Available online at www.sciencedirect.com

ScienceDirect

British Journal of Oral and Maxillofacial Surgery 57 (2019) 1044–1048

BRITISH Journal of Oral and Maxillofacial Surgery
www.bjoms.com

Exploring the relation between patients' resilience and quality of life after treatment for cancer of the head and neck

G. Clarke [a], Y.A. Asiedu [a], K. Herd [b], S. Sharma [b,*]

[a] *University of Southampton, University Rd, Southampton SO17 1BJ, United Kingdom*
[b] *University Hospital Southampton, Tremona Road, Southampton, Hampshire SO16 6YD, United Kingdom*

Accepted 11 September 2019
Available online 5 October 2019

Abstract

Resilience, which is a measure of a patient's ability to recover from a traumatic event, varies among the general population, and previous studies have suggested that it has an important influence on a patient's quality of life. We conducted a study of patients treated for cancer of the head and neck to investigate the relation between scores for resilience and quality of life (QoL). A total of 98 patients, who had been treated with curative intent, completed the University of Washington quality of life questionnaire (UW-QoL) and the Connor-Davidson resilience scale (CD-RISC). Retrospective analysis of patients' records identified demographic data, stage of disease, and treatment. The Mann-Whitney U-test, Kruskal-Wallis test, and Spearman's rank correlation were used to assess the significance of differences between the groups. The mean (SE) QoL score after treatment was 61 (2.081), and the mean CD-RISC score 0.427 for QoL in the last seven days. There was a significant correlation between overall scores for QoL and resilience (Spearman's Rho = 0.427, $p < 0.005$). As higher resilience scores had a significant correlation with a better QoL, strengthening a patient's resilience might in turn help to improve their quality of life.

Keywords: Quality of life; University of Washington Quality of Life Scale; Connor Davison Resilience Scale; Resilience; Head and Neck cancer

Introduction

After treatment for head and neck cancer (HNC), patients require prolonged rehabilitation to manage treatment-associated morbidity. Many live with various comorbidities and are often ill-equipped to cope with the severe effects of treatment. Quality of life (QoL) has a crucial role in cancer care, and longitudinal assessment is essential to prevent problems that necessitate continued access to health services.[1,2] In the past, measures such as survival have been emphasised when evaluating patients' QoL, but such assessments were biased and underestimated its multifactorial nature.[2–4] The University of Washington quality of life questionnaire (UW-QoL version 4.0) is a well-validated instrument that has successfully explored the impact of disease in HNC patients.[2]

More recently, research involving the use of the Connor-Davidson resilience scale (CD-RISC) has also shown clinical relevance.[5] It was developed to assess resilience, and has shown validity and enabled resilience to be quantified and compared among various populations.[6] Resilience refers to the ability of patients to react and cope with traumatic events, such as cancer treatment, and is a measure of a patient's ability to maintain psychological, emotional, and physical function.[5] The scale has helped to identify coping strategies that are used by patients and to show the impact that these can have on their approach to challenges.[5,7] Importantly, a person's resilience is not an inherent immutable character trait – rather it is a

* Corresponding author.
E-mail addresses: ghc1e13@soton.ac.uk (G. Clarke), yvonne.asiedu@ncuh.nhs.uk (Y.A. Asiedu), kerry.herd@nhs.net (K. Herd), Sanjay.Sharma@uhs.nhs.uk (S. Sharma).

https://doi.org/10.1016/j.bjoms.2019.09.007

characteristic that can be influenced and positively shaped to (theoretically) improve their quality of life.

Resilience scores have been shown to change in response to treatment.[5,7] In a study of patients treated for breast cancer, Markovitz et al found that those with higher resilience scores reported similar emotional well-being to that of controls.[8] Compared with patients who are less resilient, we can therefore hypothesise that the QoL of patients who are more resilient may be better after a traumatic event, such as a diagnosis of, or treatment for, HNC.

The aim of this study was to evaluate the relation between patients' resilience and their QoL after curative treatment for HNC.

Patients and methods

Patients treated in departments of ear, nose, and throat (ENT), oral and maxillofacial surgery, and head and neck oncology were recruited from the University Hospital Southampton (UHS) head and neck clinic over a period of three months. Those who had previously had curative treatment for HNC and were now under routine follow up were identified by senior members of the medical team and invited to participate. All patients having, or scheduled for, palliative treatment, were excluded. An information sheet was provided, and written consent obtained from all participants before completion of the UW-QoL and CD-RISC questionnaires. Standard demographic and service assessment data were collected using accepted pro formas. Additional clinical data were collected retrospectively from patients' records. Ethics approval was obtained from the Trust.

Statistical methods

Analysis was done with the help of IBM SPSS Statistics for Windows, version 19 (IBM Corp). All tests were two-tailed, and probabilities of less than 0.05 accepted as significant. Mean scores from each UW-QoL domain and UW-QoL global measure were correlated against demographic and clinical variables using non-parametric Mann-Whitney U and Kruskal-Wallis tests. Spearman's rank correlation coefficient (r) and Pearson's correlation were used to analyse possible associations between demographic, clinical, QoL, and resilience data.

Data from the UW-QoL

Patients completed the UW-QoL questionnaire, which comprises 12 domains based on ordinal responses (Appendix A). Each one varies in the number of possible responses and weight. Scores range from 0-100, with 100 being most associated with an improved QoL. We analysed two composite scores (physical function and socioemotional function) against demographic/clinical data and resilience scores. Physical function is computed as the mean score of the swallowing, chewing, speech, saliva, taste, and appearance domains. Socioemotional function is the mean score of the activity, recreation, pain, mood, anxiety, and shoulder domains. Descriptive analyses comprised mean (SE) scores, 95% confidence intervals (CI), and median (range) scores. Patients were also asked to complete the UW-QoL global questionnaire.

Table 1
Contents of 25-item Connor-Davidson resilience (CD-RISC) questionnaire.

Item No.	Description
1	Ability to adapt when changes occur
2	Close and secure relationships
3	If no clear solutions, fate or God can help
4	Ability to deal with anything
5	Past successes give confidence in dealing with new problems
6	When faced with problems, try to see the humorous side
7	Coping with stress can make me stronger
8	Ability to bounce back after illness, injury or hardship
9	Most things happen for a reason
10	I give my best effort
11	I can achieve my goals
12	When things look hopeless, I don't give up
13	Know when to turn for help in times of stress
14	Stay focused under pressure
15	Prefer to take the lead when solving problems
16	Not discouraged by failure
17	I think of myself as a strong person
18	Make unpopular decisions if necessary
19	Ability to handle unpleasant or painful feelings
20	When dealing with problems, sometimes act on hunch
21	Having a strong purpose in life
22	I feel in control of my life
23	I like challenges
24	I work to attain my goals no matter what the roadblocks I encounter
25	Pride in achievements

Data from CD-RISC

The 25-item CD-RISC questionnaire was used to obtain resilience scores. Scoring is based on the total of all 25 items (Table 1), each of which is scored from 0-4 (0: "not true at all" to 4: "true nearly all the time"). Total scores range from 0-100, with higher scores indicating greater resilience.

Data from patients' records

Clinical data (TNM stage at diagnosis, date of first medical procedure, time since first procedure, tumour site, and type of procedure) were obtained from patients' records (Table 2). The "type of medical procedure" was defined as the primary procedure after diagnosis.

Results

A total of 98 patients (mean (range) age 64 (32-93) years) were included and two dropped out. Most were male (65.3%),

Table 2
Table showing the primary treatments used and tumour site (University of Washington quality of life scores).

	No. of patients	Physical function		Socioemotional function	
		Mean	Median (range)	Mean	Median (range)
Primary medical procedure:					
Operation	66	77.86	80.00 (23.33– 00.00)	79.75	82.50 (46.67–100.00)
Chemotherapy	6	60.69	53.75 (45.00–81.67)	63.33	69.58 (30.00–77.50)
External radiotherapy	7	82.98	83.33 (49.17–100.00)	84.05	82.50 (66.67–100.00)
Chemoradiotherapy	13	69.16	74.17 (29.17–95.00)	82.44	86.67([53.33–100.00)
Laser	6	87.50	87.92 (71.67–100.00)	91.81	90.83 (82.50–100.00)
Tumour site:					
Skin	11	95. 83	95.83 (91.67–100.00)	90.08	95.00 (71.67–100.00)
Oral cavity	25	74.63	70.00([51.67–100.00)	81.30	82.50 (54.17–95.83)
Nasal cavity	2	65.00	65.00 (63.33–66.67)	74.17	74.17 (74.17–74.17)
Pharynx	30	69.39	74.58 (29.17–100.00)	79.11	82.50 (30.00–100.00)
Larynx	12	87.71	90.42 (59.17–100.00)	85.21	84.58 (66.67–100.00)
Salivary	8	75.21	76.67 (55.00–90.83)	72.61	76.67([46.67–100.00)
Thyroid	1	85.83	–	75.83	–
Unknown	9	70.65	75.83 (23.33–100.00)	70.00	70.83 (30.00–90.83)

Table 3
Table showing the health-related quality of life (QoL) and overall QoL in the last seven days (University of Washington quality of life global question).

	No. of patients	
	Health-related QoL	Overall QoL
Very poor	1	2
Poor	9	5
Fair	21	18
Good	38	41
Very good	27	27
Outstanding	2	5

Table 4
University of Washington quality of life global question: health-related QoL compared with that one month before diagnosis.

Response	No. of patients (n = 98)
Much better	24
Somewhat better	15
About the same	42
Somewhat worse	13
Much worse	4

which corresponds with national HNC statistics.[9] The main treatments were operation (n = 66, 67%), and chemoradiotherapy (n = 13, 13%) (Table 2). The median time since the first medical procedure was 512 days.

Analysis of the distribution of the resilience data showed that skewness was -0.876, which suggested asymmetry, and the Shapiro-Wilk test ($p < 0.001$) suggested that the data were not normally distributed. Non-parametric tests were therefore used for analysis.

UW-QoL global questions

A total of 67 patients (68%) reported good general health over the last seven days. Of them, 29 described it as being very good (n = 27, 28%) or outstanding (n = 2, 2%) (Table 3). Eighty-one (83%) considered their health to be the same or better than it had been before diagnosis (Table 4), 68 (69%) described their overall QoL as good or very good, and five described it as outstanding (with the best possible score of 100) (Table 3). The mean QoL score after treatment was 61. This is comparable to a mean overall health-related QoL score of 55 after treatment, which was reported in a study of 725 patients with oral or non-pharyngeal squamous cell carcinoma (SCC).[10] A score of 50 indicates a QoL similar to that before treatment, and 100 suggests a considerable improvement.[10] A score of 61 therefore shows a slight improvement.

UW-QoL physical function and socioemotional function

The mean (95% CI) physical and socioemotional function scores were 76.7 (74.1 to 80.3) and 80.3 (77.1 to 83.5), respectively. The best scores were in patients whose tumours were localised to the skin. This group had mean (95% CI) scores of 96.0 (94.2 to 97.8) for physical function and 90.2 (83.3 to 96.6) for socioemotional function, the latter being a value that would be expected under normal circumstances.[11] Significant differences were seen in both physical, and socioemotional function scores for TNM stage at diagnosis ($p < 0.001$ and $p = 0.027$, respectively), and type of medical procedure ($p = 0.038$ and $p = 0.031$, respectively). There was a significant difference in physical function scores when the tumour site was analysed ($p < 0.001$), but differences in socioemotional function scores remained insignificant. No significant differences were noted for sex, age group, or days since the first medical procedure.

Resilience

The correlations between UW-QoL scores and CD-RISC scores are shown in Table 5. The CD-RISC score significantly

Table 5
Spearman's rank correlation coefficient (*r*) among University of Washington quality of life (UW-QoL) scores and Connor-Davidson resilience scale (CD-RISC) scores.

UW-QoL	CD-RISC score (*r*)	p value
Subscale scores:		
Physical function	0.139	0.174
Socioemotional function	0.298	0.003**
Global domain scores:		
Health-related QoL in the last seven days	0.314	0.002**
Overall QoL in the last seven days	0.427	<0.001**

** A p value <0.05 is considered significant.

correlated with all but one of the UW-QoL domains analysed ($p < 0.05$) - the physical function subscale score ($p = 0.174$) (Table 5). This indicated a significant relation between a patient's resilience score and their reported QoL after the procedure. Of the significant results, overall QoL in the last seven days had the strongest correlation coefficient (0.427), and socioemotional function the weakest (0.298). The coefficient between the significant scores was 0.35, which showed a moderate positive correlation between resilience and reported QoL, so an increase in resilience should predict an improvement in reported QoL. Pearson's correlation was calculated as 0.22. As the CD-RISC score increased, the scores for socioemotional function, and health-related and overall QoL in the last seven days, increased in tandem.

Discussion

To our knowledge, this study is the first attempt to explore the relation between QoL and resilience in patients treated for cancer of the head and neck. Previous research has highlighted the influence of resilience on patients' QoL, and our data, which showed a significant correlation, reinforce previous work.[8,12–15]

The UW-QoL scores correlated positively with all aspects of resilience except physical function. The correlation coefficient was 0.35 (one domain score was 0.427), showed a moderate positive correlation, suggesting that an increase in resilience would predict a small increase in reported QoL, and vice versa.

This finding also highlighted the complexity of a patient's QoL and the varying factors at play. Resilience has been shown to have only a small role in QoL, and in a study of 940 patients it was not an independent predictor, but did account for 14.8% of its total effect.[12] Our study adds more weight to that claim, and an exploration of ways in which resilience can be strengthened would benefit patients in future.

In our study, physical function (swallowing, chewing, speech, saliva, taste, and appearance) was the only area that did not correlate significantly with resilience ($p = 0.174$). This is at odds with previous studies that have found a positive relation between the two.[12,13] Despite this, the correlation coefficient was 0.139, which suggests that there was a weak relation (or none). The difference between our results and those of others may be because of the nature of the disease. Other studies have focused on breast and gastrointestinal cancer, and further studies are needed to establish the true relation.

A study of resilience in cancer, which found that resilience influenced all aspects of a patient's experience, theorised that the recognition of characteristics such as optimism, and the targeting of interventions to promote resilience can help to improve well-being.[16] Help with social support or being taught coping mechanisms are examples of small interventions that may help to strengthen resilience and in turn, improve overall well-being.[16] A study that focused on the carers of HNC patients found a significant negative correlation between resilience and depression, so resilience is also important for carers.[17]

One of the limitations of this study was that we were unable to measure patients' resilience before as well as after treatment. Previous studies have shown that many factors can have a influence, and a study from 2013 compared the scores of patients at different stages after diagnosis.[14] The authors found that patients who had been diagnosed more than 12 months earlier were more resilient and, as in our group, had a better QoL.[14] This additional information would have allowed us to see how diagnosis and subsequent treatment affected resilience, and whether there were factors that could be modified to improve patients' scores.

In conclusion, there is a significant correlation between resilience scores and QoL after treatment in patients with HNC.

Knowledge surrounding the QoL of these patients continues to increase as more disease-specific instruments are developed and validated for clinical use. Resilience scores enable healthcare professionals to estimate a patient's QoL after treatment and allow for earlier intervention and the provision of additional support for those who need help. While strategies to strengthen resilience are currently unknown, research into the area would help provide non-medical ways of improving QoL. Healthcare professionals are now able to explore in greater depth the difficulties faced by patients and their surrounding support networks. However, despite the creation of such tools, the medical field still lacks the appropriate management solutions that will have an impact on all the factors that contribute to a good QoL.

Future studies would benefit from the measurement of patients' resilience scores before and after treatment to find out whether scores can be altered by major life events, and to find ways to modify and improve resilience.

Disease-specific assessments such as the UW-QoL together with resilience scales may be necessary to overcome current obstacles in clinical practice. This would ultimately enable clinicians to improve overall prognosis by tailoring management plans and referring patients more quickly to appropriate support services.[18]

Conflict of interest

We have no conflicts of interest.

Ethics approval

Permission for this service evaluation was obtained from the University of Southampton Ethics and Research Governance Office and the UHS Human Resources Department.

References

1. Semple C, Parahoo K, Norman A, et al. Psychosocial interventions for patients with head and neck cancer. *Cochrane Database Syst Rev* 2013;**7**. CD009441.
2. Rogers SN, Gwanne S, Lowe D, et al. The addition of mood and anxiety domains to the University of Washington quality of life scale. *Head Neck* 2002;**24**:521–9.
3. Calman KC. Quality of life in cancer patients — an hypothesis. *J Med Ethics* 1984;**10**:124–7.
4. Carr AJ, Gibson B, Robinson PG. Measuring quality of life: is quality of life determined by expectations or experience? *BMJ* 2001;**322**:1240–3.
5. Scali J, Gandubert C, Ritchie K, et al. Measuring resilience in adult women using the 10-items Connor-Davidson Resilience Scale (CD-RISC). Role of trauma exposure and anxiety disorders. *PLoS One* 2012;**7**:e39879.
6. Connor KM, Davidson JR. Development of a new resilience scale: the Connor–Davidson Resilience Scale (CD-RISC). *Depress Anxiety* 2003;**18**:76–82.
7. Bowen DJ, Morasca AA, Meischke H. Measures and correlates of resilience. *Women Health* 2003;**38**:65–76.
8. Markovitz SE, Schrooten W, Arntz A, et al. Resilience as a predictor for emotional response to the diagnosis and surgery in breast cancer patients. *Psychooncology* 2015;**24**:1639–45.
9. *Cancer registration statistics, England*. Office for National Statistics; 2015. Released 24 May 2017. Available from URL: https://www.ons.gov.uk/releases/cancerregistrationstatisticsengland2015 (last accessed 6 September 2019).
10. Lowe D, Rogers SN. *University of Washington Quality of Life Questionnaire (UW-QOL v4 and v4.1)*; 2018. Available from URL: https://www.headandneckcancer.co.uk/sites/default/files/assets/pages/UW-QOL-update-2018.pdf (last accessed 6 September 2019).
11. Rogers SN, Lowe D, Yueh B, et al. The physical function and social-emotional function subscales of the University of Washington Quality of Life Questionnaire. *Arch Otolaryngol Head Neck Surg* 2010;**136**:352–7.
12. Tian J, Hong JS. Assessment of the relationship between resilience and quality of life in patients with digestive cancer. *World J Gastroenterol* 2014;**20**:18439–44.
13. Ristevska-Dimitrovska G, Filov I, Rajchanovska D, et al. Resilience and quality of life in breast cancer patients. *Open Access Maced J Med Sci* 2015;**3**:727–31.
14. Talepasand S, Pooragha F, Kazemi M. Resiliency and quality of life in patients with cancer: moderating role of duration of awareness of cancer. *Iran J Cancer Prev* 2013;**6**:222–6.
15. Yazdi-Ravandi S, Taslimi Z, Saberi H, et al. The role of resilience and age on quality of life in patients with pain disorders. *Basic Clin Neurosci* 2013;**4**:24–30.
16. Rogers SN, Lowe D, Brown JS, et al. A comparison between the University of Washington Head and Neck Disease-Specific measure and the Medical Short Form 36, EORTC QOQ-C33 and EORTC Head and Neck 35. *Oral Oncol* 1998;**34**:361–72.
17. Simpson GK, Dall'Armi L, Roydhouse JK, et al. Does resilience mediate carer distress after head and neck cancer? *Cancer Nurs* 2015;**38**:E30–6.
18. Molina Y, Yi J, Martinez-Gutierrez J, et al. *Resilience* among patients across the cancer continuum: diverse perspectives. *Clin J Oncol Nurs* 2014;**18**:93–101.