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Original Article

Health advisor facilitated mouth care regime for patients with head and neck cancers undergoing intensity-modulated radiotherapy

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Abstract

Aim: To develop a regime of care for patients with head and neck cancers undergoing intensity-modulated radiotherapy (IMRT), with the support of a health advisor (HA) and temporary access to the mouth care product Caphosol™.

Materials and methods: A HA was temporarily employed to assess, monitor and refer patients as appropriate and ensure patients received and utilised supplies of Caphosol™. A retrospective audit was undertaken to provide a gap analysis of current service. The data were used to develop a pro forma for documenting assessments and monitoring lifestyle factors for IMRT patients. Assessments referrals and compliance, plus hospital admissions owing to treatment-related issues, were documented during the baseline audit and the temporary HA service and provision of Caphosol™.

Results: The presence of a HA facilitated 100% compliance with appropriate assessments, referrals and adherence to treatment. The data suggests that the additional provision of Caphosol™ may have reduced levels of mucositis and associated pain.

Conclusion: It is recommended that a HA role be established within radiotherapy departments to facilitate lifestyle assessments, referrals and compliance with positive behaviour changes (e.g., stopping smoking). The use of Caphosol™ as a routine part of mouth care regime for IMRT patients also warrants further investigation.

Keywords: head and neck; intensity-modulated radiotherapy; mouth care; nasal; oral

INTRODUCTION

The Christie NHS Trust is based in North West England and provides specialist treatment to over 40,000 patients each year. A total of 602 patients received radiotherapy for cancer of the head and neck (HN) in 2013, resulting in 13,422 attendances. Radiotherapy techniques such as intensity-modulated radiotherapy (IMRT) and volumetric-modulated arc therapy have been implemented with the primary aim of improving tumour dose distribution, whereas sparing normal tissue.[1] This reduces radiotherapy-induced toxicities and improves patient compliance.

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The side effects of IMRT need to be explained and preventive advice given, along with instruction on good oral hygiene and advice on caries prevention.[2] This should be done alongside HN cancer specialist dieticians and appropriate counselling needs to be available to patients.[2] As the jaw, teeth, oral cavity and salivary glands will be affected by IMRT, it is recommended that patients have assessments as early as possible to maximise the time available for treatment.[3] An opportunity arose to evaluate the current mouth care regime with the appointment of a HN health advisor (HA).

LITERATURE REVIEW

Oral mucositis (OM) affects up to 100% of radiotherapy patients with HN malignancies[4] and begins 1–2 weeks following the onset of IMRT treatment.[2,4] OM is the thinning, inflammation, reddening and ulceration of the mucous membranes of the oral and upper gastrointestinal tract. OM can be extremely painful and is often described as a burning sensation, which can adversely affect a patient's daily functioning, quality of life, and may lead to local and systemic infections.[4] Even at lower grades there can be trouble maintaining nutrition, as the patient may experience taste disturbances and loss as a result of direct damage to taste receptors. Xerostomia is also common, and is caused by direct radiation damage to the cells of salivary glands, leading to difficulty with eating, resulting in weight loss. If OM is severe then swallowing may be inhibited to the extent that long-term use of gastrostomy or nasogastric (NG) tube is necessary.[2] OM may necessitate treatment gaps or a reduction in radiotherapy dosage, which would impact negatively on tumour control and patient survival. In addition, hospitalisation episodes necessary for facilitation of nutritional support put increased pressure on healthcare costs and resources.[5]

There are products available for the treatment of OM, but few are aimed at preventing OM from developing. The mouth care regime at the Trust before the re-audit focussed on the use of saline mouthwashes with sodium bicarbonate to help keep the mouth clean. Caphosol™ is not currently part of this regime with the Trust provided with a limited stock for a stage of the audit. Patients were also recommended to maintain fluids and nutrition, avoid smoking, drugs and alcohol and to take analgesia to keep the mouth comfortable. Opportunistic advice was given by health professionals but not routinely reinforced and monitored. Recent UK guidelines on the prevention of OM recommend the use of Caphosol™ (a neutral super-saturated calcium phosphate oral rinse) four to ten times daily from the first day of I MRT for patients at risk of mild, moderate and severe OM.[6] Caphosol™ has been approved by the Food and Drug Administration as a device to reduce OM symptoms[7] and associated pain, and has been shown to lower the incidence of NG feeding prevent OM-related hospitalisation.[5]

Patient risk factors for developing OM, along with its severity and duration include age, sex and genetic predisposition.[7] Other modifiable risk factors include dehydration, poor nutrition, smoking, use of alcohol, lack of motivation and inability to maintain oral health, as well as comorbidities, such as pre-existing dental problems. Providing health advice/support during IMRT can increase individuals' chances of going smoke free and abstaining from alcohol, which in turn will lessen side effects from IMRT and improve treatment compliance.[8,9]

However, it is recognised that patients with HN cancer often have significant social, environmental and psychological issues, which impact on treatment compliance and patient outcomes.[10] Patients with HN cancers typically have high levels of health-risk behaviours; they are usually heavy users of alcohol, frequently live alone, have poor nutrition and are heavy smokers.[11] A pooled analysis of 18 studies found that 72% HN cancers were attributed to alcohol and tobacco with the combination of smoking and heavy drinking having the highest risk.[12] It has been found that smoking during IMRT doubles mortality rates compared with quitting before treatment.[13,14] If smoking/use of tobacco continues patients with oral/nasal cavity tumours undergoing IMRT risk developing grade three or four radiation reactions within the oral

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cavity; which can result in hospitalisation to facilitate safe completion of IMRT, particularly if they live alone.

METHODOLOGY

The aim of this work was to:

(a) Review efficacy of current practice at assessing/monitoring patients' health-risk behaviours before and during IMRT.
(b) Evaluate enhanced service provision based on comparison with the data obtained from (a).

Baseline audit

The baseline audit sought to identify the number of patients that received documented pre-treatment assessments for risk factors associated with radiation reactions, and whether they were referred for support from relevant Trust personnel. Mosaiq (a complete patient information management system) and medical notes were used to identify patients who had undergone IMRT for HN tumours over a 6 months period (3 January–6 June 2012). As funding for the project was available for a 12-month period only, this time-frame was chosen to match the two stages of the re-audit. The notes were retrospectively audited for documented baseline assessments of health-risk behaviours (alcohol, smoking, drugs, dental and diet) and hospital admissions during treatment, with 96 patients identified.

The audit suggested that documented pre-treatment assessments relating to risk factors for degree of radiation reaction and admission during treatment were inadequate or absent (Table 1). Other than pre-treatment smoking and alcohol assessments none of the other pre-treatment assessments were routinely carried out. Referral data are addressed within relevant sections of this paper.

Table 1. Pre-treatment assessments documented during the baseline audit

Assessments (%)	Yes	No	No info	No data
Smoking	80	18	1	1
Alcohol	76	17	3	4
Drugs	1	86	0	13
Dental	16·5	70	0	13·5
Dietician	6	78	0	16

Intervention and re-audit

(1) Data from the initial audit were used to develop a standardised pro forma for documentation of baseline screening assessments, triaging of referrals for appropriate support and weekly monitoring of lifestyle factors for all IMRT patients as follows:

- Social circumstances.
- Smoking, alcohol and drug habits.
- Psychological assessments using the Hospital Anxiety and Depression Scale. Trigger scores (11–21 for abnormal cases) were used to facilitate immediate referral for psychological support, if required. This has been confirmed as a valid and reliable tool for use in medical research, hospitals and primary care practices.[15]
- Memory/dementia assessments in patients over 75 years.
- Monitoring oral health (including treatment-related mucositis) using the Common Terminology Criteria for Adverse Events (CTCAE) grading system.
- Monitoring nutritional status (including placement of any NG tubes).
- Documenting treatment-related admissions.
- Signature sheet to ensure all patients provided with Caphosol™.

(2) A HA was employed within the Radiotherapy department to see all new HN patients who were attending the treatment planning clinic to give written consent for their treatment. The HA had an individual copy of the pro forma for each patient and following consent, reviewed all IMRT patients on a weekly basis to monitor their progress.
(3) One box of Caphosol™ and instructions for use were given by the HA at consent for commencement on the first day of treatment. The HA then monitored compliance on a weekly basis. Further supplies of Caphosol™ were provided as required at the weekly checks.

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(4) A prospective re-audit was conducted approximately 1 year after the changes were put into effect. There were two stages of the service evaluation; during stage 1, new patients received Caphosol™ in addition to the on-going support of the HA; during stage 2 previously mouth care regime was re-instated but the support from the HA

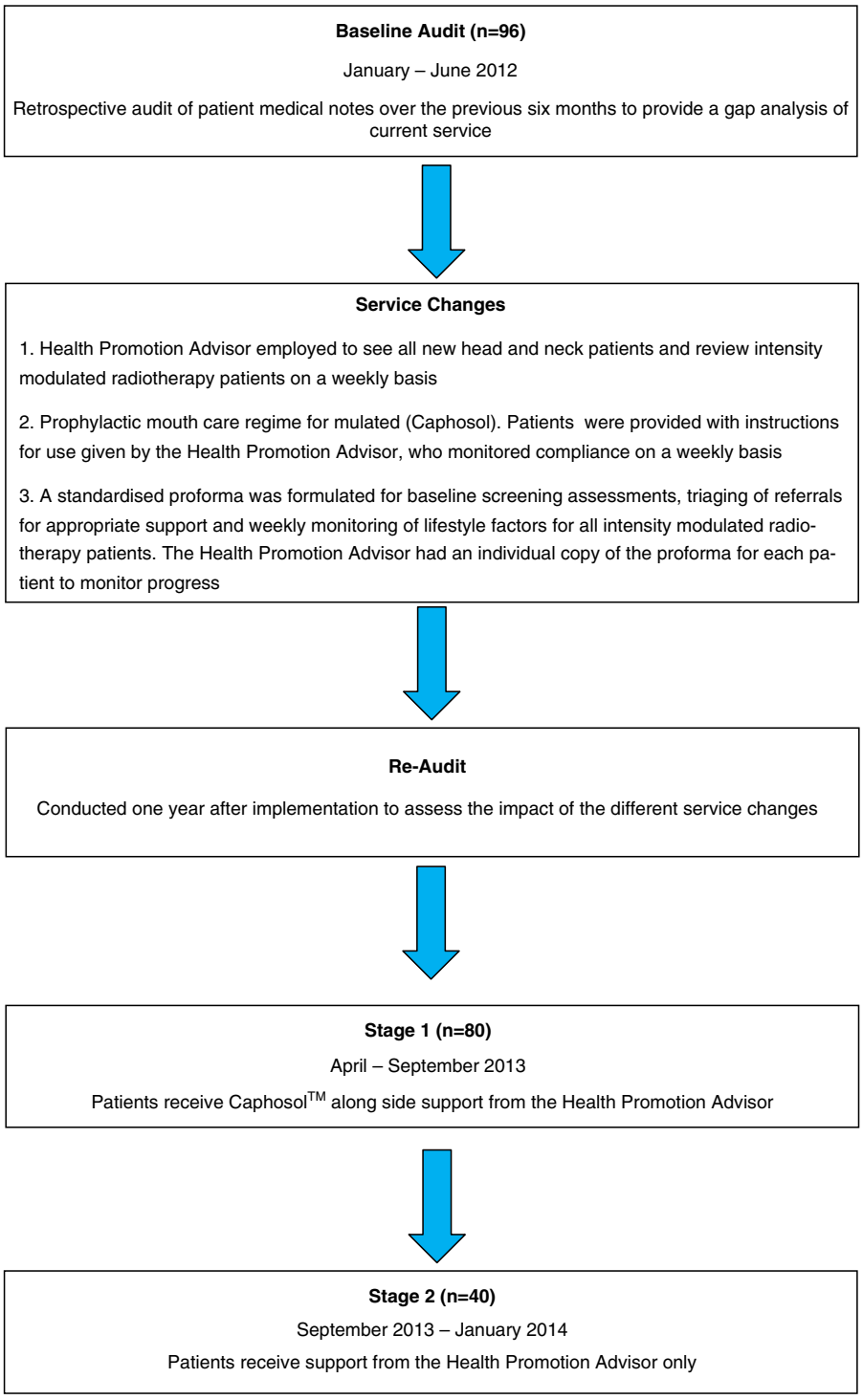

Figure 1. Flow chart of the audit process.

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continued (Figure 1). The rationale for the two stages being to assess impact of the different aspects of the service changes as follows:

- To identify whether Caphosol™ appeared to offer benefit beyond the previous mouth care regimen.
- To evaluate the role of a HA in facilitating assessments and appropriate referrals being completed, in relation to smoking, alcohol, drugs and psychological distress before patients starting their IMRT regimen.
- To monitor compliance with reduction in health-risk behaviours before and during treatment along with any changes in patterns of admission as a consequence.

The proposal for this two stage audit was submitted and approved by the Trust Audit Committee.

Study population for intervention

The study population for intervention was a convenience sample; this was all patients owing to start IMRT recruited before the start of treatment. Stage 1 recruited 80 patients and ran from 16 April to 17 September 2013. Stage 2 enrolled 40 patients and ran from 24 September 2013 to 28 January 2014.

RESULTS

The final sample includes patients with completed pro formas only (Table 2); an additional four patients started the protocol, however, two passed away before treatment completion, one patient withdrew after discontinuing IMRT and one patient in stage 2 received Caphosol™ from their General Practitioner and was excluded.

Table 2. *Patient demographics*

Audit	Sex (% male/female)	Age (years) Mean	Range
Baseline (n = 96)	70/30	62	23–87
Stage 1 (n = 80)	75/25	60	37–86
Stage 2 (n = 40)	67·5/32·5	61	47–85

Pre-treatment assessments

Pre-treatment assessments were completed for all patients during stage 1 of the re-audit, meeting the target of 100% compliance. During stage 2, pre-treatment assessments were undertaken for all patients (100% compliance) for alcohol assessments, and for 97·5% of patients for smoking, drugs and dietician assessments.

Referrals Before Active Treatment

There was a substantial increase in the number of referrals to relevant teams during both stages of the intervention. In total, 3% of current smokers were referred for smoking cessation support at baseline, rising to 79% during stage 1 of the intervention (the remaining 21% made the change themselves and did not require referral) and 100% during stage 2. Similarly, none of the heavy drinkers (defined by the inability to function without alcohol assessed using the AUDIT-C[16]) were referred for alcohol cessation support during the baseline audit. During stage 1 of the intervention 80% of heavy drinkers were referred (the remaining 20% made the change themselves) and 100% during stage 2 (Figure 2).

Psycho-oncology referrals occurred in 2% of patients within the baseline audit period compared with 23% during stage 1 and 10% during stage 2 of the intervention. The 'CALM' service (which uses a variety of therapies such as hypnotherapy to assist patients in remaining calm and compliant through treatment) saw an increase in the number of referrals; 3% of patients were referred during baseline, rising to 24% during

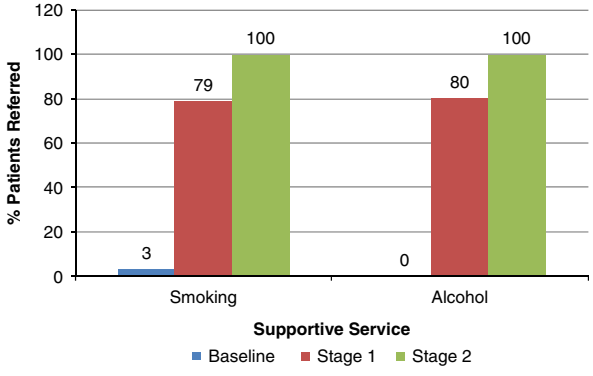

Figure 2. Patient referrals before active treatment.

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Table 3. Patient referrals before active treatment

Referrals (%)	Baseline Yes	Baseline No	Baseline No data	Stage 1 Yes	Stage 1 No	Stage 2 Yes	Stage 2 No
Macmillan support	10	72	18	4	96	5	95
Psych-oncology	2	75	23	23	77	10	90
CALM[a]	3	74	23	24	76	27·5	72·5
Social services	4	76	20	0	100	0	100

[a]*Note*: The 'CALM' service uses a variety of therapies such as hypnotherapy to assist patients in remaining calm and compliant through treatment.

stage 1 and 27·5% during stage 2 of the intervention (Table 3).

Admissions

During the baseline audit, 58% of patients were admitted to the hospital; this dropped by 13 to 45% in stage 1 of the intervention but increased to 60% during stage 2. The baseline audit revealed poor nutrition as a major risk factor for hospital admission, during all three stages of the work.

Data collected from patients admitted during their treatment showed the numbers of current smokers and drinkers dropped and there were higher numbers of 'previous' drinkers and smokers in the two intervention stages (Figures 3 and 4).

Nutrition support

At baseline the total number of bed days for patients admitted with the primary reason of nutrition support ranged between 1 and 34 days (median of 11). During stage 1 of the re-audit, the range was 1–25 days; a reduction of 9 days for the maximum length of stay. During stage 2, although the maximum length of stay for nutrition support had further reduced to 23 days, the minimum length of stay had increased to 7 days.

During the baseline audit, NG tubes were fitted from the start of IMRT, with the majority (37%) fitted between fractions 21 and 25. Patients treated within the intervention stages delayed the requirement of an NG tube as none were required until at least fractions 11–15, with the majority being fitted during fractions 26–30 (Figure 5).

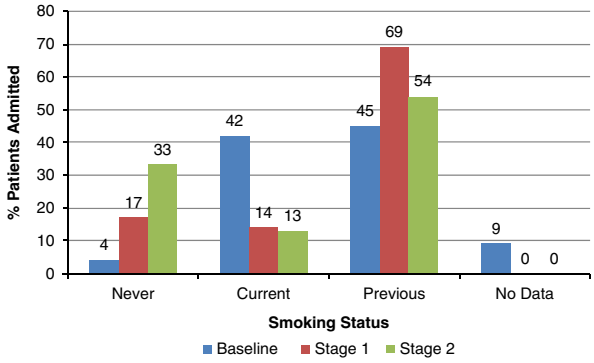

Figure 3. Patient admissions defined by smoking status.

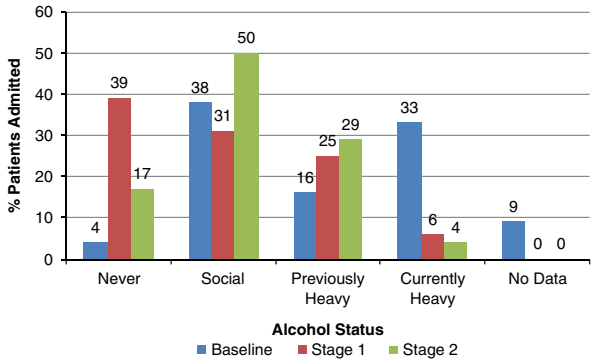

Figure 4. Patient admissions defined by alcohol status.

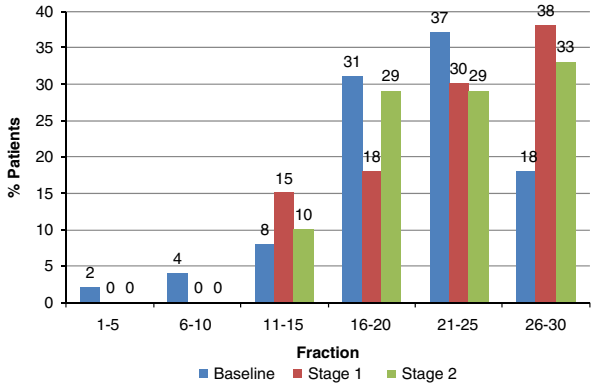

Figure 5. Fraction when nasogastric tubes were fitted.

Pain

Maximum levels of pain experienced (determined by the CTCAE grading system) were documented. At baseline and during

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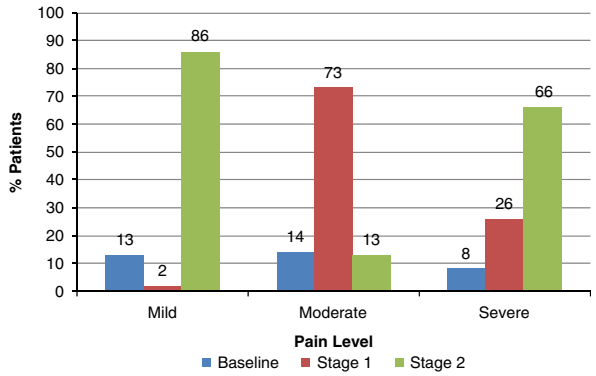

Figure 6. The maximum pain level experienced by patients.

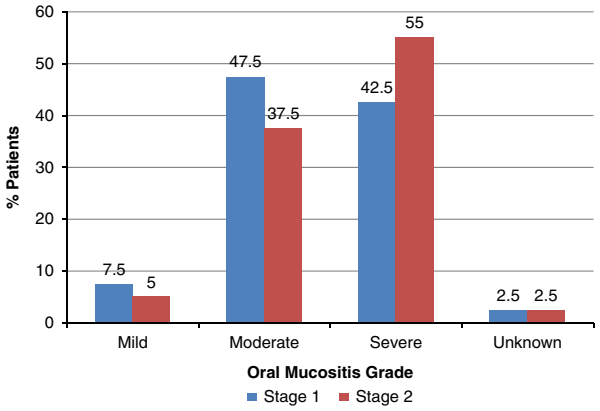

Figure 7. The maximum grade of mucositis experienced by patients.

stage 2 of the intervention, severe was reported most commonly by patients as the greatest level of pain experienced (85 and 66%, respectively). Comparatively, during stage 1 of the intervention, moderate was the highest reported (73%) maximum degree of pain experienced (Figure 6).

OM

Maximum levels of OM experienced were documented. The baseline results were not included as there was no consistent documentation of data. During stage 2 of the intervention, severe was reported most commonly (55%), whereas during stage 1 of the intervention, moderate was the highest reported (47·5%) maximum degree of OM experienced (Figure 7).

DISCUSSION

Recent commissioning for quality and innovation work in the HN radiotherapy unit of the Trust identified a potential role for a HA with additional responsibilities to assess and guide patients in oral care and positive lifestyle changes.

Our baseline audit identified smoking as a health-risk behaviour with implications for compliance with and completion of treatments; 87% of patients admitted had a history of smoking. Both stages of the intervention reflected these findings, as 83% of patients admitted during stage 1 and 67% during stage 2 gave a history of smoking. The fall in percentage of current smokers between baseline and stage 1, which was maintained at stage 2, suggests the effectiveness of smoking cessation interventions and the on-going support and encouragement provided by the HA (Figure 3).

The baseline audit identified alcohol consumption as a risk behaviour and possible factor for requiring admission with 49% of patients admitted having a history of heavy drinking, either previously or currently. As with data on smoking, these findings were replicated during both stages of the intervention with 31% of patients admitted during stage 1 and 33% during stage 2 having a history of heavy drinking. A large proportion (38, 31 and 50%, respectively) of the total number of admissions were social drinkers suggesting that any consumption of alcohol can make the mucosa of the mouth and throat sore and harder to keep clean, increasing the need for admission. The drop in percentage of current heavy drinkers in both stages of the intervention would indicate that on-going support helps patients to better comply with recommendations to reduce levels of alcohol consumption (Figure 4).

There is a marked drop in perceived levels of pain during stage 1 of the intervention (Figure 6) along with a reduction in the severity of OM (Figure 7), suggesting that Caphosol™ has a role in reducing the level of pain induced by tissue damage through IMRT. Oral comfort and pain can severely compromise quality of life for IMRT patients.[4] A review of oral regimes in

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cancer care did identify a continuing gap in the available body of research, and acknowledged that in practice there is a lack of monitoring and support.[17] United Kingdom Oral Mucositis in Cancer Group make numerous recommendations for mouth care during IMRT, however, some of this is directed towards the carer or health professional to carry out.[6] From this project our HA facilitated 100% departmental compliance with health and oral hygiene assessments and referral onto appropriate services. Referrals to psych-oncology and CALM were increased but adequately managed between baseline and the two stages of the study (Table 3).

Given the high rates of smoking and alcohol use among the HN IMRT population,[12] our results suggest that a HA has a role in helping patients to abstain from smoking and reduce/manage alcohol dependency; this support could play an important role physically and psychologically during IMRT. As a result of this audit experience, it has been recommended that this temporary post become a permanent position, within the radiotherapy department. It is also proposed that the role be extended to periods of hospitalisation, during which patients have access to on-going support by the HA to maintain reduction in health-risk behaviours and to ensure continuity of care. The data also indicate the possibility that use of Caphosol™ limits the level of pain experienced by patients undergoing IMRT. Such findings would point to an improvement in patients' wellbeing at a time of physical distress and as such increase motivation to successfully complete the regimen. In light of these findings, it is therefore also proposed that departments offering IMRT should consider the potential benefits of all patients undergoing this treatment being prescribed Caphosol™ prophylactically, with weekly patient diary being used to monitor compliance.

LIMITATIONS

This evaluative work was not conducted as a formal randomised study and as such there are weaknesses in the data and its collection. In addition, the validity of patients responses with regard to reduction in health-risk behaviours cannot be confirmed as an objective assessment could not be made. One way to explore these factors would be to monitor patient outcomes longitudinally, which was beyond the scope of this work. Caphosol™ provision was limited to one stage of the project. As the participants were a convenient sample it was not possible to match the demographic variables of the baseline audit.

CONCLUSION

The data from this work provides information, that can be used to further develop best practice in IMRT for HN patients. Certain aspects were identified as key to this process. First, the availability of a HA in the clinic to assess patients and facilitate compliance with prescribed oral care and reduction in health-risk behaviours. Second, the implementation of the assessment pro forma for patients with HN cancer; this has now been easily adopted within the Trust and ensures a comprehensive assessment of all patients. Finally, the intervention has produced data to consider recommending the use of Caphosol™ as part of mouth care regime in this patient cohort.

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Conflicts of Interest

None.

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