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Scientific Article

Trajectory of Anxiety Related to Radiation Therapy Mask Immobilization and Treatment Delivery in Head and Neck Cancer and Radiation Therapists' Ability to Detect This Anxiety

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Abstract

Purpose: Receiving radiation therapy treatment with an immobilization mask is a source of anxiety in people with head and neck cancer (HNC). This study aimed to document the trajectory of situational anxiety during HNC treatment delivery and explore radiation therapists' (RTs') ability to identify it.

Methods and Materials: Participants with HNC commencing radiation therapy completed the state-trait anxiety inventory at their mask-making session, and once each week immediately before and after their radiation treatment. Treating RTs independently rated their perception of participant's anxiety at the same time points. Participant- and RT-rated anxiety scores were calculated at each time point together with the proportion of participants reporting clinically significant anxiety (state-trait anxiety inventory ≥ 40). Intraclass correlations were calculated to assess concordance between participant- and RT-ratings.

Results: Sixty-five participants and 16 RTs took part in this study. Participants were classified into 1 of 5 trajectory groups: stable high (16%), increasing (19%), decreasing (27%), fluctuating (19%), and no anxiety (19%). Nearly half (43%) of participants reported clinically significant anxiety before their mask-making session, and between 30% and 43% across trajectories reported significant anxiety immediately before treatments. Intraclass correlation values indicated poor agreement between participant- and RT-ratings.

Conclusions: Situational anxiety is prevalent in people receiving HNC radiation therapy with mask immobilization. RTs did not reliably capture patients' situational anxiety. There is no single best time point to provide intervention, suggesting people should be screened for anxiety regularly throughout their treatment. Resources and education should also be available to improve RT skills in providing psychosocial support.

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Introduction

Radiation therapy is an important treatment modality for people with head and neck cancer (HNC), but treatment practicalities and disease-specific side effects and functional impairments can lead to high levels of emotional distress.[1] The literature suggests a large proportion of people treated for HNC experience baseline symptoms of anxiety and depression, reporting some of the highest distress levels of all patients with cancer.[2-5]

An aspect of radiation therapy specific to HNC treatment is the use of a thermoplastic immobilization mask to secure the patient, restrict movement, and provide greater treatment accuracy.[6] Although the mask is anecdotally recognized to induce high levels of situational anxiety and claustrophobia, patient experiences are diverse and there is limited understanding of the degree to which these masks affect people's psychosocial outcomes. Nixon et al[7] reported a quarter of patients with HNC rated themselves as experiencing some mask anxiety and later found 22% of patients had persistent anxiety throughout treatment. Clover et al[8] found 24% of patients in their cohort had their first radiation treatment session disrupted due to anxiety.

Radiation therapists' (RTs') daily interaction with patients over several weeks puts them in a unique position to recognize patient anxiety and provide support. Interactions between RTs and patients are important in influencing treatment experience, and the nature of these relationships can increase or decrease situational anxiety.[9,10] However, concordance between RTs' assessment of patient anxiety and patient experience is understudied. Oultram et al[11] investigated concordance in patient and RT mask anxiety ratings during patients' mask-making session and the first day of treatment, reporting only slight agreement between patient- and RT-ratings. Often, health professionals see managing the physical side effects of radiation therapy as a higher priority than psychosocial health, and it can be difficult for RTs to detect and discuss anxiety with patients.[10,12] Adding to this challenge is the suggestion patients may conceal mental health concerns from health practitioners until they are unable to cope.[13] Furthermore, radiation treatment schedules for HNC are often up to 7 weeks, and given patients' anxiety may vary across that time, it can be particularly challenging to judge the optimal time to intervene.[10,14,15]

Although there is evidence quality of life in people with HNC is lowest during diagnosis and treatment,[13] the trajectory of situational anxiety, including mask-specific anxiety, throughout radiation therapy is unclear beyond early in the treatment pathway. Nixon et al[7] provided one of the only studies to follow mask anxiety throughout radiation treatment, finding situational anxiety generally decreases as treatment progresses. More information about situational anxiety trajectories is needed to inform intervention strategies. Thus, our study aimed to document the trajectory of situational anxiety in people with HNC undergoing radiation therapy with mask immobilization and explore RTs' ability to identify it.

Methods and Materials

This was a prospective, longitudinal cohort study.

Participants

RTs employed at 2 radiation oncology treatment centers (Crown Princess Mary Cancer Centre, Westmead and Blacktown Cancer and Haematology Centre) within Western Sydney Local Health District participated in the health professional (RT) component of the study.

All adults scheduled to receive curative intent (60-70 Gy in 30-35 fractions) or high dose palliative (50-55 Gy in 20-25 fractions) radiation therapy for HNC and who possessed sufficient proficiency with written English to complete questionnaires were invited to participate in this study. All participants provided informed consent. This study received ethical approval from Sydney Local Health District Human Research Ethics Committee and site-specific approval from both institutions.

Procedures and measures

Participants completed hard copy baseline assessment forms detailing demographics, and medical records were reviewed to confirm tumor characteristics, medical conditions, and other cancer treatments. Date of cancer diagnosis as well as start and end dates of radiation therapy were also recorded.

Participants completed the hospital anxiety and depression scale (HADS), a self-rated measure designed to detect anxiety and depression in the general medical population,[16] at baseline. Given anxiety is often multifactorial in people with HNC, the HADS was administered to document the prevalence of generalized anxiety, in addition to situational anxiety as measured by the state-trait anxiety inventory (STAI).

The STAI is a short-form, 6-item version of the inventory developed by Spielberger et al[17] and shortened by Martaeu and Bekker[18] (Supplementary Materials). The items are rated on a 1 to 4 Likert scale, summed, multiplied by 20 and divided by 6, generating a total STAI score ranging from 20 to 80. Higher scores indicate higher anxiety and scores ≥ 40 indicate clinically significant levels of anxiety.[17] Each week during radiation treatment, before and after treatment sessions, participants completed the STAI assessing situational anxiety. The primary endpoint

was change in situational anxiety scores across the treatment trajectory. As the duration of the radiation therapy course could vary, an end of treatment (EOT) score was calculated to incorporate week 6 or 7 responses to best represent the final score. Note that patients who underwent high dose palliative treatment regimens may have had EOT ratings before this time and were not included in EOT scores.

Patients completed the baseline questionnaires in a private room. The weekly STAI questionnaires administered during treatment were completed in a semiprivate waiting area immediately outside the treatment room and away from the main waiting room. These questionnaires were administered on a Thursday, to avoid days on either side of a weekend and when patients may have been receiving other treatments such as concurrent chemotherapy (which is administered on Monday or Tuesday at both institutions).

RTs rated their perception of each participant's level of anxiety during treatment sessions by completing a study-developed single item rating scale of patient anxiety, using a 4-point Likert scale (Supplementary Materials). RT ratings were performed once a week, on the same day the participant completed the STAI.

There were always 2 RTs involved in each patient's daily treatment delivery. Once the patient was positioned with the immobilization mask, the RTs would leave the room to deliver the radiation treatment within the console area. One of the RTs would complete the RT questionnaire based on their own perception of the patient's anxiety specific to that day's treatment session, from time of positioning to treatment delivery.

Statistical analysis

Mean, standard deviation (SD), and median patient- and RT-rated anxiety scores were calculated at each assessment time point as well as the proportion of patients reporting clinically significant anxiety (ie, STAI scores $\geq$ 40). Paired samples *t* tests were performed to compare patient-reported anxiety ratings pre- and posttreatment. Intraclass correlations (ICCs) were calculated to assess concordance between patient- and RT-rated anxiety immediately before each treatment session. ICC estimates and their 95% confidence intervals were based on single measures, absolute agreement, 2-way mixed-effects models. For this analysis RT ratings were standardized to the same scale as the patient-ratings, by multiplying the raw RT ratings by 20. ICC values less than 0.5 are indicative of poor agreement, values between 0.5 and 0.75 indicate moderate agreement, values between 0.75 and 0.9 indicate good agreement, and values greater than 0.90 indicate excellent agreement.[19]

Patients who completed at least 4 STAI assessments were categorized into the following trajectory groups based on overall pattern and magnitude of change in anxiety they reported from baseline (pre mask making session) and throughout treatment, using these classification rules:

- No anxiety: STAI scores <35 at pre mask-making session, remaining <35 throughout treatment.
- Decreasing anxiety: Clinically meaningful decrease in STAI score from baseline to end of treatment, defined by a decrease of $^1/_2$ SD[20] or a decrease from above to below the clinical threshold of 40.
- Fluctuating anxiety: Overall pattern of fluctuating anxiety with an STAI $\geq$ 40 at 1 or more time points throughout treatment.
- Increasing anxiety: Clinically meaningful increase in STAI score from baseline to end of treatment, defined by an increase of $^1/_2$ SD[20] or an increase from below to above the clinical threshold of 40.
- Stable high anxiety: STAI score remaining above the clinical threshold of 40 from baseline to end of treatment.

Statistical analysis was performed with IBM SPSS Statistics version 24.

Results

Sixty-five patients with HNC (83% male; mean age, 62.02; SD, 12.1; range, 29-89 years) were recruited from August 2017 through December 2019. Participant characteristics are displayed in Table 1. Thirty-seven patients completed all STAI assessments, 10 had intermittent missed assessments, and 18 were lost to follow-up. All 16 RTs approached took part (56% male; mean age, 29.44; SD, 5.24; range, 21-40 years) and their mean oncology experience was 6.42 years (SD, 4.78; range, 0.75-15 years).

Baseline generalized anxiety and depression

Eighteen percent (n = 12) of participants scored above the clinical threshold of 11 on HADS anxiety at baseline (mean, 6.49; SD, 4.68) and 18% (n = 12) scored above the clinical threshold of 11 on HADS depression (mean, 6.69; SD, 4.24). Four participants (6%) scored above the clinical threshold for both generalized anxiety and depression at baseline.

Patient-reported situational anxiety and trajectory groups

Nearly half (43%) of participants reported clinically significant levels of situational anxiety (STAI score $\geq$ 40) before their mask-making session (baseline). Immediately before weekly treatments, 30% to 43% of participants

Table 1 Demographic and disease characteristics of the patient study sample (n = 65)

	M (SD)	Range
Age (y)	62.02 (12.10)	29-89
Total dose of radiation therapy (Gy)	62.28 (7.53)	36-70
Number of fractions of radiation therapy	30.70 (4.74)	20-35
	n	%
Gender		
Female	11	17
Male	54	83
Marital status		
Married/de facto	46	70
Separated/divorced	9	14
Single	9	14
Missing	1	2
Highest education qualification		
Year 10 or below (intermediate)	12	18
Year 12/High School Certificate (leaving)	13	20
Technical and Further Education (TAFE) certificate/diploma	11	17
University degree	12	19
Missing	17	26
Employment status		
Employed	28	43
Unemployed	7	11
Permanently unable to work	2	3
Retired	25	38
Student	1	2
Missing	2	3
Country of birth		
Australia	47	72
Other	17	26
Missing	1	2
Language spoken at home		
English	54	83
Other	11	17
Other chronic medical conditions		
Yes	28	57
No	37	43
Type of cancer		
Oral cavity	12	18
Salivary	13	20
Skin	3	5
Oropharynx	24	36
Hypopharynx	1	2

(*continued on next page*)

Table 1 (*Continued*)

	M (SD)	Range
Oropharynx/hypopharynx	1	2
Larynx	5	8
Nasopharynx	2	3
Unknown primary	4	6
Disease stage		
Stage I	3	5
Stage II	2	3
Stage III	10	15
Stage IV	50	77
Treatment intent		
Curative	53	82
Palliative	12	18
Previous surgical treatment		
No	28	43
Yes	32	49
Missing	5	8
Previous radiation treatment		
No	54	83
Yes	6	9
Missing	5	8
Previous chemotherapy		
No	57	87
Yes	3	5
Missing	5	8
Concurrent chemotherapy		
No	29	44
Yes	27	42
Missing	9	14
Smoking status		
Never smoked	19	29
Smoked in the past	32	49
Currently smoke	8	13
Missing	6	9

Abbreviations: M = mean; SD = standard deviation

reported clinically significant STAI scores. On average, pretreatment anxiety ratings were highest at baseline (M, 40.82; SD, 15.83) and lowest immediately following their final treatment (M, 30.14; SD, 12.43). Table 2 displays participant-reported situational anxiety throughout treatment.

At each weekly treatment, participant-reported situational anxiety was lower immediately after treatment compared with immediately before treatment. The reductions, 2.05 to 3.27 points on average, were statistically significant at weeks 1, 2, and 5 (range confidence interval 95% [0.19, 6.26]) as shown in Table 3.

Using the rules described, participants who completed at least 4 STAI assessments (n = 57) were categorized into trajectory groups as follows: no anxiety (n = 11, 19%), decreasing anxiety (n = 15, 27%), increasing anxiety (n = 11, 19%), fluctuating anxiety (n = 11, 19%), and stable high anxiety (n = 9, 16%). The mean anxiety

Table 2 Patient-reported anxiety STAI (mean, SD, median, and percentage scoring above the clinical threshold of 40)

STAI (score range 20-80)					
	n	M	SD	Md.	STAI > 40 (%)*
Baseline	61	40.82	15.83	40.00	43 (26/61)
W1 Pretreatment	54	37.53	15.13	38.33	43 (23/54)
W1 Posttreatment	53	34.40	13.93	33.33	26 (14/53)
W2 Pretreatment	57	34.56	13.39	33.33	32 (18/57)
W2 Posttreatment	57	32.51	12.91	30.00	23 (13/57)
W3 Pretreatment	56	33.99	13.20	33.33	32 (18/56)
W3 Posttreatment	57	32.87	12.46	30.00	30 (17/57)
W4 Pretreatment	57	34.27	13.42	36.67	30 (17/57)
W4 Posttreatment	57	33.16	12.78	30.00	26 (15/57)
W5 Pretreatment	54	35.31	14.53	33.33	37 (20/54)
W5 Posttreatment	54	32.04	13.67	25.00	24 (13/54)
EOT Pretreatment	46	30.72	12.03	25.00	33 (15/46)
EOT Posttreatment	47	30.14	12.43	23.33	28 (13/47)

Abbreviations: EOT = end of treatment; M = mean; Md = median; SD = standard deviation; STAI = state-trait anxiety inventory; W = week.
* Number of patients with clinical levels of anxiety

ratings for each trajectory group are depicted in Table 4 and Figure 1. The no anxiety group had a mean STAI score of 24.00 (SD, 4.67) at baseline, which was the highest mean score in that trajectory group. The decreasing anxiety group reported clinically significant levels of anxiety at baseline (mean, 49.74; SD, 11.26); however, all subsequent weekly treatment mean scores were below the clinical threshold of 40. The increasing anxiety group had a low baseline mean score of 31.21 (SD, 6.37) and a mean score of 42.08 (SD, 7.96) immediately before week 1 treatment, with mean scores increasing to 46.36 (SD, 6.05) at EOT. The fluctuating anxiety group mean scores were below the clinical threshold at all time points, likely because participant scores fluctuated at different time points and mean scores therefore masked fluctuations above 40 in this group. Finally, the stable high group reported STAI scores consistently above the clinical threshold of 40, with a baseline mean score of 56.67 (SD, 10.54) and the lowest mean score reported at EOT (mean, 45.83; SD, 3.19).

Concordance between patient- and RT-rated situational anxiety

ICCs between patient- and RT-rated anxiety before each weekly treatment are displayed in Table 5. ICC

Table 3 Means and SDs for each anxiety trajectory group

	No anxiety (n = 11)		Decreasing anxiety (n = 15)		Increasing anxiety (n = 11)		Fluctuating anxiety (n = 11)		High anxiety (n = 9)	
	M	SD	M	SD	M	SD	M	SD	M	SD
Baseline	24.00	4.67	49.74	11.26	31.21	6.37	35.15	12.24	56.67	10.54
W1	23.64	4.58	39.05	13.86	42.08	7.96	29.67	14.18	56.30	7.89
W2	20.61	1.35	37.11	13.50	34.00	8.72	33.33	10.42	49.26	13.92
W3	21.52	3.11	31.78	11.40	37.67	10.89	33.67	11.38	50.74	9.97
W4	21.82	3.45	32.67	10.99	42.12	7.93	27.88	11.08	50.37	12.30
W5	23.64	4.58	30.51	11.21	42.73	12.09	31.52	12.86	54.17	11.65
EOT	21.00	3.16	24.81	5.30	46.36	6.05	23.33	5.44	45.83	3.19

Abbreviations: EOT = end of treatment; M = mean; SD = standard deviation; W = week.

Table 4 Results from paired sample *t* tests comparing patient-reported anxiety pre- and posttreatment sessions

		Pretreatment patient-reported anxiety		Posttreatment patient-reportedanxiety				
	n	M	SD	M	SD	*P* value	Mean difference	CI for difference
W1	53	37.80	15.15	34.40	13.93	.021*	3.40	0.53, 6.26
W2	57	34.56	13.39	32.51	12.91	.031*	2.05	0.19, 3.90
W3	56	33.99	13.20	33.10	12.45	.379	0.89	-1.12, 2.91
W4	57	34.27	13.41	33.16	12.78	.384	1.11	-1.43, 3.65
W5	54	35.31	14.53	32.04	13.67	.005*	3.27	1.02, 5.52
EOT	46	30.72	12.03	29.64	12.07	.113	1.09	-0.27, 2.44

Abbreviations: CI = confidence interval; EOT = end of treatment; M = mean; SD = standard deviation; W = week.
* $P < .05$
Higher scores indicate higher anxiety.

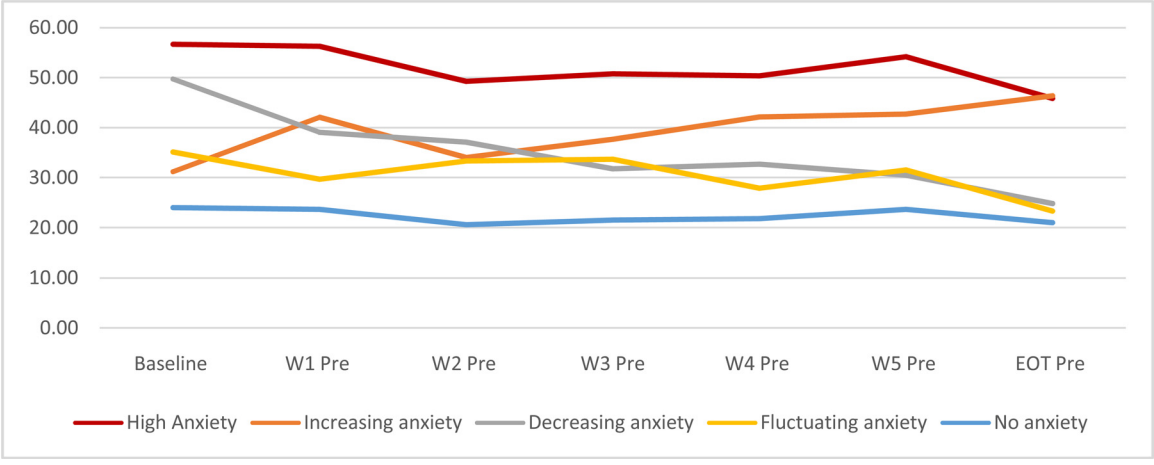

Figure 1 Mean state-trait anxiety for each trajectory group. EOT = end of treatment; Pre = pretreatment; W = week.

Table 5 Results from ICC between patient-reported versus RT-rated anxiety

			95% confidence interval		F test With True Value 0			
	n	ICC*	Lower bound	Upper bound	Value	df1	df2	Sig
W1	48	.488	.244	.676	2.944	47	47	<.001
W2	52	.563	.333	.726	3.895	51	51	<.001
W3	50	.287	.029	.514	1.943	49	49	.011
W4	51	.356	.047	.593	2.592	50	50	<.001
W5	47	.565	.162	.774	4.989	46	46	<.001
EOT	40	.020	-.264	.312	1.044	39	39	.447

Abbreviations: df = degrees of freedom; EOT = end of treatment; ICC = intraclass correlation; RT = radiation therapist; SD = standard deviation; Sig = significance; W = week.
* ICC based on single measures.

values indicated moderate interrater agreement at weeks 2 and 5; at all other treatment sessions ICCs indicated poor agreement (ie, ICC values < .50). Further examination with paired samples *t* tests suggests that this lack of correlation may be due to RTs underestimating patient situational anxiety at all time points, but due to the differences in reporting scales, this analysis should be interpreted with caution.

Discussion

This study aimed to document trajectories of situational anxiety in people with HNC undergoing radiation therapy with mask immobilization and demonstrated that patient-reported mean anxiety was highest at baseline and generally decreased over the course of radiation treatment. Nearly half of the participants in this sample (43%) had clinical levels of anxiety before their mask-making session and at week 1 of treatment, which decreased to one-third by the EOT. This suggests patients may experience habituation, a process where patients report less anxiety as they become accustomed to wearing the mask and become familiar with the treatment delivery process.[21,22] An additional explanation is that as patients develop rapport with RTs, trust is established and anxiety decreases. This is supported by Elsner et al[23] and Halkett and Kristjanson,[24] who found the relationship between patients and RTs is important in treatment experience and health-related quality of life. On average, situational anxiety dropped from just before to immediately after the daily treatment was delivered. Although there was no qualitative investigation as to why this reduction occurred, the difference may be due to the removal of the mask or finishing that day's treatment itself, that is, patients may have felt an immediate decrease in anxiety once each daily radiation treatment was over. To our knowledge, this study is the first to investigate immediate change in situational anxiety pre- and posttreatment in patients with HNC. Further studies are needed to confirm these findings.

An important finding to emerge from this study was that clinical levels of HADS anxiety were found in 18% of patients at baseline. Although it is acknowledged that generalized anxiety may have contributed to situational anxiety, it is possible that the HADS scores were actually influenced by situational anxiety in anticipation of the mask, given baseline questionnaires were administered just before the participants' mask-making session. Nevertheless, our findings highlight the likely multifactorial nature of anxiety in people with HNC and that diagnosis, disfigurement, impairment of function, and social isolation all contribute to poorer psychosocial health in this group.[21] A qualitative component in the baseline and trajectory assessments would better determine the root of anxiety in people with HNC undergoing radiation therapy.

Investigation into participants' individual trajectories indicated that anxiety patterns were diverse and varied between individuals, which is supported by qualitative literature.[14] Similar results were reported by Nixon et al,[7] who found that although the highest proportion of participants experienced mask habituation, experiences are individualized, and the timing of screening and intervention must reflect this. Classifying patient experiences into trajectory groups allowed for acknowledgment of anxiety patterns that would otherwise be overlooked if reporting total mean anxiety scores.[25] It also gives the opportunity to determine baseline predictors of anxiety for each trajectory group, which would be a valuable tool clinically for identifying potentially more vulnerable people to provide early intervention. As such, further research should examine the links between baseline predictors and differences in trajectories of situational anxiety in people with HNC.

The smallest trajectory group, stable high, still accounted for 16% of participants. There is no question that those who experience stable high anxiety require early psychosocial intervention, and patients scoring within the clinical range on the STAI at baseline should be considered high-risk and flagged for early psychological referral. Heyda et al[3] linked depression and pain to a decrease in local disease control and overall survival in patients having radiation therapy, which further supports the need for early detection.

Perhaps the more challenging cohort, however, is the increasing anxiety trajectory (19%), where patients did not necessarily experience obvious emotional distress at baseline but experienced an increase in situational anxiety as treatment progressed. All trajectory groups saw a mean decrease in situational anxiety from baseline to week 1 except patients in this group. This group also demonstrated an incremental rise in their situational anxiety up to the highest point at EOT. It is possible treatment side effects, which also peak around this time point (eg, mucositis, dysphagia, xerostomia, and pain) contributed. It has been demonstrated that treatment-related side effects contribute to poorer health-related quality of life.[14] However, why this group should experience situational anxiety differently than the other subgroups of patients, who would also have experienced a similar side effect profile, is unknown. The numbers in our trajectory-related subgroups were too small to meaningfully examine whether this subgroup suffered worse side effects compared with other trajectory groups. An interesting finding was that, although patients in the fluctuating anxiety group stabilized at EOT, they reported peaks in anxiety at different time points. The differences in the situational anxiety trajectories seen in these subgroups warrant routine screening at multiple points during the whole course of radiation therapy, not just at baseline, a strategy supported by Stiegelis et al.[26]

An important finding from this study was the consistently poor agreement between patient- and RT-ratings of anxiety at 4 of the 6 treatment sessions. ICC values were lowest at EOT, indicating agreement between patient- and RT-ratings was poorest at this time point. Klug et al[10] suggested workplace culture may contribute to this lack of concordance. System barriers such as time pressures, valuing physical above psychosocial health, and a reluctance to acknowledge concerns that may affect work routine are concerning and may affect the health practitioner's ability

to detect anxiety.[10,27] Although it is established that the relationship between patient and RT is important in the patient's experience, RTs are usually given no formal education in identifying and responding to patients' emotional needs. Trust and positive treatment experiences are related to adequate information provision, pleasant interactions, and supportive communication between patients and health practitioners.[7,14,23,28] Neither study institution had a process for routine use of psychosocial screening tools for patients with HNC undergoing radiation therapy. Furthermore, referrals to psychologists were made at the discretion of various clinical members of the treatment team. Our results indicate that routine screening for anxiety using the STAI in clinical practice may help to ensure anxiety is not missed by RTs. In addition, a structure for RTs to make timely referrals for psychosocial support through establishment of appropriate clinical referral pathways may be beneficial. It should be highlighted that if self-reported situational anxiety questionnaires are to be implemented into clinical radiation therapy practice, results should trigger appropriate clinical assessments by trained health care professionals (eg, psychologists or social workers) and not be used to diagnose anxiety by RTs themselves. Further education for RTs, such as communication skills training, may improve their ability to detect anxiety in patients and provide better emotional support.[23,29] This is important, as it has been previously documented patients tend to avoid admitting mental health concerns to health professionals until they can no longer cope.[13,27]

Limitations

A limitation of this study was the possibility of sample bias. RTs may have been selective during study recruitment and may have been reluctant to recruit patients they perceived as already anxious for fear the questionnaires would ignite greater anxiety. Similarly, it is possible patients who were more anxious at baseline were more likely to start and stay in the study. The sample, therefore, may not fully reflect the full HNC patient cohort. It is also recognized that changes in RT rosters may have contributed to recruitment challenges. However, a strength of this study was that the inter-RT variability was kept minimal due to the small number of RTs who participated. This was a result of a planned rostering system created to keep teams small and consistent for the entirety of patients' treatment, with the aims of providing continuity of care and comfort as well as opportunities for rapport building between patients and RTs. The collection of patient anxiety ratings at set time points across their treatment course, with simultaneous completion of ratings by RTs, strengthened the methods adopted in this study. However, given that different measures had to be used to assess patient- and RT-rated anxiety, we could not directly demonstrate that RTs underestimated patient anxiety and could only demonstrate a lack of concordance between ratings. Another limitation was the loss to follow-up, with 28 participants not completing questionnaires at all data collection time points. Initially, we aimed to include a follow-up questionnaire 3 months postradiation therapy. COVID-19 pandemic–related changes and restrictions to follow-up appointments (format and frequency) made research-related follow-up difficult, and the decision was made to track anxiety trajectories over the treatment course only. To improve trajectory strength, future studies should employ follow-up questionnaires given at multiple time points posttreatment.

Conclusions

This study has demonstrated differing patterns of situational anxiety trajectories and confirmed there is no single best time to provide psychosocial intervention. Future research should examine baseline predictors of situational anxiety trajectories including those related specifically to mask anxiety. RTs delivering treatment, despite their daily interactions with patients, did not reliably detect patient anxiety. Routine anxiety screening of patients with HNC at multiple time points through treatment is important. Additional strategies, such as initiating appropriate clinical pathways when detecting anxiety through routine screening, together with the provision of tools and education for RTs to detect anxiety and better support their patients, are warranted.

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Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.adro.2022.100967.

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