thai 2002). It consisted of 11 items. Total score were 30 points, Cut-off point to cognitive impairment in older aging as follow;

≤ 14 points for old age who had no formal education, (Total score 23 points

not to answer item 4, 9, 10)

≤ 17 points for old age, who graduated primary school,

≤ 22 points for old age, who graduated over primary school.

2. Xerostomia-related Quality of Life Questionnaire

The Xerostomia-related Quality of life Questionnaire was developed by Ship and colleagues (2000). It was constructed based on two studies include oral health related quality of life has demonstrated that four major domains and a specific oral pharyngeal cancer quality of life scales. It measures the impacted of salivary gland dysfunction and xerostomia on the four major domains of oral health related quality of

life. It consisted of 15 items and the fourth separate domain specific quality of life: physical functioning, pain/discomfort, personal/psychological functioning, and social functioning. (Appendix A)

To measure xerostomia related quality of life scale (XeQoLS), the subjects were asked to choose the answer based on their perception, Likert scale of item 1-14 there are 5 levels: 0 = not at all, 1 = a little, 2 = somewhat, 3 = quite a bit, 4 = very much. Item 15 there are 5 levels: 0 = delighted, 1 = mostly, 2 = mixed: equally satisfied, 3 = mostly dissatisfied, 4 = terrible. Each XeQoLS domain score was calculated by averaging the values of all the respective items for that individual domain. A total average XeQoLS score was calculated by all of four domains.

Validity and Reliability

The original version of the xerostomia-related quality of life scale was developed by Ship and colleagues (2000). The inter item consistency they were determined in 283 head and neck cancer patients currently treated with parotid sparing and standard bilateral neck radiation therapy was determined with Cronbach's alpha for the four domains: physical (r = .85), personal/psychological (r = .87), social (r = .86), pain/discomfort (r =.89) and total xerostomia-related quality of life scale (XeQoLS) (r = .96).

In this study, the researcher got the permission to use this questionnaire and translated into Thai. Content validity, language suitability was obtained from a panel of five expertise include one physician in otolaryngology, one physician in radiology , two nurses instructors and one nurse specialist who was expert in cancer care. The content and wording of the instruments were improved according to the suggestions. Cronbach's alpha in 20 head and neck cancer patients post radiation were physical (r = .42), personal/psychological (r = .67), social (r = .63), pain/discomfort (r =.85) and total xerostomia-related quality of life scale (XeQoLS) (r = .84). Cronbach's alpha in 100 participants were physical (r = .72), personal/psychological (r = .75), social (r = .80), pain/discomfort (r =.86) and total xerostomia-related quality of life scale (XeQoLS) (r = .92)

3. Xerostomia Questionnaire

The Xerostomia Questionnaire was developed by Eisbruch and colleagues (2001). It consisted of 8 items which 4 items asking about mouth dryness while eating or chewing, and 4 items asking about dryness while not eating or chewing (Appendix A)

To measure xerostomia scale, the subjects were rated each symptom on 11 point ordinal Likert scale from 0 to 10, with higher scores indicating greater mouth dryness or discomfort due to dryness. Each item score was added, and the sum was transformed linearly to produce the final summary score ranging between 0 and 100, with higher scores representing greater levels of xerostomia.

Validity and Reliability

The questions were made through a literature search of xerostomia specific and general head and neck cancer quality of life instruments. Construct validity was evaluated by comparing the questionnaire's score to a previously validated instrument developed for patients with salivary dysfunction, mostly having Sjogren's disease. The Spearman correlation coefficients (r = .73) at base line and (r = .84) at one month post radiation. The reliability of the scale, evaluated by correlating test and retest scores using Pearson's correlation coefficient was .82. The internal consistency of the scale using Cronbach's alpha was .86 at baseline and .90 at one month post radiation by the initial 47 patients.

The Xerostomia questionnaire has been translated into Thai by Panwadee Putwatana (2006) after getting permission from Eisbruch and colleagues (2001). Content validity was obtained by three nurse expertise and back translation. The reliability was determined with Cronbach's alpha was .66 determined in 20 head and neck cancer patients post radiation.

In this study, Cronbach's alpha was tested was equal to .86 among 20 head and neck cancer patients post radiation. Cronbach's alpha in 100 participants was .90

4. A Symptom Management Strategies Questionnaire: included three part(Appendix A)

Part I: The Management Strategies; compose of 17 closed-ended rating scale questions and one open ended question. The researcher based on literature review developed it. Each item consisted of 5 response choices including;

Not at all	mean never used this strategies
A little	mean little used this strategy when he/she had xerostomia.
Sometimes	mean sometimes used this strategies when he/she had xerostomia.
Quite a bit	mean quite a bit used strategies when he/she had xerostomia.
Constantly	mean constantly used strategies when he/she had xerostomia.

Part II and III questionnaire the researcher modified from a survey of common symptoms of cancer patient in southern Thailand that developed by Aphiradee Ladawan and colleague (2004) and a survey of symptom experience, symptom management, and symptom management outcomes in persons living with breast cancer in the central part of Thailand that developed by Busakorn Sangkaew (2006).

Part II: The Symptom Management Strategies

From part I the management strategies that the patients selected to manage their symptoms; this part was used to assess

1. reasons to choose such management strategies;
2. sources of knowledge that the subject received;
3. persons who assisted the subjects in managing;
4. period of time of the management strategies were used by the subjects;
5. places where the subjects used management strategies.

Part III: The Symptom Management Outcomes

This part assessed the outcomes of patients' management that were related to their symptom status about xerostomia. They are functional status: chewing, swallowing, speaking, emotional status, costs about management strategies, morbidity and co-morbidity.

Validity and Reliability

Content validity and language suitability were obtained from the same group a panel of five expertists as the Xerostomia-related Quality of Life Questionnaire. The content and wording of the instruments were improved according to the expertise suggestions. The reliability was not test because these questionnaires consisted of the

checklist type questions to the subjects which they could select more than one response choice.

5. Weighting machine, Altimeter

At the time of data collection, all of subjects were measured weigh and height by weighting machine and altimeter at Outpatients Department of Otolaryngology by the researcher. The reliability of the instruments were evaluated by calibrate every 1 month.

Protection of Human Subjects

The human rights of the subjects were respected in this study. The research proposal was approved by The Ethical Clearance Committee on Human Rights Related to Researches Involving Human Subjects of the Faculty of Medicine, Ramathibodi Hospital Mahidol University. (Appendix) Eligible subjects were asked to participate in the study, after that the researcher explained purposes of the study, research procedures, risk and benefits, length of time for completion of the questionnaire forms, and their rights to join or refuse. Although the subjects decided to take part in this study, they were able to quit at any time. The subjects who agreed to participate in the study were thus asked to sign the consent form and received assurance that all data shall be kept strictly confidential and would be reported only as group data.

Data Collection

Data collection was done by the researcher after receiving the approval from the ethical committee of the Faculty of Graduate Studies, Mahidol University, and Faculty of Medicine, Ramathibodi Hospital, data collection proceeded as follows:

1. The researcher approached the Director of Nursing, and the head nurses of the Otolaryngology Outpatient Department, Otolaryngology Inpatient Department, and the Director Department of Radiology, Faculty of Medicine, Ramathibodi Hospital, to explain the objectives of the project and requested for their cooperation in data collection during Monday to Friday from 8:00 a.m. to 8:00 p.m. and on Saturday during 8:00 a.m. to 3:00 p.m.

2. The researcher survey name list of patients with head and neck cancer who received radiation at the Department of Radiology, Faculty of Medicine, Ramathibodi hospital who would met the inclusion criteria.

3. Contacted to participants, the researcher introduced herself, explained the objectives of the project and asked for cooperation and let them know about their rights to participate the study or not.

4. After the participants agree to participate in the study, they would be made appointment for data collection. The consent form was given to the participants signed informed consent was procured from each participant, after that they were explained how to answer the questionnaires.

5. The researcher collected all the data including; a patients' profile in some part of demographic characteristics and illness and treatment information. Some parts of information were collected from the patient's records.

6. The participants answer the questions after the researcher read them follow xerostomia-related quality of life questionnaire, xerostomia questionnaire, a symptom management strategies questionnaire, respectively. Each case took approximately 30 minutes. However, some participants had speaking problem; they were allowed to write or used body language.

7. After completed all the questionnaires, they were weighing, and measured height by the researcher.

8. Completely all of data; dental status, weight and height before and after complete radiation therapy were record from patient's record.

Data analysis

Data were analyzed using the Statistical Package for the Social Sciences for Windows Program (SPSS/FW) Version 11.5

1. Demographic characteristics and clinical data were analyzed by using descriptive statistic: frequencies, percentages, ranges, means, and standard deviations.

2. The level of xerostomia post radiation was shown by ranges, means, and standard deviations.

3. The symptom management strategies and symptom management outcomes of xerostomia were analyzed by frequencies and percentages.

4. The outcomes of xerostomia: dental status, nutritional status was shown by frequencies and percentages and data of quality of life was analyzed by ranges, means, and standard deviations.

5. The relationships between experience of xerostomia and the duration of post complete radiation, nutritional status, quality of life were analyzed by Pearson's Product Moment Correlation and testing for the significant.

CHAPTER IV
RESULTS

A descriptive study was conducted to describe experiences of xerostomia, management strategies and outcomes in patients with head and neck cancer post radiation in Ramathibodi hospital. One hundred participants met the inclusion criteria during the period of data collection from January 2008 to April 2008.

Descriptive statistical analysis was used in terms of frequency, percentage, mean and standard deviation. After testing for normal distribution, Pearson product moment correlation was performed to determine the relationship among experience of xerostomia, the duration of post complete radiation, nutritional status and quality of life. The results are presented as follows;

1. Demographic characteristics, personal illness, and treatment of the participants.
2. Experience of xerostomia in patients with head and neck cancer post radiation.
3. Symptom management strategies of xerostomia in patients with head and neck cancer post radiation.
4. Outcomes of the symptom management strategies and outcomes of xerostomia.
5. Relationships between experience of xerostomia, and the duration of post complete radiation, nutritional status, quality of life.

Demographic characteristics of the participants

The total of 100 patients with head and neck cancer post radiation participated in this study. The majority of the participants were male (70%) ages ranged between 18 and 77 years old (Mean = 52.56, SD = 11.14) and the majority ranged in middle ages (59%). Seventy -three of the participants (73%) were married. Almost all of them were Buddhist (97%), and the largest group of them had bachelor’s degree (35%). In

addition, 33% were unemployed and 23% were merchant or business owner. The majority of the participants (37%) had income 5,001 to 20,000 baht per month and 45% got reimbursement for their bill from the government for medical fee payment. Sixty –six participants (66%) had tobacco smoking history and fifty-four (54%) had alcohol drinking history. The majority of them (71%) live in the Central of Thailand. (Table 1)

Table1 Demographic characteristics of the participants (n=100)

Characteristic	Frequency	Percentage
Gender		
Male	70	70.0
Female	30	30.0
Age (years)		
18 -20	1	1.0
21 -40	13	13.0
41 -60	59	59.0
> 60	27	27.0
(Range=18-77; Mean=52.56; SD=11.41)		
Marital status		
Married	73	73.0
Single	13	13.0
Divorced	8	8.0
Widowed	6	6.0
Religion		
Buddhist	97	97.0
Islam	2	2.0
Christian	1	1.0
Education		
Non formal education	1	1.0
Primary school	32	32.0

Table1 Demographic characteristics of the participants (n=100) (Cont.)

Characteristic	Frequency	Percentage
Education (Cont.)		
Secondary school	19	19.0
Diploma	13	13.0
Bachelor's degree	35	35.0
Occupation		
Unemployed	33	33.0
Merchant/Business owner	23	23.0
Government officials	17	17.0
Employees	9	9.0
Agriculturist	4	4.0
Retired	14	14.0
Income (baht per month)		
< 5,000	36	36.0
5,001-20,000	37	37.0
20,001-50,000	33	33.0
> 50,000	4	4.0
Methods of medical fee payment		
Reimbursement from the government	45	45.0
National health insurance	34	34.0
Self-paying	11	11.0
Social insurance	6	6.0
Life insurance	4	4.0
Alcohol drinking history		
Yes	54	54.0
No	46	46.0
Tobacco smoking history		
Yes	66	66.0
No	34	34.0

Table1 Demographic characteristics of the participants (n=100) (Cont.)

Characteristic	Frequency	Percentage
Regional home place		
Central	71	71.0
Northeastern	10	10.0
Eastern	8	8.0
Southern	8	8.0
Northern	2	2.0
Western	1	1.0

Illness and Treatment of the participants

The majority of the participants (41%) were diagnosed with nasopharyngeal cancer, 14% were tongue cancer and 5% were laryngeal cancer. Almost all (98%) of the participants' pathology was squamous cell carcinoma. The severity of the disease as evaluated by tumor node metastasis (TMN) showed that most of them (41%) had level T_{4a-4b} N_{0-3} M_0. Forty percent have underlying diseases, and found hypertension was the most (15%) and 15% of them had more than one underlying disease.

More than half of the participants (55%) received radiation therapy combined with chemotherapy. The second ranked treatment method (16%) was radiation therapy combined with chemotherapy and surgery. Fifteen percent of the participants received radiation therapy only. The majority of them (56%) got the external beam radiation linear accelerator 6 MV, and 37% of them got the external beam radiation cobalt 60. Seventy seven percent (77%) of the participants had received radiation therapy for each study participant were 7 to 8.5 weeks (Mean = 7.13, SD = .84). The most frequent total dose of radiation received were 61 to 70 Gy (Mean = 67.19, SD = 582.09). The majority of the participants (35%) had completed their radiation treatment for one to six months. Field of radiation therapy included major salivary glands. A half of the participants (50%) were radiate at both parotid glands and submandibular glands, and 23 % of them were radiate at three major salivary glands: parotid glands, submandibular glands, and sublingual glands (Table 2).

Table 2 Illness and Treatment of the participants (n=100)

Personal illness and Treatment	Frequency	Percentage
Cancer Site		
Nasopharyngeal	41	41.0
Oral cavity [a]	24	24.0
Larynx [b]	18	18.0
Sinonasal [c]	8	8.0
Oralpharyngeal [d]	3	3.0
Hypopharyngeal [e]	3	3.0
Other [f]	3	3.0
Pathology		
Squamous cell	98	98.0
Mucoepidermoid	1	1.0
Adenoid cystic	1	1.0
TNM		
$T_1N_{0-2}M_0$	19	19.0
$T_2N_{0-3}M_0$	18	18.0
$T_3N_{0-3}M_0$	16	16.0
$T_{4a}N_{0-3}M_0$	38	38.0
$T_{4b}N_{0-3}M_0$	3	3.0
Underlying disease		
Yes	40	40.0
HT	15	15.0
> 1 disease	15	15.0
No	60	60.0
Method of Treatment		
Radiation therapy+ Chemotherapy	55	55.0
Radiation therapy only	15	15.0
Radiation therapy+ Chemotherapy + Surgery	16	16.0
Radiation therapy+ Surgery	14	14.0

Table 2 Illness and Treatment of the participants (n=100) (cont.)

Personal illness and Treatment	Frequency	Percentage
Radiation Therapy Technique		
External Beam Radiation	100	100.0
Linac 6MV	56	56.0
Cobalt-60	37	37.0
Duration of received radiation therapy		
4.0-6.5 weeks	23	23.0
7.0-8.5 weeks	77	77.0
(Range=4.0-8.5; Mean=7.13; SD=.84)		
Total dose of radiation received (Gy**)**		
40-50	3	3.0
51-60	11	11.0
61-70	60	60.0
71-80	26	26.0
(Range=4,000-7,800; Mean=6,719; SD=582.09)		
Duration of post-radiation therapy time (months)		
0*	7	7.0
1- 6	35	35.0
7-12	29	29.0
13-18	21	21.0
19-24	8	8.0
Field of radiation therapy include major salivary glands		
Parotid glands	8	8.0
Submandibular glands	9	9.0
Parotid glands+ Submandibular glands	50	50.0
Parotid glands+ Submandibular glands + Sublingual glands	23	23.0
Submandibular glands+ Sublingual glands	10	10.0

* At the time of immediately complete radiation

[a] Tongue, base of tongue, floor of mouth, soft palate, retromolartrigone region

[b] Transglottic, Supraglottic, Glottic

[c] Sinus, nasal cavity, maxillary, ethmoid

[d] Oralpharynx, tonsillar

[e] Post cricoid, hypopharyngeal, pyriform sinus

[f] Ear, parotid

Experience of xerostomia in patients with head and neck cancer post radiation

In this study, the transformed possible range of xerostomia score is 0-100, while the actual range of score is 5-95. The mean score and standard deviation of xerostomia were 51.45, 22.32 respectively. (See table 3)

Table 3 Self report xerostomia-specific questionnaire score of the participants (n=100)

Xerostomia score	Possible range	Actual range	Mean	SD.
True score	0-80	4-76	41.16	17.86
Transformed Score (%)	0-100	5-95	51.45	22.32

Symptom management strategies as performed by the participants

Management strategies

According to the findings, the participants selected more than one strategy. Management strategies is that they practiced categorized into four groups: Changed behavior of taking foods and fluid, oral health care, reduced factors to precipitate xerostomia, and use saliva stimulants and substitutes.

Changed behavior of taking foods and fluid. The participants tried to having foods containing water and they sipped or drank water during meal (99%), more often sip/drink water extra meal (88%), they had fluid intake more than 2,000 mL./day (87%) respectively, and ice chip (42%)

Oral health care. The participants increased mouth rinsing (96%) by water (74%) and normal saline (57%), had brushing teeth after meals (95%), and follow up with dentist (92%) respectively.

Reduced factors that precipitate. The participants avoided spicy food and/or salty tasting food (98%) avoided alcoholic drinks and tobacco (96%), and avoided beverage with caffeine (90%).

Use saliva stimulants and substitutes. The participants used artificial saliva for substitutes saliva 38%, and they use candy and chewing gum (25%) to stimulate saliva.

Table 4 Frequency and percentage of management strategies used by the participants (n=100)

Management strategies*	Frequency	Percentage
Changed behavior of taking foods and fluid		
Having foods containing water and fluid intake between meal	99	99.0
More often sip/drink water extra at meal	88	88.0
Fluid intake more than 2,000 mL. /day	87	87.0
Oral health care		
Increasing mouth rinse	96	96.0
Water	74	74.0
Normal saline	57	57.0
Brushing teeth after meal	95	95.0
Follow up with dentist	92	92.0
Lips moisture	67	67.0
Ice chips	42	42.0
Reduced factors that precipitate		
Avoided spicy food and/or salty tasting food	98	98.0
Avoided alcoholic drinks	96	96.0
Avoided tobacco	96	96.0
Avoided beverage with caffeine	90	90.0

Table 4 Frequency and percentage of management strategies used by the samples (n=100)

Management strategies*	Frequency	Percentage
Saliva substitutes and stimulants		
Artificial saliva	38	38.0
Candy	25	25.0
Mix sugar	17	17.0
Xylitol	8	8.0
Chewing gum	25	25.0
Mix sugar	14	14.0
Xylitol	11	11.0

* One participant may have used more than one management strategy

Reasons for symptom management strategies chosen

The participants' reasons for choosing symptom management strategies were shown in Table 5. The majority (62%) of participants received health education from a physician or a nurse. More than half (60%) adhered to the prescription and they felt better or getting rid of symptom (53%). The majority of the participants reported that the sources of knowledge in managing their symptom were physicians (84%); nurses (61%). Documented information from brochure got from the hospital and books (45%) was a source of knowledge in managing their symptom (Table 6).

Table 5 Frequency and percentage of reason to choose symptom management strategies (n=100)

Reasons*	Frequency	Percentage
Received health education from Physician or nurse	62	62.0
Practiced follow by treatment order	60	60.0
They felt better or getting rid of symptom after use management strategies	53	53.0

* One participant may have given more than one answer

Table 6 Frequency and percentage of sources of knowledge for symptom management strategies (n=100)

Sources of knowledge *	Frequency	Percentage
Physician	84	84.0
Nurses	61	61.0
Brochure got from the hospital and books	45	45.0
Family	9	9.0
Other patients' experience	9	9.0
Television	2	2.0
Neighbors	1	1.0

* One participant may have given more than one source of knowledge

Persons who assisted in managing the symptom

Most of the participants (92%) reported that they manage their experience of xerostomia by themselves. Their families or relatives (30%) were also assisted or helped them (Table 7).

Table 7 Frequency and percentage of persons who assisted patients to manage the symptom (n=100)

Persons *	Frequency	Percentage
Oneself	92	92.0
Families or relatives	30	30.0
Doctors	13	13.0
Nurses	8	8.0

* One participant may have given more than one answer.

The time of symptom management strategies

About a half of the participants (56%) reported that the time when they managed their experience of xerostomia was when the symptom occurred. They practiced continuously all day (35%) and as routine activities (33%) (Table 8).

Table 8 Frequency and percentage of the time of using symptom management strategies (n=100)

Period of time *	Frequency	Percentage
Practicing when symptom occurred	56	56.0
Practicing continuous all the day	35	35.0
Practicing as routinely	33	33.0

* One participant may have given more than one answer

Places for symptom management strategies

Most of the participants (99%) reported that they stayed in home when managing their experience of xerostomia (See Table 9).

Table 9 Frequency and percentage of place for symptom management strategies

Place*	Frequency	Percentage
Home	99	99.0
Hospital / Health center	46	46.0
Public park	7	7.0

* One participant may have given more than one answer

Outcome of symptom management strategies

In this study evaluated five outcomes of management strategies: experience of xerostomia, functional and emotional status, costs and morbidity.

Experience of xerostomia

More than half of the participants (57%) reported that their experience of xerostomia was improvement and the symptom relieved (37%) after received management (See Table 10).

Table 10 Frequency and percentage of experience of xerostomia as outcome of the management used (n=100)

Symptom of Xerostomia	Frequency	Percentage
Improvement	57	57.0
Relieved	37	37.0
Remaining	5	5.0
No symptom	1	1.0

Functional and Emotional status

Chewing, swallowing food, and speaking after such management were evaluated as the functional status. The majority of the participants (76%) got improvement and the rest felt it still remained (24%) (Table 11). They reported that their emotion had improved (78%). Twenty one percent felt their emotional problems still remained and one of them felt worsened (See Table 12).

Table 11 Frequency and percentage of functional status (n=100)

Chewing / swallowing food and speaking	Frequency	Percentage
Improvement	76	76.0
Remaining	24	24.0

Table 12 Frequency and percentage of emotional status (n=100)

Emotional status	Frequency	Percentage
Improvement	78	78.0
Remaining	21	21.0
Worsening	1	1.0

Cost

In this study, the majority of the participants (80%) did not to spend money for symptom management. About 20% of the participants had to spend for artificial saliva, normal saline solution, and special mouthwash followed physician's prescription (Table 13).

Table 13 Frequency and percentage of cost of symptom management (n=100)

Expenditure	Frequency	Percentage
No	80	80.0
Yes	20	20.0

Morbidity

About three-quarter of the participants (75%) reported that they did not get any illness related to xerostomia or symptom management. One-fourth of the participants (25%) had sore throat/ ulceration in their oral cavities (Table 14).

Table 14 Frequency and percentage of morbidity of symptom management (n=100)

Morbidity	Frequency	Percentage
No*	75	75.0
Yes	25	25.0

* Expect dental caries separate to explain

Outcome of xerostomia

This study evaluated dental caries, nutritional status, and quality of life post radiation as outcomes of xerostomia.

Dental caries the participants were evaluated their dental status before, during, and after radiation therapy by the dentists. Before radiation treatment, all of the patients got dental and oral checked up. The majority of them (89%) had dental caries and they were treated such as extraction teeth and fill teeth. It can be said that before starting radiation no one had dental caries. Almost all of the participants followed up with dentist to check oral status at different frequency of time every week to every month until 5 years posts radiation. At the post radiation period reported dental caries about 16% of the participants. In overall dental caries was reported (Table 15).

Table 15 Frequency and percentage of dental caries of the participants (n=100)

Dental caries	n	%
Before RT	89	89.0
After RT	16	16.0

Nutritional status. Body mass index (BMI) was used to evaluate the nutritional status. It was found that at the immediately period post radiation therapy (after radiation), there were 20% of the participants had low body mass index (<18.5 kg/m^2) which are increasing from the period before radiation therapy (8%) and at the time of data collection (current) (14%). There were 13% overweight patients (BMI > 24.9 kg/m^2) at after and current radiation therapy which were decreasing from the period before radiation therapy (35%) (Table 16).

Table 16 Frequency and percentage of BMI of the participants (n=100)

Body Mass Index (kg/m^2)	Before RT		After RT		Current	
	n	%	n	%	n	%
< 18.5	8	8.0	20	20.0	14	14.0
18.5-24.9	57	57.0	67	67.0	73	73.0
>24.9	35	35.0	13	13.0	13	13.0

Quality of life. Xerostomia related quality of life scale includes 15 items, four separate domains. The higher scores mean lower quality of life. The results show that the overall xerostomia related quality of life score was 1 to 56 (Mean=17.61, S.D. =11.13) the actual scores of the overall and each domains were difference between the lowest and the highest indicated the participants had the high to low quality of life. The mean score of Quality of life reflexes that in average the participants had rather good Quality of life in overall and each domain (Table 17).

Table 17 Quality of life related xerostomia scale of the participants as categorized according to overall and each domain of quality of life

Quality of life	Possible range	Actual range	Mean	SD.
Each domain				
Physical functioning	0-16	0-16	5.56	3.25
Pain/discomfort	0-16	0-16	5.09	3.58
Personal/psychological	0-16	0-15	4.36	3.14
Social functioning	0-12	0-12	2.60	2.46
Overall	**0-60**	**1-56**	**17.61**	**11.13**

Table 18 The relationships between experience of xerostomia, and duration post radiation, quality of life related xerostomia, nutritional status, dose of radiation

Variable	r	p
Overall quality of life related xerostomia	.751	.000
Physical functioning	.746	.000
Pain/discomfort	.712	.000
Personal/psychological functioning	.558	.000
Social functioning	.665	.000
Dose of radiation	.272	.006
Nutritional status [a]	-.245	.014
Duration of post radiation (month)	-.127	.206

[a] Nutritional status (Body mass index) at the time of data collection

Pearson product moment correlation was used to identify the relationship between experience of xerostomia, and quality of life related xerostomia, duration post radiation (month), nutritional status, and dose of radiation. The significant testing of the correlation was also performed. The Komogorov-Smirnov Test revealed that experience of xerostomia, quality of life related xerostomia, nutritional status, and duration post radiation (month) had normal distribution ($p>.05$) but dose of radiation had not met the assumption ($p<.05$). The study found that the;

Xerostomia had a significant positive correlation with quality of life related xerostomia ($r =.751$, $p < .001$) meaning the more severe of xerostomia, the less quality of life.

Each domain of quality of life related xerostomia had a significant positive correlation with quality of life related xerostomia as follow;

Xerostomia had a significant positive correlation with physical functioning ($r =.746$, $p < .001$) meaning the more severe of xerostomia, the less quality of life related physical functioning.

Xerostomia had a significant positive correlation with pain/discomfort ($r = .712$, $p < .001$) meaning the more severe of xerostomia, the less quality of life related pain/discomfort.

Xerostomia had a significant positive correlation with personal/psychological functioning ($r = .558$, $p < .001$) meaning the more severe of xerostomia, the less quality of life related personal/psychological functioning.

Xerostomia had a significant positive correlation with social functioning ($r = .665$, $p < .001$) meaning the more severe of xerostomia, the less quality of life related social functioning.

Xerostomia has a significant negative correlation with nutritional status ($r = -.215$, $p < .05$) meaning the more severe of xerostomia, the lower body mass index.

Xerostomia had a significant positive correlation with dose of radiation ($r = .272$, $p < .05$) meaning more severe of xerostomia was found if the higher dose of radiation.

Xerostomia has a negative but not significant correlation with duration post radiation ($r = -.127$, $p > .05$) meaning the severity of xerostomia do not have relationship with the duration post radiation.

Additional finding, the quality of life related xerostomia has a significant negative relationship with the nutritional status ($r = -.215$, $p > .05$) meaning the lower of body mass index, the less of quality of life related xerostomia.

CHAPTER V
DISCUSSION

This chapter presents the discussion of the research findings. It provides explanations related to the following issues; demographic characteristics of the participants, experience of xerostomia, management strategies, and symptom outcome in patients with head and neck cancer post radiation.

Demographic characteristics of the participants

There were 100 participants who participated in this study. Their age ranged from 18 to 77 years with the mean age of 52.56 years. Most of them (59%) were in middle age (41 to 60 years). These findings were consistent with the findings of the incidence of head and neck cancer in Thailand who are 40 to 59 years old (NCI Cancer Registry, 2005). This group of cancer could be found at any ages; however, the peak is reached in the interval of ages from 40 to 70 years (Savitree Maoleekoonpairoj, B.E. 2541). The study showed that male had head and neck cancer (70%) more than female (30%). These findings were consistent with finding of head and neck cancer in Thailand and United State that males head and neck cancers at a rate of 2:1 over female (Savitree Maoleekoonpairoj, B.E. 2541; American Cancer Society, 2006).

In addition, almost all of the participants (97%) were the Buddhists because Buddhism is national religion of Thailand (Junda, 2004). Almost all them were married (92.7%). The largest group of them had education level as bachelor's degree (35%) and primary school (32%).

As regards to occupation, one-fourth of the participants (33%) were unemployed. They had income of about 5,001 to 10,000 baht per month (37%). Less than a half of them (45%) reported sufficient financial support and their treatment fees were reimbursed from the government. The most of the participants (71%) were from the central of Thailand which are different from the national reports Head and neck cancer was the first rank (25.6%) in the southern part of Thailand in the year 1995 to 1997 (Cancer in Thailand, 2003). The study hospital is in the central part of the

country. The reimbursement system might be the reason that the patients chose to have their treatment near by their hometown.

The major group of the participants had cancer of nasopharyngeal (41%). More than a half of them (54%) had alcoholic drinking history and 66% of the participants had tobacco smoking history. These are consistent with the national statistics that was report that nasopharyngeal cancer is the most common site of head and neck cancer in Thailand (NCI Cancer Registry, 2006). The finding is consistent with previous study at the same hospital last year that found nasopharyngeal cancer is the most common in head and neck cancer (38.2%) (Sujira Foongfaung, B.E.2550). Mukda Detprapon (2007) reported that lip/oral cavity is the most common in head and neck cancer, while nasopharyngeal cancer found the third when studies in five hospitals in Bangkok.

Tobacco smoking was reported as a cause and risk factor of head and neck cancer especially laryngeal cancer. In this study, 18% of the participants had experience of tobacco smoking. Nasopharyngeal cancer was generally not associated with tobacco and alcohol use, but instead it is associated with Epstein-Barr virus (Marilyn, et al., 2007).

Almost all of the participants (98%) had squamous cell carcinoma. The pathology of head and neck cancer report that more than 90% of them are squamous cell carcinoma (Louis, et al., 2004; Marilyn, et al., 2007). Half of the participants (54%) were diagnosed with stage 4A cancer which indicated advanced cancer. It is more extensive primary tumors, or those with regional metastasis (stage III or IV). They got combinations of preoperative or postoperative radiation and complete surgical excision or concomitant chemotherapy regimens. The use of combined modality treatment is common in the head and neck cancer population (Dest, 2006).

In addition, more than half of the participants (55%) were treated by concurrent chemoradiation. Sixty percent of them received dose of radiation between 61 Gy to 70 Gy with a mean of 67.19 Gy, for 7 to 8.5 weeks with a mean of 7.13 weeks. Dosage and duration of received radiation are congruent with standard suggestion for head and neck cancer patients (Ang & Garden, 2000). All of the participants (100%) were given radiation by external beam radiation therapy methods. It is the most common form of radiation therapy for head and neck cancer (National Cancer Institute, 2004).

About one-third of the participants (35%) were in one to six months post radiation. A half of them (50%) got radiation fields include the majors salivary glands, parotid and submandibular glands. It is the traditional treatment field of radiation therapy being delivered to the area of the salivary glands. Normally, the parotid glands are more susceptible than the submandibular and sublingual glands (Berk, Murry, & Small, 2005), so when the salivary glands were destroyed from radiation lead to occurrence of xerostomia.

Experience of xerostomia

This study explored experience of xerostomia in head and neck cancer post radiation. Each participant was collected data one time which were varied from just completed the radiation to 24 months. The actual xerostomia score range from 4 to 76 (mean=41.16, SD=17.86) with higher score indicating greater dryness or discomfort due to dryness (Eisbruch et. al., 2001). For more easier to interpreted, it was suggested to transform the true score to be ranging between 0 to 100. The results showed that the participants had 5 to 95 (mean=51.45, SD=22.32). No one got zero score indicated that all of them had some degree of xerostomia. In another word, 100% of the patients after complete the radiation of their head and neck had experience of xerostomia with range of severity from low to great level of the symptom.

The previous study reports showed that less than 70% of the head and neck cancer patients had radiation related xerostomia. Sujira Foongfaung (B.E. 2550) found that 67.3% of the patients who received concurrent head and neck radiation and chemotherapy have a symptom experience of xerostomia. Logemann and colleagues (2003) found a significant decline in saliva production from pretreatment to 3 months after chemoradiation, and this significant decline remained at 6 to 12 months posttreatment. Wijers and colleagues (2002) reported 64% of long term survivors at least 3 years after conventional radiation therapy experience a moderate to severe degree of xerostomia. However, the results might not be comparable, since the measurements of xerostomia of these studies are different. Mild degree of the symptom might not be concerned by the previous reports.

Symptom Management Strategies

The results from this study showed the symptoms management strategies of the participants varied with the individual's practice. They used more than one strategy for the symptom management.

Management strategies that they practiced were categorized into four groups: Changed behavior of taking foods and fluid, oral health care, reduced factors to precipitate xerostomia, and saliva stimulants and substitutes used.

Changed behavior of taking foods and fluid

Almost all of the participants (99%) tried to take foods containing water and they sipped or drank water during meal. They sipped or drank water during meal more often (88%), and they had fluid intake more than 2,000 mL. /day (87%). Water can use as a saliva substitute (Davies, 1997). Olsson and Axell (1991) reported the effectiveness of water compared with artificial saliva in patients with xerostomia and found that water could improve the symptom better than artificial saliva. Some participants (2-3 persons) of this study also expressed that water sipped made them felt better than using artificial saliva.

One of functions of saliva were lubricant, it is binding foods into gastrointestinal tract. Therefor xerostomia results to difficulty in chewing and swallowing dry food, because of decrease of saliva. Sipping water throughout the day and rinsing the mouth with water before eating provide immediate moisture which help the patients to improve their symptom (Carper, Fleishman, &McGuire, 2004). Shakes (2004) reported that 75% of the study patients sipped water with their meals to swallow food easier.

Nutritional guidelines for symptom management of xerostomia were increased liquid consumption, dietary changed to soft, moist, not too salty food help to minimize the discomfort-associated xerostomia. It was recommended that sipping of cold fluid could help to relief mouth dryness (BC Cancer Agency Oncology Nutrition, 2005).

Oral health care

Oral hygiene care is an importance method for relieving xerostomia symptom. Mouth rinsing had a mechanical action of washing away loose debris and a physical action of moistening and softening the oral mucosa. It is also a good preventing

strategy of oral infection and dental caries. Ninety six percent of the participants rinse their mouth more often by using water and/or normal saline. Isotonic sodium chloride solution was suggested to be more effective than a more astringent mouthwash solution (Davis, 1998). Sujira Foongfaung (B.E. 2550) study in head and neck cancer who received chemotherapy and radiotherapy, they have a symptom of xerostomia and reported that management strategies that they used to relieve symptom of xerostomia were mouthwash with normal saline and sodium bicarbonate. Another recommendation is to avoid alcohol-based mouthwashes. It increases dry mouth or irritants oral mucosa (BC Cancer Agency oncology nutrition, 2005).

Reduced factors that precipitate xerostomia

Avoided food with spicy and/or salty taste, stop or decrease alcoholic drinking and tobacco smoking, and avoid drinking beverage with caffeine were the management strategies of the participants to reduce factors that precipitate xerostomia. Because caffeine can dry out the mouth and increase mucosal sensitivity to acidic or spicy food. Shakes (2004) reported 63% of the samples with xerostomia spicy food affected their mouth, and 70% of them acidic food affected their mouth.

Saliva stimulants and substitutes

Some participants (38%) used artificial saliva for saliva substitutes under prescription, and they use candy and chewing gum (25%) to stimulate saliva. Artificial saliva was based on either mucin or carboxymethylcellulose, which are a natural component of saliva (Levine et al., 1987). Although artificial saliva act as substitute to saliva, but it had limitation, include short duration of action, inconvenience, undesirable taste, and cost (Chembers, Rosenthal, &Weber, 2007). Olsson and Axell (1991) study the action of artificial saliva and found that the mean duration of subjective improvement in oral friction was 11.5 minutes. In this study, few participants said that using water was better than artificial saliva.

Chewing gum might stimulate the receptor within and around the oral cavity (Miller, &Kearney, 2001).

The majority of the participants (62%) and more than half (60%) reported that the reasons to choose symptom management strategies because they received health education from physician and nurse and they adhered to the prescription. They identified that the sources of knowledge were recommendations by physicians (84%)

and nurses (61%). From this study indicated the health care providers were important persons to give health education and suggestion to manage the symptom.

Most of the participants (92%) took care of themselves while managing their symptom. It might be the majority of them (59%) were in middle age, and they have ability to take care themselves. Fifty six percent of the participants managed their symptom whenever it occurred and most of them (99%) did it at home.

Outcomes

This study includes outcomes of symptom management strategies and outcomes of xerostomia as follow;

Outcomes of symptom management strategies

In this study, the outcomes focus on symptom status, functional status, emotional status, costs, and morbidity. These are five of eight outcomes suggest by the model of Dodd, et al. (2001:674).

According to the study findings, more than half of the participants (57%) perceived that symptom of xerostomia resulted in improvement and 37% of the participants can relieve. There are different from Sujira Foongfaung (B.E. 2550) report, which showed that 5.7% of the samples had improvements while the major of the samples (77.4%) felt relieved. It might be because that previous report was studied during the course of treatment. Combination of chemotherapy and radiation therapy have unwanted effect of xerostomia and mostly, it is dose related.

The majority of the participants (76%) got improvement of functional status in chewing, swallowing food, and speaking. Most of them take liquid food, sipped or drank water during meal, and more often sip/drink water extra meal which could relief their symptoms. In addition, emotional status had improved (78%). One of the possible explanations may be related to demographic characteristics. Most of the participants (73%) were married. The status of married is a factor to support emotional domain. Urai kloaynaak (B.E. 2540) reported one hundred patients with head and neck cancer had high scores of emotional support from family.

As regard to the cost of symptom management, the majority of the participants (80%) did not need to spend extra money for symptom management. Almost all of them used natural strategies as water sipped, oral hygiene care by plain water. Another

possible reason was that almost all of the participants (89%) could reimburse from the government, national health insurance, and life insurance.

With regard to the morbidity, three quarter of the samples did not get other complication illness while one fourth of the participants had sore throat, ulceration of their oral cavity. The majority of them (55%) received combination of chemotherapy and radiation therapy so it might have more chance to get those illnesses.

Outcomes of xerostomia

The outcomes of xerostomia in this study are dental caries, nutritional status, and quality of life related xerostomia.

Dental caries, hyposalivation increases the risk of oral infection mainly related to dental caries (Chembers et. al., 2006). All of them got dental care before started radiation. The majority of the participant (89%) had dental caries before radiation therapy; they were treated by extraction teeth and fill teeth, after that no one had dental caries. Until, at the post radiation period, found 16% of the participants had dental caries. It might explained all of the participants (100%) had experience of xerostomia, although different level from low to great level of the symptom. Saliva contains antibacterial proteins to prevent overgrowth of oral microbial populations. It contains calcium and phosphate ions, which facilitate the remineralisation of the teeth. If the patients had hyposalivation, it would result to risk of dental caries.

Dental and oral checked up before, during, and follow up 5 years post radiation were set as routine care for this group of patients. Pretreatment dental evaluation and care is especially important. Studies have shown that dental follow up compliance is low among patient with head and neck cancers. The majority of the participants had good oral hygiene care such as frequent mouth washing, brushing teeth after meal, and follow up with dentist.

Nutritional status, body mass index (BMI) was used to evaluate the nutritional status. It was found that at the immediately period post radiation therapy (after radiation), there were 20% of the participants had low body mass index (<18.5 kg/m^2) which are increasing from the period before radiation therapy (8%). At the time of data collection (current) low BMI was found 14%. Overweight persons (BMI > 24.9 kg/m^2), at after and current radiation therapy was found less (13%) than the period of before radiation therapy (35%)

This finding consistent with the previous reports which showed that the patient had loss of taste, mucosal sensitivity to acidic or spicy foods, or loss of appetite, weight loss, and result to nutritional deficiency (Peterson, 2000; Atkinson, 2001; Bruce, 2004). It might be explained that mouth is a structure for food intake. If the patients had experience of xerostomia, decreasing saliva lead to resulting to nutritional status because saliva had function to dissolves foods to allow for the sensation of sweet, sour, salty and the bitter taste, loss of taste and appetite and decrease foods intakes.

This study found that xerostomia has a significant negative correlation with the nutritional status ($r = -.215$, $p < .05$) meaning that the more severity of xerostomia, the lower body mass index. It might be explained that radiation therapy directed to the structures of head and neck had negatively affect the nutrition status of patients. Xerostomia contributes to patients' inability to maintain their nutritional status and body weight (Marilyn et. al., 2007).

Quality of life related xerostomia (QOL). The results show that the overall of the actual score was 1 to 56 (Mean=17.61, S.D. =11.13). The actual scores of the overall and each domain (Table 17) were varied between the lowest and the highest indicated the participants had low to high quality of life. The value of mean (17.61) and median (17.00) were about the same with a bit positively skewed indicated the majority of the participants had low scores. The lower scores mean higher quality of life. One of the possible reasons that may be explained this finding is an expectation of Thai culture that men have to be the household heads and to show strength. Moreover, most of the patients in this study were middle aged men. These data may have caused some bias resulted in the scores of quality of life because QOL measured by self-report.

Another reason might be explained for this result of rather high QOL is that the patients tried to satisfy their present lives. Almost all of them are Buddhism. They might try not to have expectation. The better explanation of this issue might be that QOL has a positive significant correlation with the experience of xerostomia in this study. The more severe of xerostomia, the lower QOL. In overall the severity of xerostomia was in moderate level, so the QOL seemed to be good.

The study found that the experience of xerostomia had a significant positive correlation with quality of life related xerostomia ($r = .751$, $p < .01$) meaning the higher scores of xerostomia, the less quality of life. This finding was consistent with the report of Rose and Yates (2001) which explores the quality of life during and one month after completion of radiation therapy. Sore throat and dry mouth affecting to functional well being, which is one of five dimensions of quality of life.

Each domain of quality of life related xerostomia had significant positive correlation with quality of life related xerostomia as follow;

Xerostomia had a significant positive correlation with physical functioning ($r = .746$, $p < .001$) meaning the higher scores of xerostomia, the less quality of life related physical functioning. Xerostomia had a significant positive correlation with pain/discomfort ($r = .712$, $p < .001$) meaning the higher scores of xerostomia, the less quality of life related pain/discomfort.

Xerostomia had a significant positive correlation with personal/psychological functioning ($r = .558$, $p < .001$) meaning the higher scores of xerostomia, the less quality of life related personal/psychological functioning.

Xerostomia had a significant positive correlation with social functioning ($r = .665$, $p < .001$) meaning the higher scores of xerostomia, the less quality of life related social functioning.

Physical well-being, social well-being, emotional well-being, and functional well-being are dimensions of quality of life related in patients with head and neck cancer. In this study, showed four-domain quality of life related xerostomia include physical functioning, pain/discomfort, personal/psychological functioning, and social functioning. In patients with head and neck cancer, post radiation had experience of xerostomia, hyposaliva leads to loss function of saliva to lubricate oral mucosa. It makes the patients difficult to speech, swallow food. Patients describe a feeling of thickened saliva and often carry water bottles with them at all times. The chewing of dry foods such as crakers may be very painful for them (Bruce, 2004; Atkinson & Baum, 2001). The experience of xerostomia is harmful and effect on patients' quality of life.

Xerostomia had a significant positive correlation with dose of radiation ($r = .272$, $p < .05$) meaning higher level of xerostomia was found if the dose of

radiation increased. A radiation dose of as little as 10 Gy or approximately 1 week of treatment causes salivary output decreases (Ship, & Hu, 2004). The total dose is 26Gy or less, recovery of salivary function is possible. However, the typical total dose of 60 Gy or more, which are used for head and neck cancer ensures permanent damage to salivary glands. In addition, the majority of the participants (60%) use total dose 60 to 70 Gy which are most likely to affect xerostomia.

Xerostomia has a negative but not significant correlation with duration post radiation ($r=-.127$, $p > .05$) meaning level of xerostomia variable do not have relationship with duration post radiation. It might be because of the permanent damage of the salivary glands as describe earlier. In one study, a survey of the dry mouth syndrome in long term survivors, investigators observed that 64% of long term survivors (at least three years after convention radiation therapy) experience a moderate to severe degree of xerostomia (Wijers et al., 2002).

Summary

From the study, showed all of the participants had experience of xerostomia. In average, the severity of the symptom is in moderate level. The participants had a knowledge and management strategies from the most of physicians and nurses. There are a several methods to relief experience of xerostomia. Most of the participants report improvement or relieve of the symptom and better functional status. Sixteen percents of the participants had dental caries, 14% had low BMI (<18.5 kg/m^2). Their mean quality of life related xerostomia was rather good. The experience of xerostomia had a significant positive correlation with QOL related xerostomia in overall and each aspect, and dose of radiation. It was negative correlation but not significantly with the duration post radiation.

CHAPTER VI
CONCLUSION

This non-experimental: descriptive, cross sectional study design was used to explore experience of xerostomia, symptom management strategies, and outcome in patients with head and neck cancer post radiation. The correlation between experience of xerostomia and outcomes were studies. The duration from post radiation to the time of data collection was different and each participant was collected data one time.

Conclusion

The study participants were persons who diagnosed with head and neck cancer post radiation therapy completely. They were admitted in the hospital or came for follow up, or received another treatment at Ramathibodi Hospital, Mahidol University. Data was collected from January to April, 2008. The purposive sampling method was used, with inclusion criteria of the participants who were diagnosed and knew their diagnosis of head and neck cancer, men and women at the age of 18 years and older, received radiation therapy since just completed to 2 years post radiation by single modality or combined with surgery and/or chemotherapy, could communicate in Thai, agree to participate in the study, and had a good consciousness and perception.

There were five instruments used in this study, composed of 1) patients' profile form; 2) Xerostomia-related Quality of Life Questionnaire; 3) Xerostomia Questionnaire; 4) A Symptom Management Strategies Questionnaire; 5) Weighing machine, and Altimeter. Data collection was done by the researcher after receiving the approval from the ethical committee of the Faculty of Graduate Studies, Mahidol University, and Faculty of Medicine Ramathibodi Hospital. Descriptive statistics was used for data analysis. The relationship between the variables was determined by Pearson Product Moment Correlation and tested for significant.

Demographic Characteristic of the participants

There were 100 participants in this study. Their ages range from 18 to 77 years with the mean of 52.56 years. Almost all of them were Buddhist (97%). Seventy -three percent of them (73%) were married and 35% had bachelor's degree. About one thirds of the participants (33%) were unemployed, and thirty seven percent of them (37%) had monthly income between 5,001 to 20,000 baht and 45% used reimbursement from the government for medical fee payment. Sixty –six percent of the participants (66%) had tobacco smoking history and fifty-four (54%) had alcohol drinking history. The majority of them (71%) live in the Central of Thailand.

The majority of the participants (41 %) were diagnosed with nasopharyngeal cancer and three fourth of their pathology (78%) were squamous cell carcinoma, and a half of the participants (54%) were diagnosed with stage 4A cancer. More than half of them (55%) received radiation therapy combined with chemotherapy. Fifty six percent of them got the external beam radiation linear accelerator 6 MV. The duration of radiation therapy for each participants were 7 to 8.5 weeks (Mean = 7.13, SD = .84). The most frequent total dose of radiation therapy were 61 to 70 Gy (Mean = 67.19, SD = 582.09). The majority of the participants (35%) had completed their radiation treatment for 1 to 6 months. Field of radiation therapy included major salivary glands. A half of the participants (50%) were radiated at both parotid glands and submandibular glands.

Experience of xerostomia

Experience of xerostomia were evaluated by 15 items of xerostomia questionnaire, asking about dryness while eating or chewing, and about dryness while not eating or chewing. In this study, the transformed possible range of xerostomia score is 0-100, while the actual range of score is 5-95. The mean score and standard deviation of xerostomia were 51.45, 22.32 respectively, indicated all of the participants had experience of xerostomia and in overall at medium severity.

Symptom management strategies

The study showed management strategies that they practiced were categorized into four groups: changed behavior of eating foods and fluid intake, oral health care, reduced factors to precipitate xerostomia, and use saliva stimulants and substitutes. The top five of the most favorable methods for symptom management were 1) having

foods containing water and they sipped or drank water during meal (99%) 2) avoided spicy food and/or salty tasting food (98%) 3) mouth rinsing and avoided alcoholic drinks and tobacco (96%) 4) had brushing teeth after meals (95%) 5) follow up with dentist (92%).

The reasons for choosing such management strategies are shown. The majority of the participants (62%) received health education from physicians (84%) or nurse (61%) as the sources of knowledge in managing their symptom. Most of them (92%) managed their symptom by themselves when the symptom occurred (56%), and (99%) managed their symptom at home.

Outcomes

Five outcomes of management strategies were improvement of xerostomia symptom, functional and emotional status, costs and morbidity. More than half of the participants (57%) reported that their xerostomia were improved. The majority of them (76%) got improvement of the functional status; Seventy eight percent of them (78%) had emotional improvement. The majority of the participants (80%) did not spend extra money for symptom management, and one-fourth of them (25%) had sore throat/ ulceration in their oral cavities.

Three outcomes of xerostomia in this study are dental caries, nutritional status, and quality of life related xerostomia. Sixteen percent of the participants had dental caries. There were 20% of the participants had low body mass index (<18.5 kg/m^2) at the immediate post radiation period, which are increasing from the period before radiation (8%). Overweight patients (> 24.9 kg/m^2) found less number than the former period. The overall xerostomia related quality of life actual score was 1 to 56 (Mean=17.61, S.D. =11.13) the actual scores of the overall and each domains were difference between the lowest and the highest indicated the samples had the high to low quality of life.

The relationship of the variable

Experience of xerostomia had a significant positive correlation with quality of life related xerostomia, and dose of radiation, significantly. Whereas experience of xerostomia has a significant negative correlation with nutritional status, and has a negative but not significant correlation with duration of post radiation.

Limitation of the study

This study is a cross sectional study design. Most of the participants were treated with multimodality therapy. Therefore, the symptom that was found in this study was integrated symptom that varies according to the treatment received. The present study was conducted with head and neck cancer who sought treatment at Ramathibodi Hospital only. Thus, the study findings could not be generalized to all head and neck cancer populations.

Recommendations

The findings of the study provided several important implications for the nursing profession including nursing practice, nursing research, and nursing education.

Implications for nursing practice

The study found that the xerostomia symptom had occurred in all of patients with head and neck cancer post radiation but different in level with the average at moderates severity. In addition, their management strategies were based on the health information received from physicians or nurses. The results could be used to suggest or educate the patients and bases for developing the nursing practice guideline for symptom management and prevention.

Implications for nursing research

1. The present study was conduct with head and neck cancer in one hospital in Bangkok the result can not be generalized to the population. Collecting data from many hospitals would help for better generalization.

2. The design in this study, descriptive research, non experimental design cross sectional study and limited to 2 years post radiation. The results showed that there were no correlation between experience of future research should be used a prospective study design.

Implications for nursing education

The concept of symptom experiences and management should be taught to nurses and other health care providers at all levels to help them understand the process of the symptom, how to management, and outcome that occurred in patient. It is important since the correlation between experience of xerostomia and quality of life related xerostomia was found. Xerostomia and the duration period post radiation, significantly. To understand more clear about this issue.

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APPENDIX

APPENDIX A
เครื่องมือที่ใช้ในการวิจัย

รหัสผู้ป่วย.....
สถานที่.....
วันที่..... /...../25….

ส่วนที่ 1 แบบบันทึกข้อมูลพื้นฐานทั่วไปภายหลังได้รับรังสีรักษาของผู้ป่วยมะเร็งศีรษะและคอ

คำชี้แจง ในการตอบแบบสอบถามนี้ ต้องการทราบข้อมูลส่วนบุคคลและข้อมูลเกี่ยวกับความเจ็บป่วยของท่าน

โปรดเติมข้อความในช่องว่าง และ/ หรือทำเครื่องมือ ✓ ในช่อง □ หน้าข้อความที่ตรงตามความเป็นจริงโดยแต่ละข้อ ขอให้ท่านเลือกตอบเพียงคำตอบเดียว และโปรดตอบคำถามทุกข้อ

1.1 ข้อมูลส่วนบุคคล

1. เพศ □ ชาย □ หญิง
2. อายุ ……..ปี
3. สถานภาพสมรส □ โสด □ คู่ □ หม้าย □ หย่า □ แยก
4. นับถือศาสนา □ พุทธ □ คริสต์ □ อิสลาม □ อื่นๆระบุ……

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11. จังหวัดที่เกิด.....
จังหวัดที่อาศัยอยู่นานที่สุด…….เป็นเวลา……..เดือน/ ปี
12. สถานที่ที่สามารถติดต่อได้สะดวก.....
หมายเลขโทรศัพท์.....

รหัสผู้ป่วย.....
สถานที่.....
วันที่..... /..... /25….

1.2 แบบบันทึกข้อมูลเกี่ยวกับความเจ็บป่วยและการรักษา (บันทึกโดยผู้วิจัย)

1. การวินิจฉัยโรค.....เมื่อ.....ผลพยาธิวิทยา.....
   การดำเนินของโรค (Cancer staging)..... T…. N….M….
2. โรคประจำตัว……
3. ประวัติการรักษา
   - ☐ รังสีรักษา
     เทคนิคการให้รังสี……
     ปริมาณรังสีที่ได้รับทั้งหมด……cGy. ปริมาณรังสีที่ได้รับต่อครั้ง……cGy.
     ระยะเวลาที่ได้รับรังสีรักษาทั้งหมด……สัปดาห์
     เริ่มได้รับรังสี วันที่……..เดือน……..พ.ศ. 25…..
     ครั้งสุดท้ายที่ได้รับรังสี วันที่……เดือน……พ.ศ. 25……..
     ต่อมน้ำลายหลักที่ได้รับรังสี ☐ หน้าหู ☐ ใต้คาง ☐ ใต้ลิ้น
   - ☐ เคมีบำบัด Course ที่.....
     ชนิดของยาที่ได้รับ……
     ……
     ครั้งสุดท้ายที่ได้รับวันที่……..เดือน…… พ.ศ. 25…….
   - ☐ การผ่าตัด
     ชนิดของการผ่าตัด……
     ได้รับการผ่าตัดวันที่……..เดือน……..พ.ศ. 25……
4. ก่อนได้รับรังสีรักษา น้ำหนัก……kgs. ส่วนสูง……cms. BMI……..kgs/m^2
5. วันสุดท้ายได้รับรังสีรักษา น้ำหนัก……kgs. ส่วนสูง……cms. BMI……..kgs/m^2
6. วันที่เก็บข้อมูล น้ำหนัก……kgs. ส่วนสูง……cms. BMI……..kgs/m^2
7. สภาพฟัน
   ก่อนได้รับรังสีรักษา
   ☐ ไม่มีฟันผุ ☐ มีฟันผุ…… ซี่ การจัดการ……
   หลังได้รับรังสีรักษา
   ☐ ไม่มีฟันผุ ☐ มีฟันผุ…… ซี่ การจัดการ……
   พบทันตแพทย์ครั้งสุดท้ายเมื่อวันที่ ……เดือน……พ.ศ. 25……
8. การรักษา/ ยาที่ได้รับระหว่างรับรังสีรักษาที่เกี่ยวกับอาการแทรกซ้อนในช่องปาก …….....

รหัสผู้ป่วย.....
สถานที่.....
วันที่...../...../25….

ส่วนที่ 2 แบบสอบถามคุณภาพชีวิตภายหลังได้รับรังสีรักษาของผู้ป่วยมะเร็งบริเวณศีรษะและคอ

คำชี้แจง คำถามต่อไปนี้เกี่ยวข้องกับสุขภาพในช่องปากและมีผลต่อชีวิตประจำวันของท่านอย่างไร โปรดทำเครื่องหมาย ✓ ลงในช่อง ☐ที่ตรงกับความรู้สึกของท่านมากที่สุด ในช่วง 7 วันที่ผ่านมา

1. อาการปาก/ คอแห้งทำให้ฉันจำกัดชนิดหรือปริมาณอาหารที่รับประทาน

☐ ไม่ใช่ ☐ เล็กน้อย ☐ ค่อนข้างมาก ☐ มาก ☐ มากที่สุด

2. อาการปาก/ คอแห้งของฉันทำให้ฉันรู้สึกไม่สุขสบาย

☐ ไม่ใช่ ☐ เล็กน้อย ☐ ค่อนข้างมาก ☐ มาก ☐ มากที่สุด

3. อาการปาก/ คอแห้งของฉันทำให้ฉันรู้สึกกังวลมากหรือคอยคำนึงถึงเรื่องนี้ตลอดเวลา

☐ ไม่ใช่ ☐ เล็กน้อย ☐ ค่อนข้างมาก ☐ มาก ☐ มากที่สุด

4. อาการปาก/ คอแห้งของฉันทำให้ฉันไม่อยากพบปะผู้คน หรือออกนอกบ้าน

☐ ไม่ใช่ ☐ เล็กน้อย ☐ ค่อนข้างมาก ☐ มาก ☐ มากที่สุด

10. อาการปาก/ คอแห้งทำให้รบกวนการปฏิบัติกิจวัตรประจำวันของฉัน

☐ ไม่ใช่ ☐ เล็กน้อย ☐ ค่อนข้างมาก ☐ มาก ☐ มากที่สุด

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14. อาการปาก/ คอแห้งส่งผลกระทบต่อชีวิตทุกด้านของฉัน

☐ ไม่ใช่ ☐ เล็กน้อย ☐ ค่อนข้างมาก ☐ มาก ☐ มากที่สุด

15. คุณจะรู้สึกอย่างไรถ้าต้องอยู่กับภาวะที่มีอาการปาก/ คอแห้ง

☐ ยอมรับได้มาก ☐ ค่อนข้างจะรับได้ ☐ ยอมรับและไม่ยอมรับ
☐ รับไม่ได้อย่างยิ่ง ☐ เลวร้ายมาก

ส่วนที่ 3 แบบประเมินความรุนแรงของภาวะน้ำลายแห้งภายหลังได้รับรังสีรักษาของผู้ป่วยมะเร็งบริเวณศีรษะและคอ รหัสผู้ป่วย**……..**

วันที่……. เดือน…… พ.ศ.25…….หลังครบการรักษาด้วยรังสี…… ปี….. เดือน….. วัน

ชื่อ…….....นามสกุล…….. อายุ……ปี HN……..

คำชี้แจง แบบสอบถามนี้ใช้เพื่อประเมินความรุนแรงของภาวะน้ำลายแห้ง โปรดวงกลม (O) ล้อมรอบตัวเลขที่ตรงกับระดับความรู้สึกของท่านต่ออาการน้ำลายแห้ง โดยตอบคำถามให้ครบทั้ง 8 ข้อ ในแต่ละข้อจะมีคะแนน 0-10 คะแนน

คะแนน 0 หมายถึง ไม่มีอาการนั้นๆ เลย คะแนน 10 หมายถึง มีอาการนั้นๆมากที่สุด

1. ท่านมีน้ำลายแห้งจนรู้สึกยากลำบากในการพูดเพียงใด

ไม่มีอาการ มากที่สุด

0	1	2	3	4	5	6	7	8	9	10

2. ท่านมีน้ำลายแห้งจนรู้สึกยากลำบากในการเคี้ยวอาหารเพียงใด

ไม่มีอาการ มากที่สุด

0	1	2	3	4	5	6	7	8	9	10

3. ท่านมีน้ำลายแห้งจนรู้สึกกลืนอาหารที่แห้งหรือแข็งได้ยากลำบากเพียงใด

ไม่มีอาการ มากที่สุด

0	1	2	3	4	5	6	7	8	9	10

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7. ท่านใช้การจิบน้ำเพื่อช่วยในการกลืนอาหารบ่อยครั้งเพียงใด

ไม่ใช้ บ่อยที่สุด

0	1	2	3	4	5	6	7	8	9	10

8. นอกเหนือจากเวลารับประทานอาหารท่านใช้การจิบน้ำเพื่อบรรเทาอาการปากและคอแห้งบ่อยครั้งเพียงใด

ไม่ใช้ บ่อยที่สุด

0	1	2	3	4	5	6	7	8	9	10

(สำหรับผู้วิจัย) คะแนนรวม**……**คะแนน

รหัสผู้ป่วย.....
สถานที่.....
วันที่...../...../25….

ส่วนที่ 4 แบบสอบถามการจัดการกับภาวะน้ำลายแห้ง

คำชี้แจง ท่านมีวิธีการจัดการกับอาการปากหรือคอแห้ง หรือที่เรียกว่าภาวะน้ำลายแห้งอย่างไรบ้าง โดยเป็นวิธีการที่ท่านเคยใช้ /ปฏิบัติ หรือใช้/ ปฏิบัติอยู่ในปัจจุบัน และผลของวิธีการจัดการนั้นช่วยให้อาการที่ท่านมีอยู่เป็นอย่างไร โปรดตอบคำถามต่อไปนี้ โดยกาเครื่องหมาย✓ ในช่องที่ตรงกับการปฏิบัติของท่านหรือเติมคำตอบในช่องว่าง

ไม่ได้ปฏิบัติ	หมายถึง	ไม่เคยใช้/ ปฏิบัติ วิธีการตามข้อนี้เลย
ปฏิบัติน้อยมาก	หมายถึง	เมื่อเกิดอาการใช้/ ปฏิบัติ วิธีการนี้น้อยมาก
ปฏิบัติเป็นบางครั้ง	หมายถึง	เมื่อเกิดอาการใช้/ ปฏิบัติ วิธีการนี้เป็นบางครั้ง
ปฏิบัติเป็นส่วนใหญ่	หมายถึง	เมื่อเกิดอาการใช้/ ปฏิบัติ วิธีการนี้เป็นส่วนใหญ่
ปฏิบัติเป็นประจำ	หมายถึง	เมื่อเกิดอาการใช้/ ปฏิบัติ วิธีการนี้เป็นประจำ

1. วิธีการจัดการกับภาวะน้ำลายแห้ง

วิธีการที่ท่านใช้ในการจัดการกับภาวะน้ำลายแห้ง	ไม่ได้ปฏิบัติ	ความถี่ของการปฏิบัติ			
		ปฏิบัติน้อยมาก	ปฏิบัติเป็นบางครั้ง	ปฏิบัติเป็นส่วนใหญ่	ปฏิบัติเป็นประจำ
1.1 ดื่มน้ำมากกว่า2000ซีซี/วัน (8-10 แก้ว /วัน)					
1.2 จิบ/ ดื่มน้ำบ่อยๆ					
1.3 ใช้สเปรย์พ่นน้ำใส่ปาก					
1.4 บ้วนปากบ่อยๆ					
. . .					
1.8 รับประทานอาหารที่มีน้ำมากขึ้น/รับประทานอาหารร่วมกับการดื่มน้ำ					
1.9 หลีกเลี่ยงการรับประทานอาหารที่มีรสจัด เช่น เผ็ด เค็ม					
1.10 หลีกเลี่ยงเครื่องดื่มที่มีส่วนผสมของคาเฟอีน เช่น ชา กาแฟ					
1.11 งดเครื่องดื่มที่มีส่วนผสมของแอลกอฮอล์					
1.12 งดสูบบุหรี่					
1.13 ใช้ลิปสติกชนิดมัน/ ขี้ผึ้งทาริมฝีปาก					

ข้อคิดเห็นเพิ่มเติม

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2. จากวิธีการที่ท่านเลือกใช้เพื่อลดภาวะน้ำลายแห้งที่ตอบในข้อ 1 โปรดตอบคำถามต่อไปนี้ (ตอบได้มากกว่า 1 ข้อ)

2.1 เหตุผลในการเลือกใช้วิธีนั้นๆ

☐ ปฏิบัติแล้วอาการดีขึ้น/หาย

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2.2 แหล่งที่มาของข้อมูลที่ทำให้ท่านใช้วิธีนั้นๆ

☐ ครอบครัว/ญาติแนะนำ ☐ เพื่อนบ้านแนะนำ

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2.3 ใครเป็นผู้ช่วยเหลือในการใช้วิธีนั้นๆ

☐ ตนเอง ☐ ครอบครัว/ ญาติ

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2.4 เวลาที่ปฏิบัติ

☐ ปฏิบัติเป็นเวลาที่แน่นอน(ระบุช่วงเวลา) เช่น เช้า/ เย็น

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2.5 สถานที่ที่ใช้ปฏิบัติกิจกรรมการจัดการกับอาการ (ที่ทำเป็นประจำ)

☐ บ้าน

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3 ผลของการจัดการกับอาการ

ผลของการจัดการ หมายถึง การที่ท่านมีอาการปากหรือคอแห้ง หรือที่เรียกว่าภาวะน้ำลายแห้ง แล้วท่านได้ใช้วิธีการต่างๆ ไม่ว่าจะเป็นวิธีการที่แพทย์สั่ง หรือได้รับคำแนะนำจากผู้อื่น หรือทำเอง ผลที่ได้เป็นอย่างไร โปรดตอบตามที่ท่านรู้สึกว่าเป็นผลจากการจัดการนั้นๆโดยให้ท่านทำเครื่องหมาย ✓ ลงในช่อง ☐ ที่ตรงกับความรู้สึกของท่านมากที่สุด

3.1 อาการน้ำลายแห้ง

☐ ดีขึ้น ☐ หาย

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3.2 การทำหน้าที่ของร่างกาย คือ การเคี้ยวอาหาร การกลืนอาหาร การพูด

☐ ดีขึ้น/หาย

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3.3 สภาพอารมณ์ของท่าน

☐ ดีขึ้น

.....

3.4 ค่าใช้จ่ายที่ใช้ในการจัดการกับอาการ .....บาท/ครั้ง

☐ ไม่เสียค่าใช้จ่าย

.....

3.5 ท่านมีการเจ็บป่วยอื่นหรืออาการแทรกซ้อนอื่นเกิดขึ้น

☐ ไม่เกิดการเจ็บป่วยหรือภาวะแทรกซ้อน

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APPENDIX B

CONSENT FORM

เอกสารชี้แจงข้อมูล/คำแนะนำแก่ผู้เข้าร่วมการวิจัย

(Patient/Participant Information Sheet)

ชื่อโครงการ ประสบการณ์ วิธีการจัดการ และผลลัพธ์ของภาวะน้ำลายแห้งภายหลังได้รับรังสีรักษาของผู้ป่วยมะเร็งศีรษะและคอ

ชื่อผู้วิจัย นางสาว ปิยวดี ขัดทะเสมา คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี

สถานที่วิจัย แผนกตรวจผู้ป่วยนอกหู คอ จมูก หน่วยรังสีรักษาและเวชศาสตร์นิวเคลียร์ หอผู้ป่วยจักษุโสตฯสามัญชายและหอผู้ป่วยจักษุโสตฯสามัญหญิง โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล

บุคคลและวิธีการติดต่อเมื่อมีเหตุฉุกเฉินหรือความผิดปกติที่เกี่ยวข้องกับการวิจัย

นางสาว ปิยวดี ขัดทะเสมา แผนกตรวจผู้ป่วยนอกหู คอ จมูก หมายเลขโทรศัพท์ 02-2011138, 02-2011125

ความเป็นมาของโครงการ

การเจ็บป่วยด้วยโรคมะเร็งบริเวณศีรษะและคอ เป็นส่วนที่เกี่ยวข้องกับการแสดงออกของบุคลิกภาพ และมีผลต่อภาพลักษณ์ของผู้ป่วย ได้มีความพยายามในการหาวิธีรักษาและดูแลผู้ป่วยมาอย่างต่อเนื่อง การรักษาโรคมะเร็งมีวิธีการรักษาหลัก 3 วิธีคือ การผ่าตัด เคมีบำบัด และรังสีรักษา การรักษาขึ้นอยู่กับชนิดและระยะของโรคที่เป็น ตามความเห็นของแพทย์ผู้ทำการรักษา และการตัดสินใจของผู้ป่วยร่วมด้วย รังสีรักษาเป็นวิธีหนึ่งที่มีบทบาทสำคัญสามารถใช้เป็นวิธีเดียวหรือร่วมกับวิธีอื่น ช่วยให้หายขาดหรือบรรเทาอาการได้ดี และคงสภาพการทำงานของอวัยวะนั้นๆไว้ โดยเฉพาะบริเวณศีรษะและคอ แต่อาจทำให้เกิดภาวะแทรกซ้อนทางร่างกายกับผู้ป่วยได้ โดยเฉพาะการเกิดภาวะแทรกซ้อนในช่องปาก เช่น เยื่อบุช่องปากอักเสบ และภาวะน้ำลายแห้ง เนื่องจากเป็นตำแหน่งที่ใกล้บริเวณที่ฉายรังสี ทำให้ผู้ป่วยไม่สามารถทำหน้าที่ต่างๆได้ตามปกติจากผลกระทบ

จากโรคและการรักษา ส่งผลต่อการดำเนินชีวิตประจำวัน การเกิดภาวะน้ำลายแห้งเป็นปัญหาที่พบได้มาก มีความสำคัญอย่างยิ่งในระยะหลังการรักษาด้วยรังสีรักษาครบแล้ว อาจส่งผลต่อความสุขสบายและปัญหาทางสุขภาพหลายประการ มีวิธีบรรเทาอาการได้บ้าง และได้ผลมากน้อยต่างกัน

ดังนั้นผู้วิจัยจึงศึกษาประสบการณ์ วิธีการจัดการ และผลลัพธ์ของภาวะน้ำลายแห้งภายหลังได้รับรังสีรักษา เพื่อใช้ข้อมูลพื้นฐาน ตลอดจนนำผลการศึกษาไปพัฒนารูปแบบการดูแลผู้ป่วยให้มีประสิทธิภาพต่อไป

วัตถุประสงค์

ผู้วิจัยขอเรียนเชิญให้ท่านเข้าร่วมในโครงการศึกษาครั้งนี้ เนื่องจากท่านเป็นผู้มีประสบการณ์ตรง ว่ามีอาการปากและคอแห้งหรือไม่ ท่านได้จัดการอาการที่เกิดขึ้นอย่างไรและได้ผลหรือไม่ อย่างไร ทั้งส่วนที่ได้รับการรักษา/ แนะนำจากแพทย์ พยาบาล บุคคลหรือแหล่งอื่นๆ ผู้วิจัยจะนำข้อมูลที่ได้มารวบรวม ซึ่งจะใช้ในการกำหนดวิธีการและรูปแบบการดูแลผู้ป่วยที่มีปัญหาในลักษณะเดียวกันกับท่านต่อไป ขอขอบคุณท่านที่ให้เวลา ให้คำตอบ อันเป็นข้อมูลสำคัญที่จะเป็นประโยชน์อย่างยิ่งต่อไป

รายละเอียดที่จะปฏิบัติต่อผู้เข้าร่วมการวิจัย

การเข้ามามีส่วนร่วมในการวิจัยครั้งนี้เป็นไปด้วยความสมัครใจ หากท่านยินดีร่วมมือผู้วิจัยขอให้ท่านตอบแบบสอบถามจำนวน 4 ชุด ได้แก่ แบบบันทึกข้อมูลพื้นฐานทั่วไป แบบสอบถามคุณภาพชีวิตภายหลังได้รับรังสีรักษา แบบประเมินความรุนแรงของภาวะน้ำลายแห้ง แบบสอบถามการจัดการกับภาวะน้ำลายแห้งและผลจากการจัดการ โดยคาดว่าจะใช้เวลาประมาณ 20-30 นาที โดยที่ผู้วิจัยจะอ่านคำถามตามแบบสอบถาม และขอให้ท่านให้คำตอบ โดยผู้วิจัยขออนุญาตจดบันทึกข้อมูลที่ได้ และข้อมูลที่ได้จากการตอบแบบสอบถามจะถูกเก็บรักษาไว้ในที่ปลอดภัย

ประโยชน์และผลข้างเคียงที่จะเกิดแก่ผู้เข้าร่วมการวิจัย

ข้อมูลที่ได้รับจะใช้เป็นแนวทางในการช่วยเหลือท่านและผู้ป่วยรายอื่นๆให้ได้รับการดูแลที่เหมาะสมและมีประสิทธิภาพยิ่งขึ้น ขณะทำการวิจัยผู้วิจัยสามารถติดตามประเมินหรือช่วยเหลือท่านตามปัญหาที่ท่านต้องเผชิญอยู่ และระหว่างการตอบแบบสอบถาม คำถามบางคำถามอาจทำให้ท่านรู้สึกเศร้า เมื่อท่านนึกถึงประสบการณ์ที่ตึงเครียดของท่าน ท่านอาจรู้สึกวิตกกังวล ไม่สบายใจ ถ้าความรู้สึกเหล่านี้เกิดขึ้นระหว่างการให้ข้อมูลท่านสามารถที่จะพูดคุยเกี่ยวกับความรู้สึกของท่านกับผู้วิจัย ท่านมีอิสระเต็มที่ในการที่จะไม่ตอบคำถามหรือถอนตัวจากการวิจัยครั้งนี้ได้ทุกเวลา

การเก็บข้อมูลเป็นความลับ

ท่านจะไม่สูญเสียสิทธิประโยชน์ใดๆ ที่จะได้รับจากโรงพยาบาลถ้าท่านไม่เข้าร่วมในการวิจัยนี้ ในการวิจัยนี้ไม่มีเงินหรือค่าตอบแทนสำหรับความร่วมมือของท่าน ข้อมูลทั้งหมดจากการ

วิจัยจะถูกรักษาไว้เป็นความลับ ในที่ที่ปลอดภัย ชื่อของท่านจะไม่ปรากฏบนแบบฟอร์มใดๆของแบบสอบถาม ตัวเลขจะถูกใช้แทนชื่อของผู้เข้าร่วมวิจัยแต่ละท่าน ผู้วิจัยและอาจารย์ที่ปรึกษาเท่านั้นที่จะทราบข้อมูลที่บ่งชี้ถึงตัวบุคคล ผลการวิจัยจะถูกนำเสนอเพื่อการศึกษาหรือในการประชุมวิชาการ ท่านสามารถขอรับผลสรุปของการวิจัยได้หลังการวิจัยสิ้นสุดลง

ถ้าท่านมีปัญหาข้องใจหรือรู้สึกกังวลใจกับการเข้าร่วมในโครงการวิจัยนี้ ท่านสามารถติดต่อกับประธานกรรมการจริยธรรมการวิจัยในคน สำนักงานวิจัยคณะฯ อาคารวิจัยและสวัสดิการ คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี

หนังสือยินยอมโดยได้รับการบอกกล่าวและเต็มใจ

(Informed Consent Form)

ชื่อโครงการ ประสบการณ์ วิธีการจัดการ และผลลัพธ์ของภาวะน้ำลายแห้งภายหลังได้รับรังสีรักษาของผู้ป่วยมะเร็งศีรษะและคอ

ชื่อผู้วิจัย นางสาว ปิยวดี ขัดทะเสมา คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี

*ชื่อผู้เข้าร่วมการวิจัย .....

อายุ ..... เลขที่เวชระเบียน .....

คำยินยอมของผู้เข้าร่วมการวิจัย

ข้าพเจ้า นาย/นาง/นางสาว ..... ได้ทราบรายละเอียดของโครงการวิจัยตลอดจนประโยชน์ และข้อเสี่ยงที่จะเกิดขึ้นต่อข้าพเจ้าจากผู้วิจัยแล้วอย่างชัดเจน ไม่มีสิ่งใดปิดบังซ่อนเร้นและยินยอมให้ทำการวิจัยในโครงการที่มีชื่อข้างต้น และข้าพเจ้ารู้ว่าถ้ามีปัญหาหรือข้อสงสัยเกิดขึ้น ข้าพเจ้าสามารถสอบถามผู้วิจัยได้ และข้าพเจ้าสามารถไม่เข้าร่วมโครงการวิจัยนี้เมื่อใดก็ได้ โดยไม่มีผลกระทบต่อการรักษาที่ข้าพเจ้าพึงได้รับ นอกจากนี้ผู้วิจัยจะเก็บข้อมูลเฉพาะเกี่ยวกับตัวข้าพเจ้าเป็นความลับและจะเปิดเผยได้เฉพาะในรูปที่เป็นสรุปผลการวิจัย การเปิดเผยข้อมูลเกี่ยวกับตัวข้าพเจ้าต่อหน่วยงานต่างๆที่เกี่ยวข้อง กระทำได้เฉพาะกรณีจำเป็นด้วยเหตุผลทางวิชาการเท่านั้น

ลงชื่อ..... (ผู้เข้าร่วมการวิจัย)

..... (พยาน)

..... (พยาน)

วันที่ .....

คำอธิบายของผู้วิจัย

ข้าพเจ้าได้อธิบายรายละเอียดของโครงการ ตลอดจนประโยชน์ของการวิจัย รวมทั้งข้อเสี่ยงที่อาจจะเกิดขึ้นแก่ผู้เข้าร่วมการวิจัยทราบแล้วอย่างชัดเจนโดยไม่มีสิ่งใดปิดบังซ่อนเร้น

ลงชื่อ ..... (ผู้วิจัย)

(นางสาว ปิยวดี ขัดทะเสมา)

วันที่.....

หมายเหตุ : กรณีผู้เข้าร่วมการวิจัยไม่สามารถอ่านหนังสือได้ ให้ผู้วิจัยอ่านข้อความในหนังสือยินยอมฯ นี้ให้แก่ผู้เข้าร่วมการวิจัยฟังจนเข้าใจดีแล้ว และให้ผู้เข้าร่วมการวิจัยลงนามหรือพิมพ์ลายนิ้วหัวแม่มือรับทราบในการให้ความยินยอมดังกล่าวข้างต้นไว้ด้วย

* ผู้เข้าร่วมการวิจัย หมายถึง ผู้ยินยอมตนให้ทำวิจัย

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Documentary Proof of Ethical Clearance Committee on Human Rights Related to Researches Involving Human Subjects Faculty of Medicine, Ramathibodi Hospital, Mahidol University

MURA2007/522

Title of Project	Experience of Xerostomia, Management and Outcome in Patient with Head and Neck Cancer Post Radiation
Protocol Number	ID 12-50-03
Principal Investigator	Miss. Piyawadee Kathasema
Official Address	Department of Nursing Faculty of Medicine, Ramathibodi Hospital Mahidol University

The aforementioned project has been reviewed and approved by Committee on Human Rights Related to Researches Involving Human Subjects, based on the Declaration of Helsinki.

Signature of Secretary Committee on Human Rights Related to Researches Involving Human Subjects	..... Assoc. Prof. Duangrurdee Wattanasirichaigoon, M.D.
Signature of Chairman Committee on Human Rights Related to Researches Involving Human Subjects	..... Prof. Boonsong Ongphiphadhanakul, M.D.
Date of Approval	December 21, 2007

APPENDIX C

List of Experts Consulted on Validation of Instruments

1. Associate Professor THongchai Bhongmakapat, MD.
   Department of Otolarygology, Faculty of Medicine Ramathibodi Hospital,
   Mahidol University.

2. Assistant Professor Ladawan Narkwong, MD.
   Department of Radiology, Faculty of Medicine Ramathibodi Hospital,
   Mahidol University.

3. Associate Professor Sujinda Rimsritong, MS (Nursing)
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   Mahidol University.

4. Lecturer Tiraporn Junda, Dr., Ph.D. (Nursing)
   Department of Nursing, Faculty of Medicine Ramathibodi Hospital,
   Mahidol University.

5. Mrs. Suvimon Suntisuktana, MS (Health Educator)
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BIOGRAPHY

NAME	Miss Piyawadee Kuthasema
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INSTITUTIONS ATTEND	Ramathibodi School of Nursing, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, 1995-1999 Bachelor of Science (Nursing and Midwifery) Mahidol University, 2006-2008 Master of Nursing Science (Adult Nursing)
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POSITION & OFFICEE	Eye ear nose and throat Nurse, Department of Nursing, Faculty of Medicine, Ramathibodi Hospital, Bangkok, Thailand.