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## IMPACT OF DYSPHAGIA ON QUALITY-OF-LIFE IN NASOPHARYNGEAL CARCINOMA

Sarah J. Lovell, MSc,<sup>1</sup> Hwee-Bee Wong, MSc (Biostatistics),<sup>2</sup> Kwok-Seng Loh, FRCS (Glasg),<sup>1</sup> Raymond Y. S. Ngo, MRCSEd, MMED (ORL),<sup>3</sup> Janet A. Wilson, MD, FRCS<sup>4</sup>

<sup>1</sup> Department of Otolaryngology–Head & Neck Surgery, National University Hospital, 5 Lower Kent Ridge Road, Singapore 119074. E-mail: SarahL@nuh.com.sg

<sup>2</sup> Clinical Trials & Epidemiology Research Unit, Singapore

<sup>3</sup> Department of Otolaryngology, Singapore General Hospital, Singapore

<sup>4</sup> Department of Otolaryngology–Head & Neck Surgery, University of Newcastle, Freeman Hospital, Newcastle-upon-Tyne, United Kingdom

Accepted 24 March 2005

Published online 19 August 2005 in Wiley InterScience (www.interscience.wiley.com). DOI: 10.1002/hed.20250

**Abstract:** *Background.* Little is known about dysphagia or quality of life (QOL) in patients treated for nasopharyngeal carcinoma (NPC). The aim of this study was to determine the impact of dysphagia on QOL in patients treated for NPC as measured by two standard tools, the University of Washington Quality-of-Life Questionnaire<sup>1</sup> (UW-QOL) and the Swallow Quality-of-Life Questionnaire<sup>3</sup> (SWAL-QOL).

*Methods.* This is a cross-sectional survey of 59 consecutive disease-free survivors of NPC attending the head and neck cancer clinic at the National University Hospital, Singapore. The UW-QOL and SWAL-QOL underwent minor modification and were translated into Mandarin. A linear regression analysis was performed to identify significant predictors of health-related QOL.

*Results.* Fifty-one patients (86%) responded; of these, 43 had self-reported swallowing difficulties. On the UW-QOL, respondents indicated the three most important issues to be swallowing (59%), hearing (45%), and saliva/dry mouth (41%). Respondents with swallowing difficulty reported a lower UW-QOL composite score ( $p = .002$ ) and a lower health-related QOL score (HR-QOL)

than those without swallowing difficulty ( $p = .004$ ). Self-reported swallowing difficulty predicted a lower HR-QOL score ( $p = .004$ ). A longer time since treatment predicted a better score in HR-QOL ( $p = .024$ ). A lower score in fatigue predicted a lower HR-QOL score ( $p = .001$ ).

*Conclusions.* Swallowing difficulties negatively impact QOL. It is recommended that future QOL studies aimed specifically at swallowing function in NPC use a swallowing specific questionnaire (eg, SWAL-QOL) in addition to a head and neck-specific measure. Further research is needed to look at the adaptation and usefulness of swallowing-specific QOL surveys for use with people treated for NPC. © 2005 Wiley Periodicals, Inc. *Head Neck* 27: 864–872, 2005

**Keywords:** nasopharyngeal carcinoma; dysphagia; quality-of-life; SWAL-QOL; UW-QOL

**N**asopharyngeal carcinoma (NPC) is unique among head and neck cancers because of its geographic, ethnic, and genetic associations.<sup>6</sup> Singapore has a high incidence of NPC (18.5/100,000 [men]:7.3/100,000 [women]).<sup>7</sup> Approximately 300 new cases are diagnosed yearly in Singapore,<sup>7</sup> of which approximately 65 are at the

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Correspondence to: S. J. Lovell

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National University Hospital (NUH). Most at NUH are diagnosed between the ages of 31 and 60 years. Hearing loss, xerostomia, trismus, and dysphagia have been reported both during and after treatment.<sup>8-12</sup> Therefore, hearing is screened routinely, artificial saliva is used to provide some symptomatic relief of xerostomia, and patients are routinely advised to perform jaw exercises to prevent trismus. However, long-term swallowing dysfunction in NPC has received little attention.

Yu et al<sup>13</sup> highlight that swallowing problems are inevitable in people treated for NPC and will have a negative effect on short-term quality of life (QOL). It has been shown that patients who have been well informed about their disease and treatment by their physicians have a better adjustment to a new diagnosis, a faster recovery, better QOL, and a quicker return to work and functioning.<sup>14</sup>

Swallowing dysfunction may present at diagnosis because of cranial nerve palsies (IX, X, XII)<sup>15</sup> seen in approximately 8% of our new patients with NPC. It also occurs during treatment because of acute radiation side effects such asodynophagia<sup>16</sup> or after treatment because of the long-term side effects of radiation such as fibrosis, xerostomia, or cranial nerve neuropathies.<sup>15</sup> The prevalence of dysphagia in people treated for NPC has been reported to be 76% to 100%.<sup>17,18</sup>

A MEDLINE search from 1966 to 2004 identified five published articles in English looking specifically at dysphagia in NPC.<sup>15,17-20</sup> These articles<sup>15,17-20</sup> primarily describe dysphagic symptoms and physiologic dysfunctions seen on videofluoroscopy or fiberoptic endoscopic evaluation of swallowing. Symptoms of dysphagia include nasal regurgitation, chewing difficulty, coughing, choking, difficulty swallowing solid foods, and aspiration.<sup>21</sup> Aspiration has been reported in 78% to 94% of long-term NPC survivors with dysphagia.<sup>17,18</sup> When dysphagia in patients previously treated for NPC is of apparently recent onset, tumor recurrence must be excluded.<sup>15</sup>

Chang et al<sup>17</sup> showed that the most significant factor in the severity of dysphagia was not the tumor stage or the type of treatment but the time after treatment. The biologic tissue changes that take place after radiation are still not clearly understood,<sup>8,9</sup> but if these changes occur gradually, patients may compensate and adapt and not report their difficulties in a busy outpatient clinic.

Consequently, this disorder has tended to be underrecognized and untreated.

A MEDLINE search from 1966 to 2004 identified six articles<sup>13,4,6,22-24</sup> in English looking specifically at QOL in patients with NPC. An additional article included a subgroup of patients with NPC.<sup>25</sup> These seven articles have used varying QOL measures.<sup>22,23,25</sup> Overall QOL has been reported to be "good" over the long term but hearing, swallowing, chewing, and dryness of mouth have been identified as major problems on head and neck-specific measures.<sup>22,23</sup>

The aim of this study was to determine the impact of dysphagia on the quality of life in patients treated for NPC.

## MATERIALS AND METHODS

The study design is a cross-sectional survey of 59 people treated for NPC. The definition of "swallowing problem/difficulty" was elicited from the focus group (the focus group participants are detailed later). The aim was to define "swallowing problem/difficulty" in a meaningful way to the patients. This study focused on the patients' self-report and perception of a swallowing difficulty. Dysphagia was not formally assessed or determined by the clinician. To reduce selection bias, prior reporting of swallowing difficulty by the participant to their physician or documented evidence of dysphagia was not a prerequisite for participation in this study. The University of Washington Quality-of-Life questionnaire (UW-QOL)<sup>1,26,27</sup> and the Swallow Quality-of-Life questionnaire (SWAL-QOL)<sup>3-5</sup> were used to explore QOL.

The UW-QOL<sup>1,2,22</sup> is a self-administered head and neck-specific measure and covers possible areas of impairment seen clinically in NPC, except for hearing and visual problems. The questionnaire takes 5 minutes to complete. It has been reported to have good internal consistency and short-term reproducibility, although little information is available on the initial design and item reduction process.<sup>1,2,22,26</sup>

The SWAL-QOL<sup>3-5</sup> is self-administered and swallowing specific. It is a 44-item tool that assesses 10 aspects of QOL, takes 15 minutes to complete, and has been reported to have excellent internal consistency, reliability, and short-term reproducibility.

The UW-QOL and SWAL-QOL are standardized on an American English-speaking population. Singapore is a multicultural nation with four official languages: English, Chinese, Malay, and

Tamil. However, patients with NPC are predominantly ethnic Chinese, and, therefore, the first stage of this study was to ensure conceptual and semantic equivalence and to translate the questionnaires into Mandarin. A focus group was used to achieve this goal.

**Focus Group.** The focus group was made up of six people, previously treated for NPC, with no tumor recurrence but with documented evidence of dysphagia on videofluoroscopy. The mean age of the group members was 53 years (range, 37–75 years). Educational levels ranged from primary school to university. All members were bilingual; English was the first language of half of the members and Mandarin of the other half.

The aims of the initial group meeting were to define “swallowing difficulties,” determine whether the target questionnaires measured domains of importance, whether issues of swallowing dysfunction were adequately addressed, and whether the local population would understand the language, vocabulary, and concepts used. All members filled out the original questionnaires 1 week before meeting. Instructions were given to consider specifically whether the questionnaires covered health-related issues important to members’ QOL. Group consensus was required for modifications.

**Semantic Modification and Translation of UW-QOL and SWAL-QOL.** The authors of the original questionnaires gave permission for some minor vocabulary modifications, for the addition of hearing and vision domains to the UW-QOL, and for the questionnaires to be translated into Mandarin. The modified questionnaires were called UW-QOL (modified) and SWAL-QOL (modified).

*UW-QOL (Modified).* The UW-QOL (modified) consists of 14 specific domains, three general QOL questions, an importance rating, and a free text section. The individual domains are scored from zero (most dysfunction) to 100 (best function). The composite score is the mean of the scores of all 14 domains.

Health-related QOL and overall QOL are rated categorically from very poor to outstanding on the original UW-QOL questionnaire. To facilitate analysis, a 100-metric scoring system was used. Very poor was assigned the lowest score (zero) and outstanding the highest score (100).

*SWAL-QOL (Modified).* The SWAL-QOL (modified) consists of the original 10 domains. Each domain was rated by respondents on a 5-point Likert scale. A score of 1 indicated most dysfunction, and a score of 5 indicated no dysfunction. Domains were scored using a 100-metric scoring system as recommended by the authors.<sup>28</sup> A score of zero indicates most dysfunction, and a score of 100 indicates no dysfunction.

*Translation.* A double back translation method was used<sup>29</sup> to translate the questionnaires into Mandarin. Two translators were involved in the forward translation and two in the backward translation. All translators were bilingual and included one medical professional and three patients with NPC from the focus group. Lay people were included in the translation process to ensure that the target population would understand the language and concepts. This was a semantic translation and not a psychometric translation.

After the translation, the focus group met one more time. A copy of the translated questionnaires was sent to group members before the meeting. Group participants were instructed to complete the questionnaires before the meeting to test and verify their semantic content. Group consensus was needed for any changes to be made.

**Study Recruitment.** Ethical approval for this study was obtained from the hospital institutional review board. Recruitment took place during the weekly head and neck cancer clinic at NUH between October 2003 and January 2004. A series of consecutive patients who met the inclusion criteria (a diagnosis of NPC, completed treatment for NPC, on current follow-up at NUH, clinically disease free) agreed to take part in the survey. A brief, but standardized, description of the study, in either Mandarin or English, was given to the participant by the physician or staff nurse assisting in the clinic. None of the focus group was included in the study. Exclusion criteria for participation were recurrent disease or inability to understand English or Mandarin. Respondents could withdraw their information from the study at any time and without explanation. An information sheet was given to all respondents, and informed consent taken.

All respondents were required to fill out the UW-QOL (modified) in either English or Mandarin. The instruction sheet of the SWAL-QOL (modified) gave participants a choice of ticking

box A (I have no difficulty swallowing) or box B (I have difficulty swallowing). If the respondents ticked box B, they were instructed to complete the SWAL-QOL (modified) in addition to the UW-QOL (modified).

The questionnaires were filled in either in the clinic or returned in the post. A phone reminder was given if the questionnaires had not been returned within 2 weeks.

The medical records of participants were accessed for demographic data, tumor stage, dates of treatment, and type of treatment.

**Statistical Analysis.** Respondents were categorized by age group (<45, ≥45 years), sex (male, female), cancer stage (early [stage I, II], advanced [stage III, IV]), treatment type (radiotherapy, chemoradiotherapy), swallowing difficulty (yes, no), and time to interview after treatment (short-term ≤12 months; long-term > 12 months). All statistical analyses were carried out using SPSS (version 11.5).

Associations between scores and categorical or continuous variables were assessed using chi-square or Fisher exact tests. Normality testing was carried out for the continuous variables. Two sample *t* tests or analysis of variance (ANOVA) were performed if normality and equality of variances assumptions were satisfied, otherwise the Mann–Whitney U test or the Kruskal–Wallis test was used.

A linear regression analysis was performed to determine significant predictors of UW-QOL (modified) composite score and health-related QOL (HR-QOL) score, adjusting for self-reported swallowing difficulty, age, sex, cancer stage, treatment type, and time interval after treatment. The linear regression analysis performed on HR-QOL included the significant predictors obtained from a stepwise regression analysis on SWAL-QOL (modified). Statistical significance was set at  $p < .05$ .

## RESULTS

**Definition of “Swallowing Difficulties.”** The focus group expressed the view that reference to swallowing alone would only refer to the ability to “pass food/liquid down the throat,” and if they were simply asked whether they could “swallow,” most would reply “yes,” despite having difficulty chewing or eating solid food, for example. In the context of this study and after the focus group

discussion, swallowing difficulties were defined as “any difficulty in the process of swallowing, chewing, eating, drinking, or being on a modified or self-imposed restricted diet because of these difficulties.”

### Semantic Modification and Translation of Questionnaires.

*UW-QOL (Modified).* The following changes were made to the original UW-QOL.

1. Under the domain “pain,” the American English version uses the terms “codeine or narcotics,” terms not familiar to patients in Singapore. These terms were changed to “medication prescribed by your doctor.”
2. The final item of the pain domain, “I have severe pain, not controlled by medication” was changed to “I have severe pain—medication does not make it better.”
3. Under the domain “speech,” the passive statement “I can be understood on the phone” was changed to the active tense, “people understand me on the phone.”
4. The domains of hearing and vision were added, because focus group members thought these were important to their HR-QOL.
5. The saliva domain was renamed “saliva/dry mouth,” because focus group members expressed that this best described their difficulty with little saliva and xerostomia.
6. Under the “mood” domain, group members expressed that they would be “depressed by their cancer” rather than “about their cancer.”
7. The domains of “hearing” and “vision” were added to the “important issues” section.

*SWAL-QOL (Modified).* The following changes were made to the SWAL-QOL.

1. The instructions for completing the questionnaire were modified to make it more relevant to the current study (ie, “swallowing problem” was defined as “difficulty eating, drinking, and chewing,” a suggestion put forward by the focus group. Participants were instructed to tick box A if they had a swallowing problem and would then go on to complete the questionnaire. If participants perceived no swallowing problem, they were instructed to tick box B, and they did not need to complete the questionnaire; however, they were asked to read

through the questionnaire to make sure that none of the questions applied to them.

2. Examples of food items were changed to local Singapore equivalents.

**Translation.** One of the main issues that arose from the focus group was how to define QOL in Mandarin. During discussion, members expressed that QOL was “a way of life,” “a life standard,” or “a balance in living,” but final agreement was reached on the term “living a life—quality,” a direct translation from the Mandarin term. A Mandarin to English translation of “taste,” the title of the taste domain, literally means, “the sensation of taste”; however, within the items of this domain, another term for taste is used, which is more contextually correct in Mandarin and translates in English to “savor.”

**Respondents' Characteristics.** Fifty-nine consecutive patients who met the inclusion criteria agreed to take part in the study. There was an 86% return rate (51 of 59). No significant difference was found between respondents and non-respondents with regard to age, sex, treatment type, or cancer stage ( $p < .05$ ). The mean age in years was 46 (SD = 10; range, 16–72). Seventy-eight percent of respondents were men. Thirty-seven percent had an early cancer stage (I and II), and 63% had an advanced cancer stage (III and IV). Most (59%) underwent chemoradiotherapy, and the remainder underwent radiotherapy only (one respondent with an advanced cancer stage was treated with radiotherapy only). The mean time interval after treatment in months was 41 (SD, 56 months; range, 1–379 months). Educational levels ranged from primary school to university degree holders. Only 21% (11 of 51) required some family assistance to complete the questionnaires because of low educational level. None of the respondents needed to be excluded because of recurrent disease or inability to understand English or Mandarin.

**Prevalence of Swallowing Difficulties.** Of the 51 respondents, 43 (84%) acknowledged having some swallowing difficulty. There was a significant association between the “swallowing” domain of the UW-QOL (modified) and self-reported swallowing difficulties ( $p = .006$ , Fisher exact test). There is also a significant association between the “chewing” domain of the UW-QOL (modified) and self-reported swallowing difficulties ( $p = .118$ ,

Fisher exact test). However, no significant association was found between the other swallow-related domains: “saliva/dry mouth” ( $p = .173$ ) or “taste” ( $p = .447$ ) domain and self-reported swallowing difficulties, Fisher exact test.

**UW-QOL (Modified).** The mean (SD) UW-QOL (modified) domain scores are displayed in Table 1. The problems for swallowing were significantly greater than the problems for pain, recreation, speech, hearing, and vision ( $p < .001$ , Mann–Whitney U test) but were significantly less than the problems for saliva/dry mouth ( $p = .001$ , Mann–Whitney U test).

**Important Issues during the 7 Days before Completing the Questionnaire.** On the UW-QOL (modified), each respondent was asked to select the three most important issues to him or her during the 7 days before completing the questionnaire. Swallowing was selected by 59% of the respondents to be the most important issue, followed by hearing (45%), and saliva/dry mouth (41%) (Table 1).

Younger respondents (age <45 years) were more likely to select appearance and speech as important. Conversely, respondents with age  $\geq 45$  years were more likely to select taste as important (Table 2). The respondents in the

**Table 1.** Mean domain scores\* and importance rating on UW-QOL (modified).

Domain	Mean score (SD)	Importance rating by percentage (%)†
Saliva/dry mouth	41 (25)	41
Chewing	61 (31)	8
Swallowing	61 (26)	59
Taste	63 (34)	18
Mood	70 (29)	17
Activity	70 (26)	6
Appearance	70 (28)	12
Anxiety	71 (28)	6
Hearing	76 (19)	45
Shoulder	77 (29)	4
Recreation	80 (23)	4
Speech	82 (23)	24
Pain	83 (25)	10
Vision	93 (14)	10
Other issues‡	–	2

Abbreviation: UW-QOL, University of Washington Quality-of-Life questionnaire.

\*A score of zero indicates the most dysfunction; a score of 100 indicates the best function.

†All participants selected the three most important issues to them during the 7 days before completing the questionnaire.

‡“Other issues” is only asked on the importance rating section.

**Table 2.** Clinical features showing positive associations\* with importance issues of UW-QOL (modified).

	Domain	RR†/OR‡	95% CI	p value
Age group <45 y	Appearance	1.33†	1.06–1.68	.007
	Speech	4.81‡	1.12–20.41	.027
Age group ≥45 y	Taste	9.68‡	1.11–84.47	.026
Cancer stage Early (I, II)	Taste	5.32‡	1.16–24.39	.036
	Salivation	4.88‡	1.25–18.87	.017

Abbreviations: UW-QOL, University of Washington Quality-of-Life Questionnaire; RR, †relative risk; OR, ‡odds ratio; CI, confidence interval.

\*Based on comparisons between age group, sex, treatment type, cancer stage, and time interval after treatment. Only significant results are displayed.

short-term group were more likely to select taste and salivation as important (Table 2). Otherwise, no significant differences were found between age group, sex, treatment type, cancer stage, and time interval after treatment.

**Composite and HR-QOL Scores (Table 3).** Respondents with swallowing difficulties had significantly lower composite scores than those without swallowing problems ( $p = .002$ , Mann–Whitney U test).

The mean HR-QOL score was 49 (SD, 22). The HR-QOL score for respondents with swallowing difficulty was significantly worse than for those without swallowing difficulties ( $p = .004$ , Mann–Whitney U test).

A linear regression analysis on the HR-QOL score, adjusting for age, sex, treatment type, cancer stage, and time interval since treatment, found “time since treatment” and “swallowing difficulty” to be significant predictors. A longer time interval after treatment predicted a better HR-QOL score (ie, a 1-month increase in time interval after treatment related to a score increase of 0.1 in HR-QOL [95% confidence interval {CI}, 0.02–0.24;  $p = .024$ ]). On average, respondents without swallowing difficulty scored 25 points higher (95% CI, 8.4–41.2;  $p = .004$ ). Otherwise, no significant differences were found between age, sex, treatment type, and cancer stage.

**Overall (Global) QOL.** The mean overall QOL score was 48 (SD, 22). Those with swallowing difficulty reported a lower overall QOL (44; SD, 22) than those without swallowing difficulty (68; SD, 10;  $p = .002$ , Mann–Whitney U test). Otherwise no significant differences were found between

age, sex, treatment type, cancer stage, or time since treatment.

**SWAL-QOL (Modified).** A summary of scores across domains for the SWAL-QOL (modified) is displayed in Table 4. A comparison of all the median scores showed that respondents reported significantly fewer problems with communication and fear of eating compared with eating duration and food selection ( $p < .001$ , Kruskal–Wallis test).

Linear regression analysis on HR-QOL score, including the significant predictors from the SWAL-QOL (modified) stepwise regression analysis and adjusting for age, sex, treatment type, cancer stage, and time since treatment, showed that “time since treatment” ( $p = .032$ ) (Table 3) and “fatigue” ( $p < .001$ ) (Table 4) remained significant predictors of HR-QOL (ie, respondents who reported a better score in the “fatigue” domain or had a longer time interval after

**Table 3.** UW-QOL (modified) composite and health-related QOL scores\* by respondent characteristics ( $n = 51$ ).

	No. of patients	Composite score	Health-related QOL score
		Mean (SD)	Mean (SD)
Age group			
<45 y	24	72 (16)	47 (23)
≥45 y	27	71 (17)	50 (22)
Sex			
Male	40	72 (16)	49 (22)
Female	11	70 (18)	49 (24)
Cancer stage			
Early (stage I, II)	19	72 (16)	50 (24)
Advanced (stage III, IV)	32	71 (17)	48 (22)
Treatment type			
Radiotherapy	21	72 (18)	51 (21)
Chemoradiotherapy	30	71 (15)	47 (24)
Time since treatment			
Short term (≤12 mo)	13	65 (16)	45 (17)
Long term (>12 mo)	38	73 (16)	50 (24)††
Swallowing difficulty			
Yes	43	69 (16)	45 (22)§
No	8	86 (10)	68 (10)

Abbreviations: UW-QOL, University of Washington Quality-of-Life questionnaire; QOL, quality of life; SWAL-QOL, Swallow Quality-of-Life questionnaire.

\*A score of zero indicates the most dysfunction; a score of 100 indicates the best function.

Linear Regression Analysis:

†Predictor of UW-QOL score ( $p = .024$ ).

‡Remained predictor of UW-QOL HR-QOL score after inclusion of stepwise regression on SWAL-QOL domains ( $p = .032$ ).

§Predictor of UW-QOL HR-QOL score ( $p = .004$ ).

**Table 4.** Domain scores\* on SWAL-QOL (modified) (*n* = 43).

Domain	Mean score (SD)
Food selection	43 (32)
Eating duration	46 (29)
Fatigue	53 (25)†
Social function	56 (33)
General burden	58 (27)
Mental health	61 (32)
Symptom frequency‡	62 (19)
Sleep	67 (27)
Communication	71 (29)
Fear of eating	72 (26)
Eating desire	73 (26)

Abbreviations: SWAL-QOL, Swallow Quality-of-Life questionnaire; QOL, quality of life; UW-QOL, University of Washington Quality-of-Life questionnaire.

\*A score of zero indicates the most dysfunction; a score of 100 indicates the best function.

Linear Regression Analysis:

†Predictor of UW-QOL HR-QOL score ( $p = .001$ ) after SWAL-QOL stepwise regression analysis.

‡Symptom frequency is not a QOL domain. Only 42 of 43 completed this section.

treatment reported a better HR-QOL). Otherwise, no significant predictors were found between age, sex, treatment type, and cancer stage.

## DISCUSSION

This study is the first to focus specifically on the impact of swallowing difficulties on QOL in NPC. In view of the young age at diagnosis and good survival rates in NPC, there is a need to highlight the likelihood of dysphagia. Yu et al<sup>30</sup> suggest that it is worthwhile focusing on preventative and remedial measures to minimize dysphagia and use this information to empower patients with more optimism and positive thinking and thereby reduce the negative impact of dysphagia. Despite prior knowledge of possible side effects of cancer treatment, cure and survival have been reported to be the most important issues to both patients and nonpatients<sup>31</sup> and overshadow associated toxicities and dysfunctions.

This study demonstrated a high prevalence of swallowing difficulties (84%). This finding is similar to the few published reports available<sup>17,32</sup> and highlighted the likelihood of people with NPC having dysphagia develop even many years after completion of treatment and despite remaining disease free. The swallowing and chewing domains of the UW-QOL (modified) showed a significant association with self-reported swallowing difficulty, suggesting that a poor performance in these domains may be an early clinical indicator

of swallowing dysfunction, especially if the questionnaire is administered at routine follow-ups. The fact that the saliva/dry mouth and taste domains showed no association with self-reported swallowing difficulty is a reflection that most patients with NPC experience a change in their taste and saliva after treatment. These effects are commonly seen as both acute and late side effects of radiation therapy to the head and neck region.<sup>9</sup>

This study supports the hypothesis that swallowing difficulties have a negative impact on QOL in patients with NPC. Respondents with swallowing difficulties reported a worse HR-QOL than did those without swallowing difficulties. Furthermore, self-reported swallowing difficulty was a significant predictor of a lower HR-QOL and a lower UW-QOL (modified) composite score. Treatment type, age, and cancer stage were not shown to be significant predictors of HR-QOL. The latter findings may be related to the small sample size, and a larger study would be needed for further evaluation.

Chang et al<sup>17</sup> in a group of 184 patients with NPC found that the most important factor in contributing to the development of dysphagia was not treatment type or cancer stage but the length of time after treatment. An interesting finding from the this study is the improved HR-QOL with the passage of time despite the negative impact of dysphagia. Epstein et al<sup>33</sup> point out that QOL continues to improve in patients who remain disease free. This is in contrast to people who have been newly diagnosed with disease or are actively undergoing treatment.<sup>34</sup> Wood-Dauphine<sup>35</sup> reminds us that a person's attitude toward a particular component of a HR-QOL measure or the standard by which he or she evaluates his or her QOL may change through such psychosocial phenomena as adaptation, coping, or expectation.

This study reports swallowing, hearing, and salivation/dry mouth to be the most important issues in a group of 51 treated, disease-free patients with NPC. These are similar findings to the studies by Fang et al<sup>36</sup> and Thalmi et al.<sup>22</sup> With the possible exception of chewing in Thalmi et al's article,<sup>22</sup> all three studies report similar important issues, despite the study numbers ranging from 30 to 182, and varying representation with regard to age, sex, time since treatment, treatment type, and cancer stage.

Hearing was identified in this study as one of the three most important issues by 45% of respondents, despite the fact that it got a good score

in the domain-specific item. Similarly, speech rated well on domain-specific items but was the fourth most important issue (24%) to those surveyed. This may be because participants under-reported their disability.<sup>37</sup>

The fact that fatigue was identified as a significant predictor of HR-QOL in this study is not surprising. Fatigue has been reported to be one of the most common symptoms experienced by patients with cancer<sup>38,39</sup> and a major obstacle in maintaining normal daily activities.

One potential limitation of this study is the lack of instrumental or clinical swallow evaluations that would have allowed more comparisons with Chang et al's article,<sup>17</sup> in particular the deterioration of swallowing function with time. However, the aim was to reflect the patient's experience of swallowing and eating difficulties. Furthermore, a psychometric translation of the questionnaires would have tested validity.

This research demonstrates a high prevalence of dysphagia among people who have been treated for NPC and the negative impact of dysphagia on QOL. A positive finding is that swallowing difficulties were not associated with deterioration in QOL with the passage of time. Future QOL studies interested in swallowing function should consider the use of a swallowing-specific questionnaire in addition to other measures. Longitudinal and larger studies will serve to study dysphagia in NPC over time and explore preventative dysphagia management. Further research is needed to look at the usefulness of swallowing-specific questionnaires in NPC and whether they should also be condition specific.

**Acknowledgments.** The authors thank Professor E. A. Weymuller and Dr. Bevan Yueh for permission to use, translate, and modify the UW-QOL, Dr. Coleen A. McHorney for permission to use, translate, and modify the SWAL-QOL, and Professor A. G. Kerr and Professor P. W. Alberti for critical comments on initial drafts of this article.

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