DETERMINATION OF ACUTE COMPLICATIONS OF HEAD AND NECK RADIOTHERAPY, THEIR IMPACT ON TREATMENT AND QUALITY OF LIFE.

BY

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DECLARATION

I .&.V?:../M . M ^ t r K . . $.<! !<?.<*?#? declare that this dissertation, entitled ''Determination of acute complications of head and neck radiotherapy, their impact on treatment and quality of life" is the result of my own work and that it has not been submitted either wholly or in part to this or any other university, for the award of any degree or diploma.

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List of Abbreviations

DNA: Deoxyribonucleic acid

DD: Dry Desquamation

3DCRT: 3- dimensional conformal radiotherapy

ER: Erythema

Gy: Gray (a measure of radiation)

GM-CSF: Granulocyte macrophage - colony stimulating factors

HNC: Head and Neck Cancer

HNRQ: Head and Neck Radiotherapy Questionnaire

KNH: Kenyatta National Hospital

MD: Moist Desquamation

ORN: Osteoradionecrosis

OTT: Overall Treatment Time

PGT: Percutaneous Gastrostomy tube

PORT: Post Operative Radiotherapy

PTV: Planning Target Volume

QoL: Quality of Life

SPSS: Statistical package for social sciences

SD: Standard Deviation

SCC: Squamous cell carcinoma

TMJ: Temporomandibular joint

TQM: Total Quality Management

XBRT: External beam radiotherapy

ABSTRACT

Radiotherapy is in common use for managing head and neck cancer (HNC). As much as it has proven benefits, it also has many adverse side effects. These side effects may lead to treatment interruption and a deterioration of the quality of life (QoL) of patients.

Objectives: The aim of this study was to determine the range of acute morbidity among patients undergoing radiotherapy for head and neck cancer (HNC) at Kenyatta National Hospital (KNH), as a consequence of ionizing radiation; and their impact on treatment and quality of life (QoL).

Design: A descriptive cross-sectional hospital based study.

Setting: Radiotherapy department of the Kenyatta National Hospital (KNH).

Material and methods: A total of 64 patients were recruited among whom 26 patients were evaluated for pattern of occurrence of side effects, incidence of treatment interruption and the number of rest days during the interruption. The other 38 patients who had completed treatment had evaluation of their QoL. Data regarding acute side effects was obtained using a standardized form. A standardized head and neck radiotherapy questionnaire was utilised to collect data for evaluating QoL. This instrument was a modification of the head and neck radiotherapy questionnaire (HNRQ) developed by the McMaster University. In evaluating QoL eight questions were asked to cover symptoms related to the domains of pain, skin reactions, taste, saliva, chewing, speech, swallowing and psychosocial issues. The results were analyzed using the Statistical Package for Social Sciences (SPSS) 11 (SPSS Inc. Chicago, Illinois, USA). The Fischer's exact test was used to

test for significance of association among variables. The variables were age, gender, site of tumour and treament interruption.

Results: Twenty six patients (16 male and 10 female) aged between 21-70 years (mean= 49.6 yrs; SD±15.44) were evaluated for acute side effects of radiotherapy. Xerostomia (96.8%), mucositis (88.5%), skin reactions (88.5%) and odynophagia (84.5%) were found to have been the most frequently occurring side effects. Half the patients had to have their treatment interrupted due to severity of side effects. The cumulative radiation dose received at the time of interruption ranged from 22 to 58Gys. The number of rest-days during the interruption ranged from 4-30 days.

Thirty eight patients (28 male and 10 female) aged 21-69 years (mean 47; SD±13.39) who had completed radiation therapy were evaluated to determine their QoL. Altered taste (96.6%), mouth sores and pain (79.4%), dryness of the mouth (71.1%) and difficulty in swallowing (71.1%) were found to have been the most debilitating domains of the QoL measured. Nineteen (50%) of the patients were found to have had a good QoL with the remainder exhibiting a poor QoL. In this group 16 patients (42.1%) had had treatment interrupted due to severity of side effects.

In conclusion the severity of acute side effects resulted in treatment interruption for about half the patients who underwent head and neck radiotherapy at KNH. This may have grave consequences in terms of tumour control and hence overall patient survival. There was also a significant erosion in the QoL of patients who had completed radiotherapy which calls for measures to be taken to ameliorate the situation. It is, therefore, recommended that specific HNC treatment protocols be revised and implemented within the guidelines of Total Quality Management (TQM).

Studies should be conducted to determine the long-term QoL of post-radiotherapy patients and its effect on patient survival and also to determine the effect of frequent treatment interruption on tumour control at KNH. It is also recommended that the delivery system for radiotherapy at KNH should be upgraded and that a study similar to the present one should be done using a larger sample size.

CHAPTER 1

INTRODUCTION AND A REVIEW OF THE LITERATURE

Radiotherapy either alone or in conjunction with surgery and/or chemotherapy is a major mode of treatment for cancer. However, in addition to anti-tumour effects, ionizing radiation causes damage to normal tissues located in the radiation portals leading to treatment complications. Injury to living tissue results from transfer of energy to atoms and molecules in the cellular structure. Ionizing radiation causes atoms and molecules to become ionized or excited. These excitations and ionizations can:

1. Produce free radicals
2. Break chemical bonds
3. Produce new chemical bonds and cross-linkage between macromolecules
4. Damage molecules that regulate vital cell processes such as DNA, RNA and proteins.

At high radiation doses cell death results. At extremely high doses, cells cannot be replaced quickly enough, and tissues fail to function.
Oral complications of radiotherapy in the head and neck region are the result of the deleterious effects of radiation on salivary glands, oral mucosa, bone, dentition, masticatory musculature and temporomandibular joints (TMJ).

The clinical consequences of head and neck radiotherapy include mucositis, hyposalivation, taste loss, osteoradionecrosis (ORN), radiation caries and trismus (1). The symptomatic and functional consequences of oral complications of cancer radiation treatment may result in treatment interruption, increased length of hospital stay, use of analgesics and antibiotics, the need for nursing services and adjunctive care such as parenteral feeding (1). All these consequences form a heavy burden for the patients and have a tremendous impact on their QoL during and after radiotherapy.

The ultimate aim of any treatment is to achieve physical, mental and social well-being. A good QoL is increasingly being seen as the ultimate measure of the treatment process at which clinicians should aim. The optimal treatment modality must, therefore, offer good loco-regional control, long-term survival, with minimum loss of function. QoL is defined as a person's evaluation of his or her well being and functioning in different life domains (2). It is a subjective and yet a quantifiable construct. The four core domains in assessing QoL are physical functioning, psychological functioning, social interactions and disease and treatment related symptoms. QoL indices or scales aimed at measuring a whole series of very complex data and to examine the patients well being, their psychological state and more specific parameters such as communication, swallowing, social integration and enjoyment of life.

Improving QoL in oncology patients is an important therapeutic goal and most treatment decisions are heavily influenced by their effect on it. Numerous instruments now exist for measuring QoL and symptom burden, ranging from general health status measures to considerably more focused symptom measures.

QoL measures have been routinely incorporated in clinical trials; and their use in clinical settings is strongly encouraged because their value in the cancer patient management is now established (2). These measures also have a potential impact in the managed care environment because they provide information on patient satisfaction and quality of care provided (2).

1.1.1 Side effects of head and neck radiotherapy and the impact on QoL

The nature of the side effects depends on the site which receives the radiation and the treatment schedule. The treatment schedule entails the radiation dose, fractionation and whether or not concurrent chemotherapy is given. Individuals differ somewhat in their radiation reaction. Most side effects are predictable and expected. One of the aims of modern radiotherapy management is to reduce side effects to a minimum and to help the patient to understand and to deal with those side effects which are unavoidable.

1.1.2 Radiation Morbidity and its impact on morbidity and QoL

Mucositis: This is an inflammatory process of the oral mucosa due to irradiation or chemotherapy. It is considered to be an inevitable but transient side effect of anti-neoplastic therapies. During a course of curative radiation, about 80% of the patients will develop different grades of mucositis which is an integral part of the morbidity(3). The World Health Organization (WHO) Oral Toxicity Scale measures anatomical, symptomatic, and functional components of oral mucositis. The severity of the condition is graded from 0 (no oral mucositis) to 4 (alimentation not possible and the patient needs total parentral nutrition);

Grade 0: None

Grade 1: Soreness with or without erythema

Grade 2: Erythema, ulcers, and patient can swallow solid food.

Grade 3: ulcers with extensive erythema and patient cannot swallow solid food.

Grade 4: Mucositis to the extent that alimentation is not possible.

The early radiation reaction causes local discomfort as well as difficulties in drinking, eating, swallowing and speech. Higher rates of acute toxicity result in higher levels of pain and difficulty in oral intake and a significant worsening of the patient's QoL (1). Severe mucositis can give rise to nutritional problems. Hospitalization and nasogastric feeding may become necessary. About 10% to 30% of patients, depending mostly on the type of treatment, may require an interruption or a modification and prolongation of the course of radiotherapy because of severe mucositis (3).

Skin reaction: This constitutes the most common side effect of radiotherapy. Over 90% of patients treated with radiotherapy develop skin reactions to some extent during or shortly after treatment (4). Skin reactions can range from mild erythema, through dry desquamation (DD), to confluent moist desquamation (MD), where blistering, peeling and sloughing of the skin occur. Symptoms include epilation (hair loss), DD, MD, decreased sweating, oedema, ulceration, bleeding and skin cell death. Symptom progression depends on the total radiation dose, fractionation, total duration of treatment, volume of tissue irradiated, and type of radiation delivered.

Xerostomia: Common complaints of xerostomia are dry mouth including difficulty in speaking, chewing, tasting and swallowing foods. In a study conducted by Bansal et al.(5) to evaluate acute morbidity following head and neck radiotherapy, the occurrence of xerostomia was found to have been 84% (5). Xerostomia was also shown to contribute significantly to the erosion of QoL. After the first week of radiotherapy, patients will experience viscous saliva, because serous cell loss results in diminished water secretion. Eventually mucous cells are also affected, decreasing the overall volume of saliva produced (1).

Muscles and joint effects: Trismus, or limited jaw opening may develop due to tumour invasion of the masticatory muscles and/or the temporomandibular joint (TMJ), or be the result of radiotherapy if masticatory muscles and/or the TMJ are included in the field of radiation, or a combination of both. The limited jaw opening interferes with oral hygiene, speech, nutritional intake, examination of the oropharynx and dental treatment and can be particularly discomforting to the patient (6).

Odynophagia and speech impairment'. These are persistent problems for patients with HNC before and after treatment. The overall incidence of odynophagia was found to be 56% in four studies reporting this outcome following head and neck radiotherapy (7). Speech and swallowing are important determinants of health-related QoL (1). The main sites of oral, oropharyngeal and laryngeal cancer are all crucial for swallowing and speech function and all types of treatment will have a significant impact in these areas.

Dysgeusia (Loss of taste): Alteration in taste is an early response to radiation and often precedes mucositis. Most patients experience partial or complete loss of taste acutely during radiotherapy (1). Mechanisms for this sensory disturbance are often complex and range from direct molecular effects on acinar cell function to conditioned aversions to selected foods. Compositional and/or flow rate changes in saliva may also contribute to the symptom, although underlying mechanisms are not clearly established. Taste impairment has profound effects on the nutritional status of the patient and is associated with weight loss through reduced appetite and altered patterns of food intake(l).

Pain and Suffering: This is a common symptom that adversely affects the QoL of HNC patients. Three studies have reported a 69% occurrence of pain as an outcome following head and neck radiotherapy (8). It is difficult to make a clinical distinction between pain and suffering after cancer because the physiological, emotional and psychological changes associated with cancer-related pain aggravates problems associated with the suffering from this disease. Two major factors have contributed to the enhanced importance of QoL in recent years. The increasing frequency of pain and the resources devoted to its treatment and the growing theoretical insight that pain affects most domains of QoL , primarily physical and emotional suffering. Radiation therapy causes pain mainly as a result of causing mucositis and ORN (8). Anxiety and sleeplessness contribute to painful conditions. The pain of losses can accelerate physical pain. The under-treatment of pain can lead to depression. It is important to remember that pain treatment enhances psychological well being and contributes to increased QoL.

Measurement of QoL.

QoL is subjective and can only be measured by the patient. Assessment by health care professionals is not only inappropriate but also inaccurate and studies of concurrent assessment of QoL by physicians and patients with cancer have demonstrated considerable disparity. Subjective evaluation does not imply soft or non-reproducible data. In fact, QoL data are at least as reproducible as tumour-response data and sometimes more so (9). QoL is subjective, multidimensional and dynamic as it changes over time and situations. The QoL can only be described and measured in individual terms, and depends on the present lifestyle, past experience, hopes for the future, dreams and ambitions (9). QoL must include all areas of life and experience and take into account the impact of illness and treatment.

Demographic analysis has shown that among patients with HNC, women have lower QoL scores compared with men and that unemployment and older age predicted a worse global QoL rating (10). Patients with higher economic status, higher educational levels, those who were employed and those without comorbidity tended to enjoy better QoL. Comorbidities are diseases or conditions that coexist with a disease of interest. Seven comorbid conditions have been significantly related with head and neck cancer and these are congestive heart disease, cardiac arrhythmia, peripheral vascular disease, renal disease, cancer controlled, and cancer uncontrolled. QoL and survival rates are also better for married persons and those not living alone compared to unmarried persons and those living alone. QoL considerations are uniquely important in head and neck oncology outcomes research due to the multi-dimentional impact of these tumours and their treatment.
Patient variables, tumour variables and treatment variables must be considered comprehensively in order to maximize the validity of QoL outcome measures. There are a multitude of QoL instruments that are

being used. An instrument should meet the following criteria as articulated by Spilker (1996) (9):

- It should be short and rapid to complete
- It should be reproducible, reliable and valid in a population of HNC patients.
- It should not require extensive training to administer.
- It should be easy to interprate and yield objective results.

Allison et al.(2004) (11) in their study conducted personal interviews with 33 individuals who had received radiotherapy for HNC. Their findings illustrated the debilitating nature of post-therapeutic morbidity and the importance of appreciating the patients' perspectives of their treatment experience. A study involving twelve patients suggested that surgical resection combined with reconstruction and postoperative external beam radiotherapy for squamous cell carcinoma (SCC) of the base of the tongue can offer good functional results and improvement in the overall QoL (12). In another study involving 38 patients with advanced cancer of the larynx and hypopharynx, treatment toxicity, loco-regional tumour control and disease specific survival were used as outcome measures (13).

Effect of treatment interruption on tumour control and patient survival

Unplanned prolongation of the overall time of radical radiotherapy treatment due to the introduction of unscheduled gaps has been shown to have detrimental effects on local control rates and, thereby, tumour cure rates for patients with certain tumours (14). These include SCC of the head and neck region, cervix, skin, lung, transitional carcinomas of the bladder, medulloblastoma and possible SCC of the vagina. The minimum length of a gap that will have a significant effect on local tumour control is difficult to determine especially when 'standard

departmental treatment times' may vary by 2 days depending upon which day treatment starts.

Mathematical modeling of the information from the various data bases suggests that an unscheduled gap of a day can result in an absolute reduction of local control ranging from 3 to 25% (median 14%) for a gap of one week (15,16). More recently it has been reported that prolongation of a 28-day course by 3 days or more, seriously prejudices both the probability of local tumour control and survival unless the radiation dose is adequately increased. The same studies remain inconclusive on the importance of early versus late gaps in treatment.
Reported studies (17) show that more than 30% of radical treatments are interrupted. In many studies the causes of the interruptions are not specified reflecting the lack of general awareness of the importance of avoiding treatment gaps. A retrospective analysis was performed on 161 patients with SCC of the head and neck who received split-course radiotherapy (27 patients) or continuous-course radiotherapy (134) following radical surgical resection (18). The results showed that at 5 years, the actuarial rate of disease control above the clavicles for continuous-course irradiation was 80% versus 44% for split course ($p=0.002$). The overall and cause-specific survival rates were also much better for patients treated with continuous-course irradiation and the difference was highly statistically significant (overall 5-year survival with continuous course was 33% whilst with split-course it wasl5% [$p=0.005$]).

These results demonstrated that in the postoperative setting, split-course irradiation yields lower loco-regional control and survival rates compared with continuous-course therapy with no difference in the rate of severe complications. The data reviewed show very strong evidence that prolongation of overall treatment time affects outcome or local

tumour control (cure rates) in patients with SCC of the head and neck region and SCC cervix (19).

Concept of Treatment Package Time

Treatment package time is defined as the period beginning on the day of operation and terminating with the completion of post- operative radiotherapy (PORT). Rosenthal et al.(2004) in a retrospective study, investigated patients with a treatment package time of more or less than 100 days (20). The longer package was found to have been detrimental to tumour control and survival. The authors concluded that it was not the reduction in the time gap between surgery and radiotherapy that was crucial to outcome, but rather limiting the whole package to less than 100 days (20).

Management of unscheduled gaps

Data accrued in the last 5 years indicate that the use of advanced treatment techniques such as altered fractionation, reduction of overall treatment time (OTT) and concurrent chemo-radiotherapy may minimize any adverse effect of a delay (19). Overall treatment time may be reduced by:

1. Provision of adequate resources (linear accelerators and staff) to accommodate transfer of patients between machines when required.
2. Avoidance of the adverse effects of prolonged breaks over public holidays by appropriate treatment scheduling, either by treating during the break or by compensation.
3. Planned scheduling of machine down-time to avoid treatment gaps for patients receiving radical treatment courses (19).

Compensation for unscheduled gaps

Compensation for unavoidable or unscheduled gaps may be achieved by:

1. Twice daily fractionation, minimum 6-hour interval.
2. Weekend treatment.
3. Use of biologically equivalent dose in fewer fractions to achieve planned overall time.
4. Additional fractions where compensation cannot be achieved within the original overall planned time.

1.2 Statement of The Research Problem

KNH is the only public hospital that offers radiotherapy services in Kenya. It has only one machine for head and neck radiotherapy. There are already many unscheduled treatment interruptions due to issues such as patients not receiving radiotherapy over weekends and public holidays. Machine breakdown or maintenance results in further treatment interruptions. If one were to add interruptions due to side effects of radiotherapy then it becomes apparent that patients may stay many days without undergoing radiotherapy and this may have far-reaching consequences in terms of tumour control and long-term patient survival.

There have been hardly any studies done at KNH to determine the pattern of occurrence of acute side effects of head and neck radiotherapy. There have similarly been no previous studies done at KNH to establish the proportion of patients who have had their treatment interrupted due to severity of side effects of head and neck radiotherapy. There have also been hardly any studies done at KNH to evaluate the QoL of patients undergoing head and neck radiotherapy.

1.3 Justification

This is the first study executed to document the range of acute complications of head and neck radiotherapy at KNH. Knowledge of the occurrence of the side effects of radiotherapy and the incidence of treatment interruption arising from them may reveal the magnitude of the problem. This should form the basis for corrective measures to be instituted.

1.4 Broad Objectives

To determine the range of acute complications among patients undergoing radiotherapy for HNC as a consequence of ionizing radiation, and their impact on treatment and QoL.

1.5 Specific Objedives

1. To determine the pattern of occurrence of side effects among patients undergoing radiotherapy for HNC.
2. To determine the proportion of HNC patients whose treatment is interrupted due to the severity of acute side-effects of radiotherapy.
3 To determine the number of rest days the patients had during the treatment interruption.
4. To assess the QoL of patients who have completed radiotherapy

1.6 Hypothesis

The incidence and severity of acute side effects of radiotherapy at KNH is high.

CHAPTER 2

2.1 Material and Methods

2.2 Ethical considera tions

This study was approved by the Ethics, Research and Standards Committee of the Kenyatta National Hospital (KNH) and the University of Nairobi (appendix 6.5). Permission to conduct the study was also obtained from the Director of KNH. Only patients who gave consent were recruited into the study. Complete confidentiality was maintained at all times.

2.3 Study design

This was a descriptive cross- sectional hospital based study.

2.4 Study Site.

The study was conducted at the radiotherapy department of the KNH. This is the main referral hospital in Kenya and the only public hospital that offers radiotherapy services. Services are offered by consultant radiation oncologists, nuclear medicine specialists, radiation technologists, nurses and other associated cadres. Therapy is delivered to both in-patients and out-patients. External Beam Radiotherapy (XBRT) is the only mode of delivering radiation at KNH for HNC patients.

2.5 Study Population

This comprised of patients with histopathologically confirmed HNC who were either undergoing radiotherapy or had just completed treatment during the study period.

2.6 Study Period

The study was conducted between January 2006 and March 2006.

2.7 *Inclusion Criteria*

1. Patients with HNC aged 18 to 70 years.
2. Patients with HNC who consented to participate in the study.

2.8 Exclusion Criteria

1. All patients below the age of 18 years and those above the age of 70 years.
2. Patients who declined to participate.

2.9 *Sampling method*

Convenience sampling.

2.10 *Patient Sample Size and Recruitment*

a) Sample Size

The following formula by Fisher (21), was used for sample size determination.

$$n = \frac{Z^2 \; P(i-P)}{d^2}$$

where

n = minimum sample size

Z = Standard normal deviate corresponding to 95% confidence level.

P = reported prevalence of complications (in this case, mucositis, = 80%)

d = degree of precision (set at ± 10%)

Substituting in the above formula a minimum sample size of jgO^patients satisfying the inclusion criteria was determined for the sU^.

- Twenty six patients who satisfied the inclusion criteria were recruited for the evaluation of side effects in patients undergoing radiotherapy

- Thirty eight patients who satisfied the inclusion criteria were recruited in the part of the study to assess QoL of patients who had completed radiotherapy within the study period.

2.11 *Examination and interviews*

Clinical examinations were done to evaluate acute side effects using gloves and wooden tongue depressors in natural light. Interviews were conducted in Kiswahili and a translator was made available where the language was not understood.

- Demographic data were obtained for all patients.
- Side effect evaluation was done by clinical examination of patients and occurrence was recorded in relation to radiation dose received (Appendix 6.1).
- QoL life assessment was done using an instrument adapted from The McMaster University Head and Neck Radiotherapy Questionnaire (HNRQ) (appendix 6.3). The questionnaire consists of 8 questions that cover symptoms related to the domains of pain, skin reactions, taste, saliva, chewing, speech, swallowing and psychosocial issues (appendix 6.2). All interviews were standardized and questions were asked in consecutive order beginning with the first question in the questionnaire. In the scoring system used, the most severe effect was scored at 100 whilst the least was scored at 0, and the final score for the HNRQ-QoL was expressed as a mean of the score of the 8 questions. A cut-off composite score of between 0 to 32 was considered good QoL while 33 to 100 was considered poor QoL.
- For each patient it was determined whether treatment had been interrupted due to severe acute side-effects and the number of rest days they received in order to recover.

2.12 Data Analysis and Presentation

The collected data were processed and analyzed using the statistical package for Social Sciences (SPSS) 11 (SPSS Inc. Chicago, Illinois, USA). The results are presented in the form of tables and figures. Comparisons were made between the occurrence of side effects, treatment interruption and the QoL against the variables of age, gender and tumour site. Statistical tests of significance were done using the Fisher's Exact test . The level of significance was set at 0.05 at 95% confidence intervals. For the purposes of comparison between variables, patients were grouped into those below 50 years to represent young patients and those above 50 years to represent elderly patients. Patients with oral cavity tumours were placed in one group while those with tumours in the nasopharynx, pharynx or larynx were grouped as "other sites".

CHAPTER 3

3.0 RESULTS

Occurrence of Radiation Morbidity

Evaluation of acute side effects of radiotherapy involved the 26 patients who were undergoing radiotherapy among whom 16 were males and 10 were females, with an age range of 21-70 years (mean =49.6; SD ±15.44). Among these patients 12(46.2%) had oral cavity tumours, 6(23.1%) had nasopharyngeal tumours, 2(7.7%) had pharyngeal tumours and 6 (23.1%) had laryngeal tumours. Of the oral cavity tumours four were carcinomas involving the maxilla, one was a soft palate carcinoma, five were buccal mucosa carcinomas which involved the mandible, and two were tongue carcinomas. All the six nasopharyngeal tumours were carcinomas. The two pharyngeal tumours were metastatic neck carcinomas. All the laryngeal tumours were carcinomas. Xerostomia was experienced by 96.2% of the patients followed by mucositis 88.5%, skin reactions 88.5%, odynophagia 84.5%, pain and suffering 76.9%, loss of taste 61.5%, trismus 34.6% and voice change was experienced by 30.8% of patients (Fig. 1).

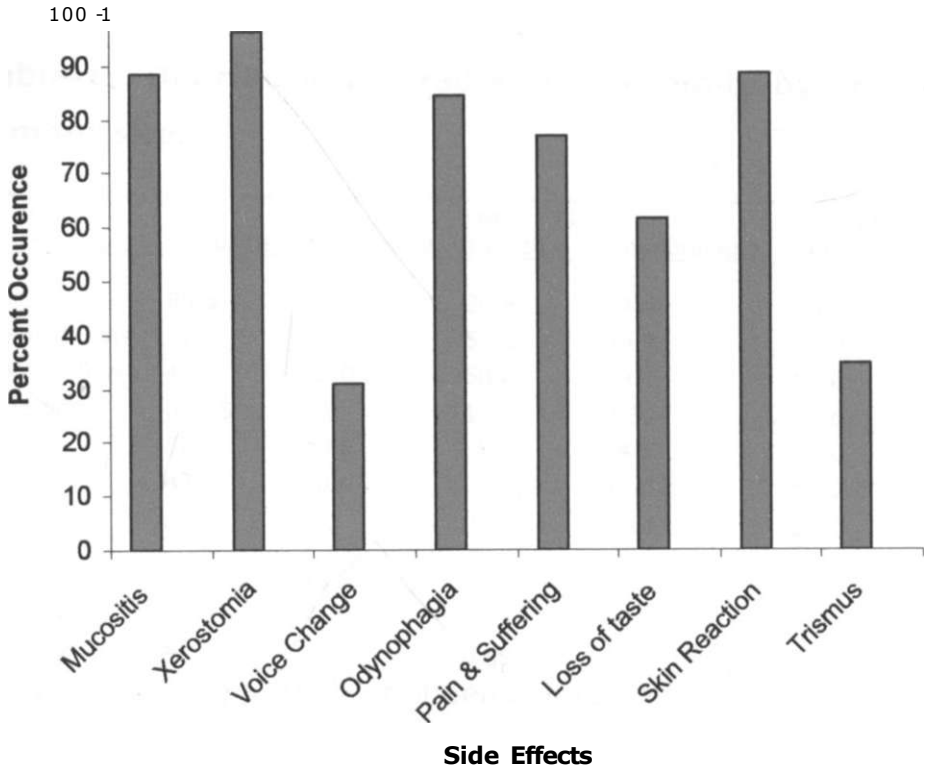

Figure 1. The prevalence of radiation morbidity among HNC patients undergoing radiotherapy.

There was no statistically significant difference when correlating the occurrence of the side effects with the age and gender of the patients. In correlating the occurrence of side effects with the tumour site only loss of taste was found to occur more when the tumour was in the oral cavity than in the other sites. This difference was found to have been statistically significant (P = 0.006). There was no significant difference in the occurrence of the other seven side effects whether the tumour was in the oral cavity or in other sites. Table 1 shows the correlations of the various side effects with age, gender and the tumour site.

Table 1. Distribution of radiation morbidity by age, gender and tumour site.

	Mucositis	Xerostomia	Loss of speech	Odynophagia	Pain and Suffering	Loss of Taste	Skin Reaction	Trismus
	88.5	96.2	30.8	84.6	76.9	73.1	88.5	38.5
Below 50 yrs	52.2	48.0	50.0	40.9	40.0	47.4	43.5	60.0
Above 50 yrs	47.8	52.0	50.0	59.1	60.0	52.6	56.5	40.0
p Value	0.225	1.0	1.0	0.30	0.36	1.0	0.58	0.42
Male	56.5	60.0	50.0	54.5	50.0	52.6	60.9	60.0
Female	43.5	40.0	50.0	45.5	50.0	47.4	39.1	40.0
p Value	0.26	1.0	0.66	0.14	0.05	0.19	1.0	1.0
Oral Cavity	52.2	48.0	37.5	50.0	50.0	63.2	47.8	50.0
Other sites	47.8	52.0	62.5	50.0	50.0	36.8	52.2	50.0
p Value	0.22	1.0	0.68	0.59	0.65	0.006	1.0	1.0

N.B p-values are at 95% confidence intervals

Treatment Interruption due to severity of side effects

Of the 26 patients, 50% had interruption of treatment due to the severity of side effects to allow the patients to rest from radiotherapy and recover. No statistically significant difference was found when correlating interruption of treatment with age, gender or site of tumour. The cumulative radiation dose received by the patients at the time of interruption ranged from 22Gy to 58Gy with a mean dose of 38.23 Gy and a mode of 44Gy.Of the 13 patients who had treatment interruption, one (7.7%) rested for less than 5 days, seven (53.8%) rested for between 6 and 10 days and five (38.5%) rested for more than 10 days. The number of rest days ranged from 4-30 days. (Fig.3).

QoL Assessment

Of the 38 patients assessed, 28 (73.7%) were males and 10 (26.3%) females with an age range of 21-69 years (mean = 47 yrs SD ± 13.39). Among these patients 12 (31.6%) had oral cavity tumours, 14(36.8%) had nasopharyngeal tumours and 12 (31.6%) had laryngeal tumours. Of the oral cavity tumours, three were carcinomas of the palate, one was a

malignant melanoma involving the palate, four were carcinomas of the tongue, three were carcinomas of the floor of the mouth, and one was a carcinoma involving the parotid gland. Of the nasopharyngeal tumours thirteen were carcinomas and one was a glomus tumour. All the laryngeal tumours were carcinomas. In this group 16 patients (42.1%) had treatment interruption during radiotherapy due to the severity of the side effects while 22 (57.9%) had no interruption of treatment. The minimum cumulative dose received by the patients at the time of interruption ranged from 20Gy to 46Gy.

Effect of different Domains on the QoL

Dry mouth (92.1%), mouth sores and pain (86.8%), pain and soreness of the skin (86.8%), difficulty tasting food (76.3%), difficulty chewing food (55.3%), hoarseness or loss of voice (86.8%), difficulty swallowing (86.8%), anger, depression or fatigue (63.2%) were the measured domains that influenced the QoL of patients (Fig. 2) . Patients were also asked to identify the side effects that were most debilitating. Difficulty tasting food (96.6%) was mentioned most frequently, followed by mouth sores and pain (79.4%), dryness of the mouth (71.1%) and difficulty in swallowing (71.1%) (Fig.3).

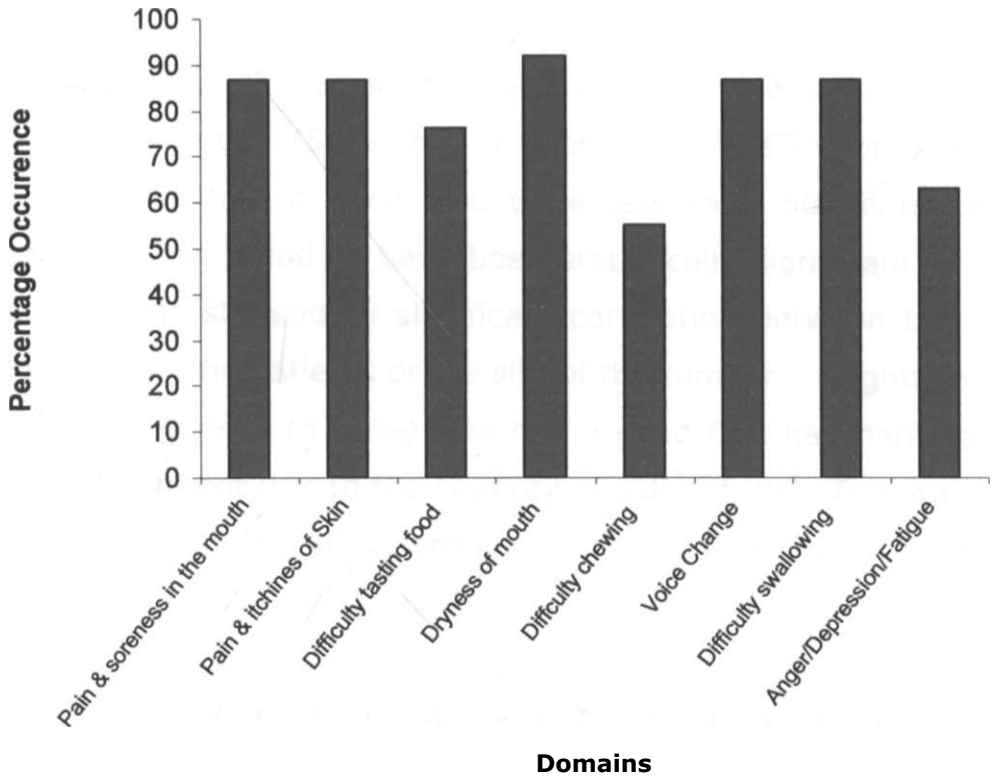

Fig. 2. Percentage occurrence of domains that influenced QoL.

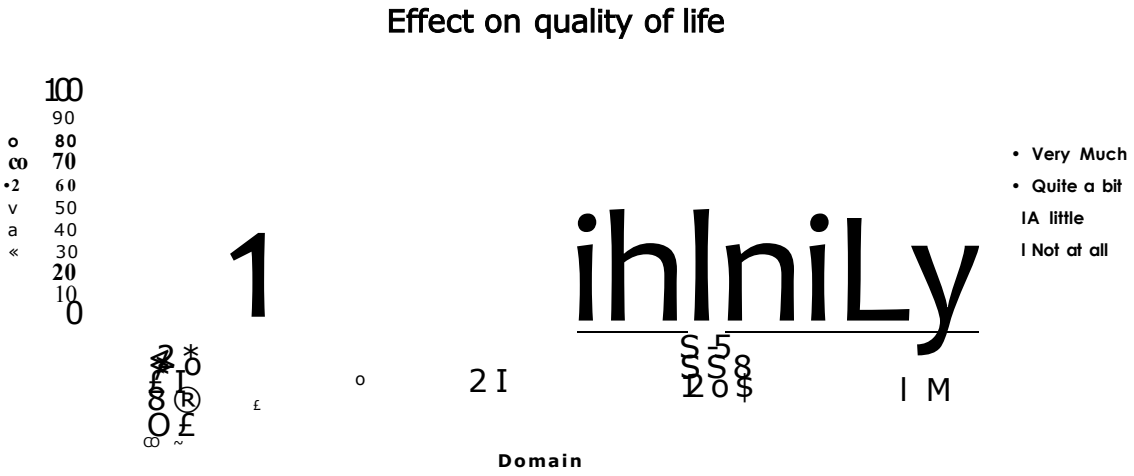

Fig. 3. Relative Contribution of each domain on QoL

Nineteen (50%) of the patients were found to have had a good QoL and the other nineteen (50%) had a poor QoL. The majority of patients (78.9%) who had a good QoL were less than 50 years old. This correlation was found to have been statistically significant (P = 0.02). There was no statistically significant correlation between the QoL with the gender of the patients or the site of the tumour. Slightly more than half of the patients (57.9%) who had a good QoL had had interruption of their treatment due to the severity of side effects. This was found to have been statistically significant (P = 0.049).Table 2 shows the correlations of QoL with age, gender, site of tumour and treatment interruption.

Table 2. Percentage distribution of outcomes (QoL) for different variables.

		Age		Gender		Site of tumor		Treatment	Treatment
		<50 yrs	>50 yrs	Male	Female	Oral cavity	Other sites	Interrupted	Not interrupted
Outcome	Good QOL	78.9	21.1	73.7	26.3	15.8	84.2	57.9	42.1
	Poor QOL	36.8	63.2	73.7	26.3	47.4	52.6	26.3	73.7
	p Value	0.02		1.00		0.079		0.049	

CHAPTER 4

4.0 DISCUSSION

Occurrence of side effects

In the present study an effort was made to utilize measuring instruments that elicited side effects of radiotherapy alone and ignored the effects that may have been due to the cancer itself or due to surgery that may have been performed on the subjects. This study has shown that the occurrence of acute side effects of radiotherapy is much higher at KNH than has been seen in similar studies done elsewhere (3, 5, 7, 8). The study has also shown that the occurrence of these side effects was neither influenced by the age or gender of the patients, nor the tumour site. It is estimated that 50% of the cancers occur in persons over 65 years old. With the presence of co-morbidity and the ageing of normal cell lines, it is accepted that increasing age limits the healing ability (22). It would be logical to assume that any skin and mucosal reaction would be more severe as age increases. However, the reducing frequency of mitosis that accompanies ageing needs to be considered. Less frequent mitosis may reduce the severity of acute reactions because the effects of ionizing radiation damage become apparent on cell replication. There may well be a balance between these two mechanisms with age making an indirect contribution to the skin or mucosal reaction. Huguenin in 1996(23) has shown that early morbidity of radiotherapy is not influenced by age as has also been determined in the present study.

However, patients with HNC clearly exhibit expectations regarding treatment- related side effects. It has been shown that age, gender and educational background influence what side effects a patient expects from their cancer treatment (24). Patients under 60 years of age expected more side effects than those over 60 years, women expected

more symptoms than men; and patients with a college education anticipated more side effects than those who had a high school education.

Researchers suspect that the differences between age groups are tied to natural aging. Older people may have already experienced more symptoms from other illnesses and take the cancer treatment side effects in their stride. Diverse literature has found that a patient's expectation for a side effect, such as nausea, predicts the development of the symptom. While much time and effort is spent characterizing the side effects of cancer therapies, little is known about what side effects patients expect to experience and what type of patient anticipates them. It is suspected that there is a powerful link between the side effect expectations a patient has and the experiences they have undergone. If patients are provided with more information and their concerns are eased, their radiotherapy experience may be better (25). A potential clinical application is to identify, before treatment begins, patients who are at risk and for whom extra attention in terms of side effect management and informational preparation may be quite beneficial.

Effect of tumour site on occurrence of side effects

The suprising lack of significant difference in the occurrence of side effects regardless of tumour site may be contributed by the technique used at KNH. External Beam Radiotherapy (XBRT) with high volume and fixed fractions is what is commonly used at KNH. XBRT is the most common form of radiotherapy where a patient lies on a couch and an external source of x-rays is pointed at a particular part of the body. The radiation interacts with tissues and is absorbed, damaging the DNA of the cell. The source of the x-rays can be from a radioactive source such as cobalt-60 or iridium-137. Such x-rays are monochromatic and called gamma rays. The usual energy range is in the 300 KeV to 1.5 MeV

range. The other source of x-rays are from machines that generate them, and there are two basic varieties used now:

- Conventional x-ray generators which produce x-rays and orthovoltage x-rays.
- Linear accelerators or linacs which produce x-rays called megavoltage x-rays.

This technique may not spare normal tissues which will always get included in the radiation portals of a small area like the head and neck region. This mitigates for the utilization of the 3-Dimentional Conformal Radiotherapy (3DCRT) at KNH. 3DCRT is a complex process that begins with the creation of individualized, 3D digital data sets of patient tumours and normal adjacent anatomy. These data sets of patient tumours are then used to generate 3D computer images and to develop complex plans to deliver highly conformal (focused) radiation while sparing normal adjacent tissue. This will improve the therapeutic index of the radiotherapy by conforming this treatment closely to the shape of the tumour, the relative toxicity of radiation to the surrounding normal tissues can be reduced, allowing a higher dose of radiation to be delivered to the tumour than would be possible using conventional techniques.

Nutting et al. (2001) (26) evaluated target volume dose variation using conformal therapy for parotid tumours. The study concluded that planning target volume (PTV) coverage and dose homogeneity were maintained compared with conventional treatment. Findings from the same study found a reduction in normal tissue irradiation of about 45% using 3DCRT. The downside of tight conformity is that there is an increased chance of geographically missing disease which may be invisible on the planning scans (and therefore not included in the treatment plan) or which may move between treatments because of inadequate patient immobilization. Whatever the criticisms of

conventional radiotherapy, it offers an advantage by giving a wider margin for error than conformal techniques.

Treatment Interruption

The present study has for the first time documented that 50% of the patients undergoing radiotherapy for HNC at KNH require unscheduled treatment interruptions due to the severity of side effects. This differs from what was seen in a study done by Horiot et al.(1997) whereby a comparison was made between the occurrence of acute and late toxicities and the use of conventional fractionation or accelerated fractionation radiotherapy. The study showed a 21% incidence of treatment interruption due to the severity of acute side effects during conventional radiotherapy for head and neck cancer (27). The different cumulative radiation dosages at which patients had their treatment interrupted, expressed the individual variability in susceptibility to side effects of radiotherapy. This also infers that for those patients who were interrupted at lower cumulative radiation doses, there was a possibility of them being interrupted again once radiotherapy resumed. The importance of early versus late interruption is still inconclusive.

Available data suggest, strongly, that unscheduled and uncompensated prolongation of radical treatment adversely affects local tumour control in patients with HNC (14). The present study has also for the first time documented the number of days treatment has been lengthened due to the interruptions. Treatment interruptions lengthen treatment time and Rosenthal et al. (20) have shown that a total treatment package time of more than 100 days was detrimental to tumour control and survival. If one was to add the days of radiotherapy missed due to machine breakdown, transport problems as the patients commonly reside outside Nairobi, shortage of money to pay for treatment and lack of treatment because KNH does not work on weekends then the unscheduled gaps in

treatment can be un-acceptably high. Interrupting radiotherapy and resuming later after symptoms have subsided is equivalent to performing split-course radiotherapy, which has been shown to yield lower loco-regional control and survival rates compared with continuous-course therapy (28). Treatment interruption was confounded by factors such as unplanned public holidays, machine breakdown, stoppage for annual maintenance or due to patients being unable to afford the treatment fee.

Because of the association between treatment gaps and loss of tumour control, studies need to be conducted to correlate the number of tumour recurrences, distant metastasis and overall 5-year survival rates of patients who have undergone unscheduled treatment interruptions at KNH. Moreover KNH does not compensate for treatment gaps as they have fixed working days and do not practise altered fractionation. There appears to be a general lack of awareness, in the radiotherapy department, of the importance of avoiding treatment gaps or lethargy in taking measures to address the issue.

The preceding factors all militate towards a sizeable number of HNC patients at KNH having a poor overall prognosis following radiotherapy.

Performance status is a significant predisposing factor for the interruption of radiotherapy (29). Performance status are scales and criteria used by doctors and researchers to assess how a patients' disease is progressing, assess how the disease affects the daily living abilities of the patient, and determine appropriate treatment and prognosis. Deterioration of performance status is induced either by the malignant disease itself or co-morbidity. For instance in elderly patients with HNC, performance status can easily deteriorate to grade 3 or more because of prolonged dysphagia and starvation. The commonest cause of interruption in the present study was severe mucositis which presented as oral sores, pain, and difficulty of swallowing in the context

of a dry mouth. This leads to reduced oral intake and dehydration, mal-nutrition and at times hospitalization. Three other studies have shown that about 10-30% of patients had unplanned treatment interruptions or modifications because of mucositis (3,27,30).

Mucositis may propagate contrasting forces; on the one hand treatment interruption caused by mucositis may drive tumour response lower and on the other hand the occurrence of severe mucositis may also be a marker for more aggressive treatment, with higher tumour response rates. Since about 50% of the patients in the present study had their treatment interrupted, more efforts should be spent on pre-, mid- and post- treatment health education and supportive therapy to encourage patients complete their treatment. In the present study the baseline oral health status of the patients could not be determined as they were recruited after commencement of radiotherapy. The pre-treatment state of the oral mucosa and the initial oral hygiene status, therefore, remained un-determined.

There is evidence that pre-existing oral disease unrelated to cancer or therapy may increase the risk of oral complications (31). Before the initiation of cancer therapy, a comprehensive pre-treatment dental evaluation is mandated (31). The following objectives would be fulfilled: establish baseline data upon which all subsequent examinations can be compared, identify risk factors for the development of oral complications; perform necessary dental treatment to reduce the likelihood of oral complications induced by cancer treatment. Since this may not have been performed in the present study the influence of the oral hygiene status on the occurrence and severity of side effects remains unknown.

The present study has established the need for further research to determine the baseline oral health status of HNC patients. Studies have

also to be conducted to establish reasons for low pre-radiotherapy dental evaluation and treatment and what measures should be taken to remedy this situation. In the developed world therapeutic support is given in the form of cytoprotectants., examples of which include the drugs amifostine and sucrulfate. Rescue agents such as granulocyte macrophage colony stimulating factors (GM-CSF) are also utilised. Clinical trial data have indicated that these agents can protect normal tissue or particular types of normal tissue (32). However, these agents are still on trial to evaluate their adverse effects and are prohibitively expensive, hence are not in common use in the developing world.

The use of percutaneous gastrostomy tubes (PGTs) has also been shown to significantly reduce weight loss and the rate of hospitilization for dehydration and complications of mucositis(33).The same studies have shown that treatment interruption may also be avoided by the use of PGTs in patients with good performance status. Psychotherapy should also be done to allay any doubts and fears that the patients have so as to prompt and sustain them to finish the full course of treatment in the desired time span.

QoL evaluation

QoL assessment has been used in research and clinical practice to characterize the burden created by cancer and/or its treatment, select treatment options, demonstrate the effect of rehabilitative approaches and for policy decisions. Fifty percent of the patients evaluated in the present study were found to experience a poor QoL following radiotherapy. It is hypothetized that patients achieve a steady-state QoL after they have adjusted to the effects of the diagnosis and treatment; and had mobilized their coping strategies accordingly. This has been postulated as the determinant of long-term survival rather than pre-treatment QoL. This is based on observations that QoL status

usually decreases noticeably during and in the period immediately after treatment and that patients return to a steady-state QoL at about one year after diagnosis (34). However, the observed associations between survival benefit and one-year QoL may be confounded by co-morbidity which was not measured in this study and deserves further investigation. The fact that more patients who had treatment interruption due to the severity of side effects had a good QoL compared to those who had not had their treatment interrupted can be explained by the fact that patients had time to recover during the rest from treatment. The reason why prolongation of treatment is not a good idea for all patients is that often the tumour has an easier time too, with time, to regenerate cells during the rest period (35).

Other confounding factors in the determination of QoL in the present study included previous surgery which may have affected the ability to chew, swallow, talk and may have caused disfigurement. Another confounding factor was stress. Studies have shown that patients who experienced stress at the beginning of radiotherapy also had the same or increased levels of stress during and shortly after treatment and needed permanent psychosocial support to improve the QoL (36). The identification of patients with high stress levels at the beginning of therapy could be helpful. A reduction in treatment costs will go a long way in reducing financial stresses among the patients. Local health institutions should form patient support groups where patients may meet and give each other emotional support. In the present study a pre-treatment baseline QoL was not evaluated and this may be a limitation in interpreting the post-radiotherapy QoL status of the patients. However, studies have shown that pre-treatment QoL was not associated with mortality after adjustment for confounders including age, gender, smoking, alcohol consumption, disease stage, nodal involvement and tumour site. The same studies have also shown that

patients with low QoL before treatment did not have significantly increased odds of death a year after treatment (34). However, patients who reported low QoL one year after treatment had significantly increased odds of death. These findings may mean that interventions to improve the QoL following radiotherapy can potentially improve survival (35).

The potential for poor QoL scores to predict reduced overall survival in HNC patients calls for long-term prospective longitudinal studies to be executed to determine the relationship. One key weakness in the concept of QoL is that it creates a single quantitative score by binding together assessments from a series of domains that span material, physical, social, emotional, and productive well-being. Summating the various scores not only mixes very different classes of characteristics but gives a curious notion of values (37). Each person's experience of life is unique, profoundly complex, constantly evolving, and continually modified by relational, social and spiritual factors. It is, therefore, logically incoherent to evaluate this experience in a single score. Any evaluation of the QoL may not be objective. It will inevitably be influenced by the assumptions, prejudices and life-experiences of the observer.

4.5 *CONCLUSIONS*

1. The severity of these side effects results in treatment interruption for about half the patients undergoing head and neck radiotherapy at KNH. This may have grave consequences in terms of tumour control and hence overall patient survival.
2. There was a significant erosion in the QoL of patients who had completed radiotherapy which calls for measures to be taken to ameliorate the situation.
3. Patients at KNH experience a higher incidence of acute side effects of radiotherapy than in centres elsewhere.

4.6 *RECOMMENDATIONS*

1. Specific HNC treatment protocols should be revised and implemented within the guidelines of Total Quality Management (TQM).
2. Long-term prospective studies should be conducted to determine the long-term QoL of post-radiotherapy patients and the effect of poor QoL on patient survival.
3. Studies should be conducted to determine the effect of frequent treatment interruption on tumour control at KNH.
4. The radiation delivery system at KNH should be upgraded to allow for the utilization of 3DCRT techniques.
5. A similar study to the current one should be conducted using a larger sample size.

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Appendices

Appendix A

GENERAL PATIENT INFORMATION AND CONSENT FORM

General Patient Information

I, Dr. Solomon M.MIamba from University of Nairobi, would like to Seek your consent to participate in a study aimed at evaluating the side effects of radiotherapy in cancer patients and the quality of their lives following treatment. This would hopefully enable us to work on ways to limit these side effects and hence improve the quality of life of patients.

How do you participate?

1. I shall ask some questions about when the disease developed and factors that might have played a part in its development.
2. I will do an examination of the mouth and facial structures before you commence treatment, at the end of treatment and one month following the cessation of treatment.
3. At the end of treatment, I shall provide you with a questionnaire where I shall request you to answer various questions to enable me to evaluate the quality of your life following treatment.
4. I shall endeavor to compare the results of my findings about you with those of other participants.

How does your participation affect you?

This study will not affect you negatively because:

a) The mouth examinations are supposed to be routine for all patients undergoing radiotherapy.

b) All information you give will be confidential.

c) The study does not reveal individual identity.

d) There are no added risks while you are in the study because you will get the same treatment like those not in the study. However you are prone to the side effects of radiation. Some of these side effects can be uncomfortable but medicine shall be prescribed to reduce this. The side effects go away shortly after radiation therapy has stopped, but some may persist.

e) There are no dangers in your participation or non-participation.

f) If you agree to take part in this study, there may or may not be direct medical benefits to you. We hope the information learnt from this study will benefit other patients with head and neck cancer in future.

g) If you object to any part or the whole of this study, you are free to refuse, and this will not affect the quality of care you receive.

What do I do with the information I get?

1. The information I get is part of my research for a thesis to form a partial fulfillment for the degree of Masters of Dental surgery in oral and Maxillofacial Surgery. Therefore I may publish my findings in scientific journals or present them at meetings.
2. If you require to discuss this matter with family, friends or associates you are free to do so and I will be ready to answer any questions. If you are satisfied with my explanation and are willing to participate then please sign the consent form below.

Consent Form

I.....Of

have understood the nature of the study as explained to me by Dr. Solomon M.MIamba of University of Nairobi is willing to participate in the following way:

1. I shall allow examination of my mouth and facial structures.
2. I shall answer the questionnaire as truthfully as I can.
3. I shall present myself for follow-up.

I do understand that:

1. My participation is voluntary.
2. The information is confidential
3. The study can be published in a scientific journal or at a conference without reference to me.
4. No special privileges are conferred to me by my participation in this study.

Name.....**Signed**.....**Date**

Patient

I confirm that I have explained the nature of the study to the patient.

Name.....**Signed**.....**Date**

Investigator

FOMU YA MAKUBALIANO NA MAELEZO YA ZIADA KWA WAGONJWA

Maelezo Ya Ziada Kwa Wangonjwa

Mimi, Daktari Solomon M. Mlamba kutoka chuo kikuu cha Nairobi, ningependa idhini yako kushiriki katika uchunguzi unaolenga kupima madhara ya matibabu ya seratani kutumia 'radiotherapy' au miale ya umeme katika wanaougua na thamani ya maisha yao baada ya matibabu. Ni tumaini letu kwamba hatua hii itatuwezesha kupunguza madhara hayo na mathalan kuboresha thamani ya maisha ya wagonjwa.

Unashiriki Vipi?

1) Nitauliza maswali kadhaa kuhusu lini ugonjwa huu ulipoaaza na ulivyoendelea, na mambo ambayo huenda yalichangiya katika kuanza kwa ugonjwa huu.

2) Nitafanya uchunguzi wa mdomo na sehemu za uso kabla ya matibabu kuanza, tutakapo tamatisha matibabu, na mwezi mmoja kufuatia kusimamisha matibabu.

3) Mwisho wa matibabu nitakupa nakala ya maswali ambapo nitakuomba ujibu maswali kadhaa kuniwezesha mimi kupima hali ya maisha yako kufwatia kutibiwa.

4) Nitajitahidi kulinganisha matokeo ya utafiti wangu kukuhusu wewe na yale ya wahusika wengine.

Kuhusika kwako kunakuathiri vipi?

Utafiti huu hautakuathiri kinyume kwa sababu:

a) Uchunguzi wa mdomo ni kawaida kwa wagonjwa wote wanaotibiwa kwa miale ya umeme.

b) Habari zote utakazotoa zitahifadhiwa kwa njia ya siri.

c) Utafiti huu hautafichua kitambulisho cha mtu binafsi.

d) Hakuna hatari ya ongezeko la mathara wakati wa utafiti kwani utapata matibabu yale yale kama wagonjwa wale wasio kwenye utafiti huu. Mathara haya huenda yakufanye usijisikie vizuri lakini utapatiwa madawa yakukutuliza. Mathara mengine huenda yakapotea punde baada ya matibabu, lakini mengine huenda yakadumu.

e) Hakuna hatari yeyote katika kushiriki au kutoshiriki kwako.

f) Ukikubali kushiriki kwenye utafiti huu huenda kukawa na manufaa kwako binafsi ama la. Tunatumaini matokeo ya utafiti huu huenda ukasaidia wagonjwa wengine wa seratani ya kichwa na shingo katika siku za usoni.

g) Ikiwa untapinga sehemu yeyote au kila sehemu ya utafiti huu, uko huru kukataa na hii haitaathiri hali ya kushughulikiwa kwako.

Nitafanya nini na habari nitakazopokea?

1) Habari ninazopata ni sehemu ya utafiti wangu kwa nakala itakayo kuwa sehemu ya kutunukwa shahada ya "Masters of Dental Surgery in Oral and Maxillofacial Surgery." Kwa hivo nitachapisha matokeo ya utafiti wangu katika magazeti ya kisayansi au kutoa kwa ziada katika mikutano.

2) Ikiwa utahitaji kujadili jambo hili na jamii, marafiki au wale ' unashiriki nao uko huru kufanya hivyo, nami nitakuwa tayari kujibu maswali yeyote. Ikiwa umetosheka na maelezo yangu na uko tayari kushiriki, tafadhali weka sahihi katika fomu ya makubaliano iliyoko hapa chini.

Form ya Makubaliano

Mimi wa

Nimeelewa hali ya utafiti kulingana na jinsi nilivyoelezewa na Dr. Solomon M. Mlamba wa chuo kikuu cha Nairobi. Nikotayari kushiriki kwa njia ifuatayo:

1. Nimekubali kuchunguzwa mdomo wangu na sehemu za uso.
2. Nitajibu hakala ya maswali kwa uaaminifu niwezavyo.
3. Nitajitokeza kwa ajili ya ufuatilizo.

Ninaelewa ya kwamba

1. Kushiriki kwangu ni kwa hiari yangu.
2. Habari zitahifidhiwa kisiri.
3. Utafiti huu unaweza kuchapishwa katika magazeti ya kisayansi au katika kongamano bila idhini yangu.
4. Sitapata huduma yeyote ya upendeleo kwa ajili ya kushiriki katika utafiti huu.

Jina

Sahihi **Tarehe**

Mgonjwa

Nathibitisha kwamba nimeeleza hali ya utafiti huu kwa mgonjwa.

Jina **Sahihi** **Tarehe**

Mtafiti

Appendix B.

Radiotherapy Side effects evaluation form

GENERAL INFORMATION

Name

Age in Years

Sex (M=1,F=2)

Clinical Assessment

Site of Carcinoma CD Tumour Staging

1. Oral Cavity
2. Nasopharyngeal
3. Pharyngeal
4. Laryngeal

Concurrent or previous chemotherapy

Yes • No •

Type of Treatment

Radical • Palliative I__I Other •

Date of commencement of Radiotherapy

Morbidity following Radiotherapy

Mucositis Xerostomia

Cumulative dose

0 = None
1 = mild
2 = Moderate
3 - Severe

Speech

0 = Not affected
1 = Hoarse voice
2 = No voice

Pain & Suffering

Cummulative dose

0 = none
1 = Mild
2 = Moderate
3 = Severe

Skin reactions

0 = none
1 = erythema
2 = dry desquamation
3 = Wet desquamation

Others

Cumulative dose

0 = None
1 = Mild
2 = Moderate
3 = Severe

Odynophagia

0 = absent
1 = mild
2 = severe

Taste

0 = not affected
1 = affected

Trismus

O = None ....
1 = Moderate.
2 = Severe ....

Cummulative c

Cummulative Dose at Interruption of treatment

Reason for interruption of treatment

Number of days rest period

Drugs used to ameliorate reactions

1

2

3

4

5

Appendix C.

Head and Neck Radiotherapy Questionnaire (HNRQ)

Date of Assessment

Patient Name

A. Have you had any pain or soreness in your mouth since the treatment began?

1. Yes (Continue to part b)
5. No.

Part b. How troublesome was this for you?
1. Very much
2. Quite a bit
3. A little
4. Not at all

B. Have you had pain or soreness or itchiness of your skin in the treated areas since treatment started?

1. Yes (continue to part b)
5. No.

Part b. How troublesome was this for you?
1. Very much
2. Quite a bit
3. A little
4. Not at all

C. Have you had difficulty tasting your food since treatment started?

1. Yes (continue to part b.)
5. No.

Part b. How often did you feel this way?
1. Almost all the time
2. A lot of times
3. A little of the times
4. Hardly any of the time.

D. Have you had any dryness of the mouth and found your saliva to be sticky since the beginning of treatment?

1. Yes (continue to b)
5. No.

Part b. How troublesome was this for you?
1. Very much
2. Quite a bit
3. A little
4. Not at all.

E. Have you had any difficulty chewing your food, since treatment started?

1. Yes (continue to part b)
5. No.

Part b. How troublesome was this for you?
1. Very much
2. Quite a bit
3. A little
4. Not at all.

F. Have you had a hoarse voice or lost your voice all together since treatment started?

1. Yes (continue to part b)
5. No.

Part b. How troublesome was this for you?
1. Very much
2. Quite a bit
3. A little
4. Not at all.

G. Have you had any difficulty swallowing since treatment started?

1. Yes (continue to part b)
5. No.

Part b. How troublesome was this for you?
1. Very much
2. Quite a bit
3. A little
4. Not at all

H. In general, have you felt angry, depressed or fatigued since the treatment started?

1. Yes (continue to part b)
5. No.

Part b. How often did you feel this way?
1. A great deal of the time
2. A lot of the time
3. A little of the time
4. Hardly at any time.

Appendix *B*.

McMasfer University Head and Neclc Radiotherapy Questionnaire

I. Patient ID Number

II. Date of assessment_____•_____•_____Do NOT Leave Blank
Ytv Month Do.

HI. Patient Name

(Insert the number oj 'weeks since previous HNRQ administration) —- — weeks ago, you answered a questionnaire designed for people who have rcccived radiation treatment for head and neck cancer. Please repeal the questionnaire today to find out how the treatments have been affecting how you have been feeling during the past work.

Please think about how the treatments have been affecting you.

I. (lave you had any pain or soreness in your mouth in the past week?
   I. Yes. (continue to part b)
   7. No

Part b: *How TROUBLESO ME was this for you?*
1. A Great Deal
2. A Lot
3. A Fair Bit
4. Somewhat
5. A Little
6. Hardly Any

2. Have you had dryness of your skin, where it was treated, in the past week?
   I. Yes, (continue to part b)
   7. No

Part b: *How TROUBLESOME was this for you?*
1. A Great Deal
2. A Lot
3. A Fair Bit
4. Somewhat
5. A Little
6. Hardly Any

3. Have you had any difficulty swallowing in the past week?
   1. Yes, (continue to pan b)
   7. No

Part b: *How TROUBLESOME was this Jor you?*
1. A Great Deal
2. A Lot
3. A Fair Bit
4. Somewhat
5. A Little
6. Hardly Any

4. Have you felt low in energy, in the past week?
   I. Yes, (continue to part b)
   7. No

Part b: *How OFTEN did)vu feel this way?*
1. A Great Deal of the time
2. A Lot of the time
3. A Fair Bit of the time
4. Somewhat of the time
5. A Little of the time
6. Hardly Any of the time

5. In general, have you fell angry, depressed or down in the dumps in the past week?
   1. Yes, (continue to part b)
   7. No

Part b: *How OFTEN did you feel this way?*
1. A Great Deal of the time
2. A Lot of the time
3. A Fair Bit of the time
4. Somewhat of the time
5. A Little of the time
6. Hardly Any of the time

6. Have you felt nauseated, in the past week?
   I. Yes, (continue to part b)
   7. No

Part b: *How TROUBLESOME was this for you?*
1. A Great Deal
2. A Lot
3. A Fair Bit
4. Somewhat
5. A Little
6. Hardly Any

7. Have you had any itching of the skin, in the treated area, in the past week?
   I. Yes. (continue to part b)
   7. No

Pan b: *How TROUBLESOME was this for you?*
1. A Great Deal
2. A Lot
3. A Fair Bit
4. Somewhat
5. A Little
6 Hardly Any

8. Have you had any difficulty getting a good night's sleep, in the past week?
   I. Yes, (continue to part b)
   7. No

Part b: *How OFTEN did }-ou feel this* **m** *ay?*
1. A Great Deal of the time
2. A Lot of the time
3. A Fair Bit of the time
4. Somewhat of the time
5. A Little of the lime
6. Hardly Any of the lime

9. Have you had any dry ness of your mouth, in the past week?
   I. Yes. (continue to part b)
   7. No

Pan b: *How TROUBLESOME* nm *this for you?*
1. A Great Deal
2. A Lot
3. A Fair Bit
4. Somewhat
5. A Little
6. Hardly Any

10. Have you felt tired or fatigued, in the past week, such that you are prevented from doing social or recreational activities?
   I. Yes, (continue to part b)
   7. No

Part b: *How OFTES dtd you feel this way?*
1. A Great Deal of the time
2. A Lot of the time
3. A Fair Bit of the lime
4. Somewhat of the time
5. A Little of the time
6. Hardly Any of the time

11. Have you had a sore or painful throat, in the past week?
   I. Yes. (continue to pan b)
   7. No

Part b: *How TROUBLESOME was this for yvu?*
1. A Great Deal
2. A Lot
3. A Fair Bit
4. Somewhat
5. A Little
6. Hardly Any

12. Have you had any upset of stomach, in the past week?
   1. Yes, (continue to part b)
   7. No

Part b: *How TROUBLESOME was this for you?*
1. A Great Deal
2. A Lot
3. A Fair Bit
4. Somewhat
5. A Little
6. Hardly Any

13. Have you found your saliva to be very sticky, in the past week?
   1. Yes, (continue to part b)
   7. No

Pan b: *How TROUBLESOME was this for you?*
1. A Great Deal
2. A Lot
3. A Fair Bit
4. Somewhat
5. A Little
6. Hardly Any

14. Have you had any fatigue or tiredness which interfered with your work or routine daily activities, in the past week?
   1. Yes, (continue to part b)
   7. No

Pari b: *How OFTEN did you feel this way?*
1. A Great Deal of the time
2. A Lot of the time
3. A Fair Bit of the time
4. Somewhat of the time
5. A Little of the time
6. Hardly Any of the time

15. Have you had difficulty tasting your food, in Che past week?
   I. Yes. (continue to part b)
   7. No

Part b: *How OFTEN did feet this way?*
1. A Great Deal of the time
2. A Lot of the time
3. A Fair Bit of the time
4. Somewhat of the time
5. A Little of the time
6. I lardly Any of the time

16. Have you had difficulty with your appetite, in the past week?
   1. Yes, (continue to part b)
   7. No

Part *tr. How OFTEN dul you feel this way?*
1. A Great Deal of the time
2. A Lot of the time
3. A Fair Bit of the time
4. Somewhat of the time
5. A Little of the time
6. Hardlv Anv of the time

Appendix *B.*

KARNOFSKY PERFORMANCE STATUS SCALE
DEFINITIONS RATING (H) CRITERIA

Able to cany on normal activity and to work: No special care needed.	100	Normal no complaints. no evidence of divase.
	90	Able to cany on normal activity; Minor signs or symptoms of disease.
	80	Normal scanty with effort: some sips or symptoms of disease.
Unable to work: able to live at home and care for most personal needs: varying amount of assistance needed.	70	Cues for self, unable to cany on normal activity or to do active work.
	60	Requires Decisional assistance, but is able to care fox most of his personal needs.
	50	Requires considerable assistance and trecuen: medical care.
Unable to care for self. Requires equivalent of institutional or hospital care: diseases may be progressing rapidly.	40	Disabled: requires special care and assistance.
	30	Severely disabled: hospital admission is mdicated although death not imminent.
	20	Very sick: hospital admission necessary: Active supportive treatment necessary
	10	Moribund, fetal processes progressing rapidly
	0	Dead

Oxford Textbook ofPiikafivt Median*. Oxford University Pr«v., 1993:109

FUNCTIONAL ASSESSMENT STAGING (FAST)
(Check highest consecutive level of disability.)

1. No difficulty either subjectively or objectively.
2. Complains of forgetting location of objects. Subjecnve work difficulties
3. Decreasedjob funcnonine evident toco-workers. Difficulty in traveling to new locations. Decreased organizational capacity. *
4. Decreased ability to perform complex task. (e.g.. planning dinner for guests, handling personal finances, such as forgetting to pay bills, difficulty marketing, etc.)
5. Requires assistance in choosing proper clothing to wear for the day. season or occasion, (e.g. patient nay wear the same clothing repeatedly, unless supervised. *)
6. A) Improperly putting on clothes without assistance or cueing (e.g.. may put street clothes on over night cloths, or put shoes on wrong feet, or have difficulty buttomng clothing) (Occasionally or more frequently over the pas: weeks *)
   3) Unable to bathe properly (e.g., difficulty adjusting bath-water temperature) (Occasionally or more frequently over the past weeks. *)
   C) Inability to handle mechanics of toileting (e.g.. forget to flush the toilet, does no: wipe properly or properly dispose of toilet tissue) (Occasionally or more frequently over the past weeks. *)
   D) Urinary incontinence (Occasionally or more frequently over the past weeks •)
   E) Fecal incontinence (Occasionally or more frequently over die past weeks. ")
7. A) Ability to speak limited to approximately a half a dozen intelligible different words or fewer, in the course of an average day or in the course of an intensive interview.
   B) Speech ability is limited to the use of a single intelligible word in an average day or ui the course of an intensive interview (the person may-repeat the word over and over.)
   C) Ambulatory ability is lost (cannot walk without personal assistance.)
   D) Cannot sit up without assistance (e.g.. the individual will fall over if there are not lateral rests [arms] on the chair.)
   E) Loss of ability to smile.
   F) Loss of ability to hold up head independently.

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Appendix F.

CSffl

KENYATTA NATION ALHOSPITAL
Hospital Rd. along, Ngong Rd
P.O. Box 20723, Nairobi'
Tel: 726300-9
Fax: 7252>2
Telegrams: "MEDSUP", Nairobi.
Email: KNHplan@)^eniieQ|thneLorg

Ref: KNH-ERC/01/3186 Date: 15th December 2005

Dr. Solomon, Mark Mlamba
Faculty of Dental Science
University of Nairobi

Dear Dr. Mlamba,

RESEARCH PROPOSAL: "EVALUATION OF RANGE OF MORBIDITY AND QUALITY OF LIFE AMONG PATIENTS IRRADIATED FOR HEAD AND NECK CANCER" (P140/8_V2QQ5j

This is to inform you that the Kenyatta National Hospital Ethics and Research Committee has reviewed and **approved** revised version of your above cited research proposal for the period 15th December 2005 - 14th December 2006.
You will be required to request for a renewal of the approval if you intend to continue with the study beyond the deadline given.

On behalf of the Committee, I wish you fruitful research and look forward to receiving ^ summary of the research findings upon completion of the study.

This information will form part of database that will be consulted in future when processing related research study so as to minimize chances of study duplication-

Yours sincerely

PROF'/Cri GUANTAI ^ L / ^
SECRETARY. KNH-ERC ; 4/&Q ^

c.c. Prof. K.M.Bhatt,Chairperson,KNH-ERC
The Deputy Director CS, KNH
The HOD, Medical Records, KNH
Dean, Faculty Dental Sciences, UON
Chairman Dept of Oral and-Maxillofacial surgery
Supervisors: Drf ^india ML Dept of Oral and Maxillofacial su rgery UoN
Dif. Onyango J F, Dept of Oral and Maxillofacial surgery UOM
Df. Nya&ola L, Community Health UG)N

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