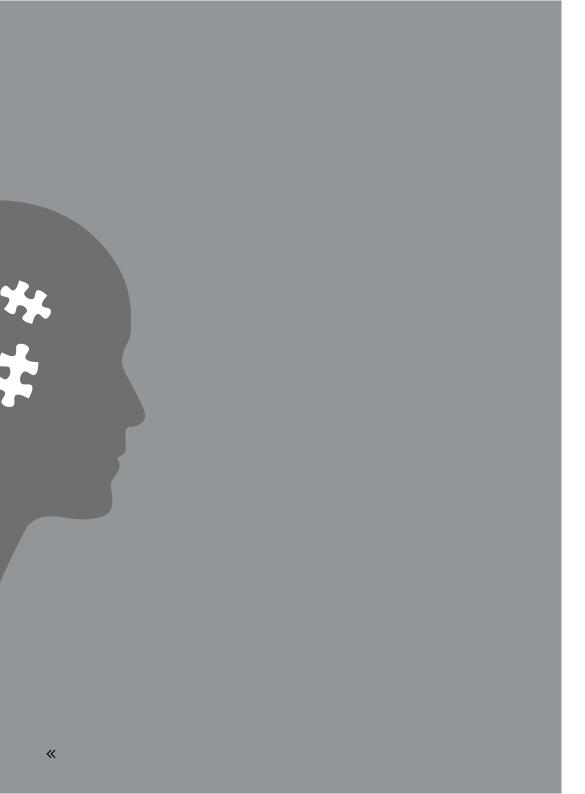Cover Page

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Emotional Intelligence in association with Quality of Life in patients recently diagnosed with vestibular schwannoma

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ABSTRACT

Objective
The objective of this study was two-fold. First, to examine the levels of emotional intelligence in patients recently diagnosed with vestibular schwannoma, in comparison to those of healthy individuals and patients with other physical illness. Second, to evaluate the correlation between emotional Intelligence and quality of life.

Study Design
Cross sectional study in a university tertiary referral center.

Methods
Consecutive patients (mean age [range], 56.4 [17-85] yr) diagnosed with vestibular schwannoma between April 2011 and October 2012 (N = 254). Sociodemographic characteristics, clinical characteristics, disease-specific quality of life (PANQOL), and emotional intelligence (TEIQue-SF) were assessed by questionnaire before the start of medical treatment.

Results
Levels of emotional intelligence in patients with vestibular schwannoma (N = 178; response rate 70.1%) were significantly lower compared with healthy individuals and patients with cancer. Emotional intelligence was highly positively correlated to disease-specific quality of life. Balance disorders and cranial nerve dysfunction made a significant negative contribution to the quality of life. For educational level, a significant positive contribution was found as well.

Conclusion
The substantial impact of a vestibular schwannoma diagnosis on a psychological measure (i.e., emotional intelligence) in the affected patients as demonstrated in our study has important clinical and research implications when developing guidelines about counselling of these patients. This also has to be taken into account when making clinical decisions about the proposed treatment. Addressing emotional intelligence may be helpful in the development of a self-management program for patients with vestibular schwannoma.

INTRODUCTION

Studies on Quality of Life (QoL) in patients with vestibular schwannoma (VS) have shown that many of these patients experience a lower QoL than healthy individuals and sometimes lower compared with patients with other chronic illnesses.[1-15] Increasingly, attention is being paid to self-reported outcomes when evaluating the effect of medical treatment, rather than physicians interpreting the patients' responses (i.e., patient reported outcome measures, PROM).[16,17] QoL is perhaps the best known PROM and has evolved into an important outcome in modern medicine where it is seen as the representation of ''the functional effect of an illness and its consequent therapy upon a patient, as perceived by the patient''.[18] It can also be defined as the ''individual's perceptions of the person's position in life and in the context of the culture, and the value system in which they live and in relation to their goals, expectations, standards, and their concerns''.[19]

With regard to VS, many articles have been published on the outcomes of medical treatment. [e.g., 20-23] However, only a few studies have evaluated the patients' perspective using PROM. In QoL research on patients with VS, the role of psychological factors has not clearly been considered.[3,4,6-10,12,24-28] Recently, a systematic review in this area was provided by Gauden et al.[29] According to their conclusion, there are methodologic weaknesses in the currently available literature on QoL of patients with VS. Further research is advocated with a disease-specific QoL measure in well-designed, prospective research. In our current study, the PANQOL (Penn Acoustic Neuroma Quality of Life scale) was used as the first available disease-specific QoL measure in patients with VS.[13,14]

To acquire a better understanding of QoL in these patients, it is of major importance to gain more insight into the determinants that impact QoL. An active coping style and a considerable degree of social support have been shown to be helpful in diminishing the potentially serious consequences of being diagnosed with VS.[12,30] These factors, therefore, seem to be important in maintaining a more favorable QoL.[12] The prevailing idea is that certain patient characteristics as well as tumor characteristics but also psychological factors are determinants of QoL in these patients.

In current literature, male sex, balance problems, vertigo, hearing loss, facial nerve dysfunction, microsurgical resection, psychological factors (low optimism, low control), and poor social support are identified as determinants of a diminished QoL in VS patients before, during, or after treatment.[3,5,10,25-27,31,32] The role of other psychological factors in determining QoL in this specific patient group has been understudied.[25] Research into the possible association of these determinants of QoL with regard to VS will still need to be

performed more thoroughly to give more insight into the distress of the disease process and the determinants that could predict QoL.

During the last two decades, emotional intelligence (EI) has been receiving increased attention within scientific research, which has been started by Petrides and Furnham.[33] EI could be a determinant of QoL in patients with VS, but this has not been investigated extensively. ''The ability to experience emotions is innate to every human being. However people differ in the way they are able to identify, express, utilize and regulate their feelings and those of others. The concept of EI has been proposed to account for this variability'' (Mikolajczak et al., 2006, p. 79). EI can be subdivided into Ability EI and Trait EI (TEI). Ability EI is considered as a competence, similar to intelligence and can be assessed by performance tests (like an intelligence quotient (IQ) test). TEI is the way in which someone would cope with pressures and demands and can be seen as a strong predictor of the impact of stressful events in life.[34,35] TEI can be assessed with self-report measures.[34-37] An instrument, which has been validated for this purpose is the Trait Emotional Intelligence Questionnaire (TEIQue).[38,39] Studies using this instrument have shown that TEI correlates positively with the way people cope with stress, which is important in the context of our study. Individuals with a higher TEI show greater self-efficacy in coping with stress, making it probable that their QoL is more favorable compared with people with lower TEI scores who show a lower self-efficacy.[34-36] A study on patients with urologic cancer concludes that patients with a lower TEI score are more at risk of psychological impairment and that TEI is a major predictor of psychological adaptation for which patients can be helped professionally, both psychologically and socially.[40] These results are in line with a meta-analysis on the relationship between TEI and health performed by Martins et al., which has shown that TEI could be a predictor of health.[41]

The aim of our study was to explore the association between TEI and disease-specific QoL in patients who have recently been diagnosed with VS, before the start of their treatment. The expectation is that people with lower TEI will have more difficulty regulating their emotions, and therefore, they will have more difficulty in dealing with the diagnosis of VS, compared with healthy individuals and cancer patients, which will result in a lower QoL. If our study confirms the association between a lower TEI and a diminished QoL, this finding is instrumental in patient care because psychological support (e.g., cognitive behavioral interventions).[42,43] can be proposed in patients who experience problems regulating their emotions. Moreover, this study creates awareness of possible problems concerning the diagnosis and thereby provides the opportunity of early anticipation on these problems. It will therefore contribute to optimal patient care.

Table 1. Patient characteristics and tumor characteristics of participating patients.

No. of participants	178
Age, mean in years (range*)*	56.4 (17 – 85)
Gender, male - *n* (%)	85 (47.8)
Initial tumor size - *n* (%)	
Small (<11 mm)	106 (59.4)
Medium (11-20 mm)	40 (22.5)
Large (>20 mm)	30 (16.9)
Unknown	2 (1.1)
Degree of hearing loss - *n* (%)	
Class A, normal hearing (<30 dB)	24 (13.5)
Class B, moderate hearing loss (30-50 dB)	54 (30.3)
Class C or D, severe hearing loss (>50 dB)	97 (54.5)
Unknown	3 (1.7)
Symptoms (patients could report > 1 symptom) - *n* (%)	
Tinnitus	133 (74.7)
Balance disorders	91 (51.1)
Vertigo	24 (13.5)
Cranial nerves dysfunction – *n* (%)	
Trigeminal nerve (N V) affected	18 (10.1)
Facial nerve (N VII) affected	4 (2.2)

MATERIALS AND METHODS

Participants
During the period of April 2011 to October 2012, a cross-sectional study was performed in 254 consecutive patients who were diagnosed with VS in the Leiden University Medical Center, Department of Otorhinolaryngology and Head and Neck Surgery. Patient characteristics and tumor characteristics were acquired from the patients' clinical charts and are summarized in Table 1. The tumor size was measured according to the common consensus[44] as the longest cerebellopontine, also called extracanalicular, dimension of the

VS. Hearing was classified according to the classification system of the Committee on Hearing and Equilibrium. Class A was defined as normal hearing, Class B as moderate hearing loss, and Class C and D as severe hearing loss.[45] Patients who could not read Dutch or who were otherwise unable to complete the questionnaire were excluded. Patients with a cerebellopontine angle growth other than VS (i.e., meningioma) that was confirmed by radiologic examination and patients with the diagnosis of neurofibromatosis Type 2 were excluded because of medical reasons.

Sociodemographic data are summarized in Table 2.

Table 2. Socio-demographic characteristics of participating patients.

Marital stage – n (%)	
Single	30 (16.9)
Married	120 (67.4)
Divorced / living separately	15 (8.4)
Widow / widower	12 (6.7)
Unknown	1 (0.6)
Living situation – n (%)	
Living alone	35 (19.7)
Living with partner	80 (44.9)
Living with partner and children	52 (29.2)
Other living situation	10 (5.6)
Unknown	1 (0.6)
Educational level – n (%)	
Low	61 (34.2)
Moderate	39 (21.9)
High	76 (42.7)
Unknown	2 (1.1)
Occupation – n (%)	
Fulltime	85 (47.8)
Parttime	13 (7.3)
Running a household	21 (11.8)
Student	1 (0.6)
Out of work or work disability	7 (3.9)
Retired	50 (28.1)
Unknown	1 (0.6)

Materials

Penn Acoustic Neuroma Quality of Life Scale - Dutch Version
The Dutch version of the PANQOL is a self-report questionnaire with 26 items concerning symptoms associated with VS. The PANQOL is a measure that assesses the disease-specific QoL in patients with VS.

The PANQOL was developed by Shaffer et al.[14] and translated into Dutch by the current authors.[13] Each item is answered on a Likert-scale of 1 (strongly disagree) to 5 (strongly agree). The PANQOL has 7 dimensions: Balance (6 items), Hearing (3 items), Anxiety (5 items), Energy (6 items), Pain (1 item), Face (3 items), and General Health (2 items). A total PANQOL score is also available, by adding scores on all items.

Trait Emotional Intelligence Questionnaire - Short Form
The TEIQue-SF is a patient-completed questionnaire that consists of 30 items designed to measure TEI. The short form (SF) version is based on the full form of the TEIQue developed by Petrides and Furnham in 2003.[37] From each of the 15 subscales of the TEIQue, 2 items were selected for inclusion in the Short Form, which was validated by the developers of the TEIQue in 2006.[46] Each item is scored on a 7-point Likert scale of 1 (strongly disagree) to 7 (strongly agree). The total score on the 30 items is called the total TEIQue-SF score. The global EI score is calculated by dividing the total TEIQue-SF score by the total number of items.[47] Petrides and Furnham[46] derived factor scores from the TEIQue-SF whereby 4 dimensions become available: Well-Being, which covers happiness, optimism, and self-esteem (example item: ''I generally believe that things will work out fine in my life''); Self-Control, which covers emotional regulation, impulse control, and stress management (example item: ''I'm usually able to find ways to control my emotions when I want to''); Emotionality, which covers empathy, emotional perception, emotional expression, and relationships (example item: ''Expressing my emotions with words is not a problem for me''); and Sociability, which covers emotional management, assertiveness, and social awareness (example item: ''I often find it difficult to stand up for my rights''). The Dutch translation of the TEIQue-SF was performed by Rieffe et al. and published on the official Web site of the London Psychometric Laboratory (http://www.psychometriclab.com).[39]

Procedure
The Medical Ethics Committee of the Leiden University Medical Center granted permission for the study. Patients received a booklet that contained the PANQOL, TEIQue-SF, Short-Form 36 health questionnaire (SF-36), and questions about sociodemographic

characteristics. The results of the SF-36 are not reported in this study because in this article, we use the disease-specific QoL measure PANQOL.[13] Patients were asked to return their completed booklet in a stamped envelope.

Levels of TEI of the patients in this study were compared with the results of healthy individuals from previously published studies. Reference groups from the studies of Petrides et al.[48], Arora et al.[49], and Cooper and Petrides[47] were used for comparing our patients with other disease samples. Another reference group in this study was patients in the diagnostic pathway with urologic cancer described by Smith et al.[50] The results of the TEI questionnaire of these patients are comparable to our sample because they both filled out the questionnaire before start of medical treatment. The mean age of the patients with cancer was 64.6 years, and 70.3% of the participants were male. To explore the association between TEI and QoL, the scores on the TEIQue-SF were correlated to the scores on the PANQOL dimensions.

Statistical Analysis

Means and standard deviations for the total TEIQue-SF score and its 4 dimensions were calculated. Independent t tests were carried out to compare of the TEIQue-SF scores between the current study and the samples of previous published studies. Level of significance was calculated with a 2-sided t test, with 95% confidence interval ($p < 0.05$). Associations between scores of the seven PANQOL dimensions, four TEIQue-SF dimensions, patient characteristics, and the socioeconomic characteristics were analyzed using Spearman correlation coefficients with living situation divided into two groups: living alone or with someone else (e.g., partner, children, friends). Educational level was defined as high, moderate, or low. Marital stage was also divided into 3 groups: married (or living together), single (or living alone), and widow(er). Furthermore, multiple linear regression analyses were performed using forward stepwise selection to examine the relationship between the independent variables sociodemographics, clinical characteristics, EI, and the dependent variable QoL, operationalized as the total PANQOL score. Only the variables that were significant in univariate analysis at the 0.05 level were used in the regression analyses. The aim of multiple regression analysis is to find out whether, based on the correlation of multiple independent variables with one dependent variable, an association with this dependent variable can be found with each of the single independent variables. The program Statistical Package for the Social Sciences version 20.0 was used.

Table 3. Comparison of levels of Trait Emotional Intelligence in current study, compared to healthy individuals and cancer patients using the TEIQue-SF [mean ± standard deviation]. [46-49]

	Current study VS patients (N = 178)			Petrides et al.[47] Healthy control group (N = 43)		Arora et al.[48] Healthy students (N = 17)	Cooper et al.[46] Healthy people (N = 866)		Smith et al.[49] Cancer patients (N = 64)
	Men	Women	Men & Women	Men	Women	Men & Women	Men	Women	Men & Women
	m (SD)	m (SD)	m (SD)	m (SD)	m (SD)	m (SD)	m (SD)	m (SD)	m (SD)
Total TEIQue	121.8 (23.4)	127.8 (21.6)	124.9 (22.5)	NA	NA	159.2 (13.4)**	NA	NA	143.2 (22.62)**
Global EI	4.06 (0.78)	4.26 (0.72)	4.16 (0.75)	4.80 (0.58)**	4.72 (0.44)**	NA	5.05 (0.69)**	4.94 (0.67)**	NA
Factors:									
Well being	4.52 (0.93)	4.78 (0.92)	4.65 (0.92)	5.16 (0.81)**	5.06 (0.58)	5.77 (0.53)**	NA	NA	NA
Self-control	3.86 (0.93)	3.93 (0.98)	3.90 (0.95)	4.37 (0.75)*	4.23 (0.58)	4.86 (0.77)**	NA	NA	NA
Emotionality	3.87 (1.02)	4.28 (0.95)	4.08 (1.00)	4.87 (0.70)**	5.01 (0.61)**	5.10 (0.70)**	NA	NA	NA
Sociability	3.81 (0.89)	3.80 (0.93)	3.80 (0.90)	4.92 (0.60)**	4.60 (0.63)**	5.35 (0.73)**	NA	NA	NA

Note; * $p < .05$; ** $p < .01$; NA: not applicable.

RESULTS

All 254 patients who were diagnosed with VS between April 2011 and October 2012 were included in the study group. Of these patients, 178 completed and returned the questionnaires (70.1%). Seventy-six patients did not respond or declined to complete the questionnaire (29.9%). The sociodemographic and clinical characteristics of the participating patients at baseline are shown in Tables 1 and 2. Clinical characteristics of nonresponders did not differ significantly from responding patients. The means and standard deviations of the total TEIQue- SF score, the global EI, and the four dimensions in the current study are given in Table 3, compared with samples of healthy individuals and patients with urologic cancer.

Both male and female patients with VS reported a significantly lower TEI score than three available reference groups of healthy respondents found in the literature.[47-49] This is shown in the total TEIQue score and Global EI score. Compared with the reference groups, significant lower scores were found on all four dimensions in men with VS ($p < 0.01$). For women, significant lower scores were found on the dimensions Emotionality and Sociability ($p < 0.01$).

Furthermore, the results show that patients in the current study who have recently been diagnosed with VS have a significantly lower TEI when compared with patients in a diagnostic cancer pathway.[50]

The PANQOL scores of current sample are given in Table 4.

Table 4. Scores on the PANQOL dimensions [mean ± standard deviation] in current sample of patients with VS (N = 178).

PANQOL dimension	Mean (SD)
Balance	66.3 (30.5)
Hearing	41.3 (26.5)
Anxiety	71.0 (24.9)
Energy	67.9 (26.8)
Pain	69.9 (36.0)
Face	84.2 (20.6)
General	59.8 (21.6)
Total PANQOL score	69.4 (21.4)

Correlations between the scores of our sample of VS patients on the TEIQue-SF and the PANQOL are shown in Table 5. The correlations between the total PANQOL score and the patient characteristics and sociodemographic data are shown in the same Table. A correlation of 0.48 ($p < 0.01$) in the expected direction was found between the total PANQOL score and the total TEIQue-SF score. For the four TEIQue-SF dimensions, a significant positive correlation with the total PANQOL score at the 0.01 level was found as well. For hearing loss, balance disorders, vertigo, and cranial nerve dysfunction, a significant negative correlation was found with the total PANQOL score. For educational level, we also observed a correlation, albeit a positive one.

Table 5. Correlations between the total PANQOL score and the Emotional Intelligence, patients characteristics and socio-demographic characteristics (N = 178).

	Total PANQOL score
Emotional Intelligence	
TEIQue-SF total score	.48**
TEIQue-SF wellbeing	.43**
TEIQue-SF self-control	.41**
TEIQue-SF emotionality	.36**
TEIQue-SF sociability	.33**
Patient characteristics	
Age	.02
Gender	-.05
Tumor size	-.12
Hearing loss	-.19*
Tinnitus	-.13
Balance disorders	-.44**
Vertigo	-.21**
Cranial nerve dysfunction	-.27**
Socio-demographic characteristics	
Marital stage	-.01
Living situation	-.07
Educational level	.32**

** p<.01; *p<.05.

All variables given in Table 5 that had a significant association with the total PANQOL score were included in the multiple regression analyses. The variables were simultaneously entered into a multivariate analyses model. The outcome of the regression analyses is given in Table 6 and shows that TEI makes a significant positive contribution to QoL-scores in patients who have been recently diagnosed with VS. Balance disorders and cranial nerve dysfunction showed a significant negative contribution to the QoL. Educational level showed a significant positive contribution to the QoL as well. These four factors together explained 38% of the variation in PANQOL scores.

Table 6. Multiple regression analysis for patient characteristics, symptoms and EI on QoL in VS patients (N = 178)

Variable	R^2adj	B	95% CI		p
Model 1	*.23****				
Total TEIQue score		.46	.33	.60	<.001
Model 2	*.33****				
Total TEIQue score		.39	.26	.52	<.001
Balance disorders		-14.0	-19.9	-8.1	<.001
Model 3	*.37****				
Total TEIQue score		.37	.24	.50	<.001
Balance disorders		-13.9	-19.6	-8.3	<.001
Cranial nerve dysfunction		-14.6	-23.1	-6.1	<.001
Model 4	*.38****				
Total TEIQue score		.33	.20	.46	<.001
Balance disorders		-13.4	-19.0	-7.7	<.001
Cranial nerve dysfunction		-14.1	-22.6	-5.7	<.01
Educational level		3.2	.08	6.3	<.05

Note. *** p<.001

DISCUSSION

Understanding of the determinants of QoL in patients with VS may help clinicians in their information provision to patients, decision making, and follow-up care. Moreover, it may give a more precise prediction of the QoL, thereby facilitating the opportunity to improve it.[51] The aim of this study was to examine the contribution of TEI on QoL in patients who have recently been diagnosed with VS.

As expected, TEI is associated with QoL in patients with VS. In addition, levels of TEI in patients who have recently been diagnosed with VS were significantly lower compared with healthy individuals on the total TEI score and on three of the 4 dimensions, namely, Well-Being, Emotionality, and Sociability. Because patients were included before start of treatment, the modality of treatment did not influence TEI, and apparently, TEI is reduced independently of the choice of treatment in these patients. The current study suggests that balance disorders, cranial nerve dysfunction, and educational level are the only factors among an extensive set of patient characteristics and clinical characteristics with an additional contribution on the QoL in patient with VS.

Recently the Penn Acoustic Neuroma Quality-of-Life scale (PANQOL) has been validated in American and Dutch patients as the first disease-specific QoL instrument for patients with VS.[13,14] Regarding disease-specific QoL, our study is comparable to the study of Shaffer et al.[14] In our study, a diminished QoL directly after diagnosis is found, which is comparable to the findings in the study of Shaffer et al.[13,14]

In the current study, TEI was significantly correlated to the dimensions of the disease-specific QoL. This correlation was found for the Total TEIQue-SF score and also for its four dimensions (Well-Being, Self-Control, Emotionality, and Sociability). Multiple regression analysis showed TEI to have a statistically significant contribution to the QoL in these patients, whereas sociodemographic characteristics and tumor characteristics did not enter the regression analyses. Results of this analysis show that TEI has contributed 23% of the variance in the QoL of VS patients. Balance disorders (10% explanation) and cranial nerve dysfunction (4% explanation) showed a significant negative contribution. This can be explained while balance disorders and dysfunction of the facial nerve or trigeminal nerve have a profound impact on the social functioning of individuals.

Educational level was shown to make a significant positive contribution as well (1% explanation). A possible explanation could be that individuals who have received higher education will generally possess higher levels of intelligence. This allows them to better

oversee their options and the information provided to them. A better understanding of their situation could eliminate uncertainties and therefore lead to a higher QoL.

Surprisingly, VS patients were shown having a significantly lower TEI than patients who are in a diagnostic cancer pathway.[50] This is a remarkable finding as most physicians would expect cancer to have a much larger impact on TEI, as patients with cancer will (most likely) require major treatment (including surgery) and might face strongly diminished life span and possible death. The explanation for this remains speculative. Physicians might not be very experienced in estimating the QoL of patients they manage medically. Studies concerning this subject will hopefully provide further knowledge about QoL among physicians and medical students. It could also help professionals in monitoring the QoL of patients during the disease process. Patients with VS have a tumor at the base of their skull. Although benign and slow growing, it might be considered as a brain tumor or a ''time bomb in the head'' [52], which is very threatening to patients. The urologic malignancies are usually well treatable. Neither in our study nor in literature there is a clear explanation for the difference in TEI compared with patients with cancer and other chronic illness. Then, again, we could state that the diagnosis of cancer is kind of definitive, patients will undergo treatment or accept consequences (including diminished life span and death) of the malignant tumor. In case of a benign brain tumor, it is not clear whether treatment is necessary at all. This causes an amount of uncertainty among patients.

Although QoL is strongly diminished in patients with VS, Brooker et al. describe that anxiety and depression in patients with VS did not differ significantly from general population norms and no significant differences were found across the three treatment options; microsurgical resection, radiation therapy, and watchful waiting.[53] In the study of Brooker et al. no description of intervention options for improving QoL are given.[53]

There are some limitations in the current study. This study is limited by its cross-sectional design, which rules out statements about causal relationships. We can only assume certain cause and effect directions, further theoretical model that forms the basis for this study (i.e., common sense model of illness, Leventhal et al.).[54] Furthermore, it should be noted that additional variables concerning emotional functioning could be relevant in this respect. For example, selfesteem, anxiety and illness perceptions could contribute.[12,53,55] Another limitation is the use of reference groups to compare the results of the TEI questionnaire. Because it is unknown whether TEI changes over time within the same patient (because of medical or other factors), the only possible comparison is with patients who are prior to treatment as well. Unfortunately, a study of patients with urologic cancer has shown to be the only available reference group in literature, where

patients filled out the questionnaire before the start of medical treatment. Although this group is small in number, it is the only available reference group as only a few studies focused on this particular determinant of QoL.

According to cognitive adaptation models, for example, the Common Sense Model of illness[54] individuals who experience traumatic events (i.e., diagnosis of disease) construct illness perceptions, and employ cognitive and emotional strategies to support self-esteem and regain a sense of control.[56] Because we find evidence for a diminished TEI in patients with VS, our study offers a suggestion for interventions with regard to dealing with emotions and cognitions of these patients at the moment of counseling. If patients indicate they experience difficulties in dealing with emotions in their daily life, psychological support by a psychologist, physician assistant, or social worker can be offered.[42,43,55] They can help patients find a way to improve management of their emotions. Social support and psychological support seem to be helpful to improve the emotional impairment in patients with, for example, cancer.[40] A future goal of the current research group is to start a cognitive behavior therapy program focused on the psychosocial consequences of the medical condition and evaluate its effects.

Vittuci emphasizes the importance of social support groups in patients with VS.[30] There is a study that showed impaired illness perception in patients with VS.[12] For patients with other chronic diseases, for example Crohn's disease, results of intervention studies focusing on psychological factors with a remarkable improvement of the QoL are available.[51] Compared with patients with other chronic illnesses (i.e., cancer), the area of psychological support in patients with VS is seriously under researched.[57,58] Future research is urgently needed to investigate which psychological intervention options are useful and available for VS patients.[25]

Because we find a significant correlation between TEI and QoL in patients with VS, possible improvement of the emotional impairment may lead to a higher QoL. We should also note that patients with balance disorders or cranial nerve dysfunction are more prone to a diminished QoL. In literature, some more studies are available concerning dizziness, which is the most significant audiovestibular predictor of QoL in patients with VS.[23,26] Future research is needed to find out which psychological intervention methods are usable in patients with VS, particularly as no studies of psychological interventions for these patients are currently available. Our results may also have clinical implications regarding medical management of patients with VS. Understanding the risk factors of a diminished QoL may be important when choosing between the three possible therapeutic interventions: microsurgical resection, radiation therapy, and watchful waiting.

CONCLUSION

This study is the first to examine the association between TEI and disease-specific QoL in patients who have recently been diagnosed with VS. Compared with healthy individuals and patients with urologic cancer, a significantly lower TEI was observed in the current sample of VS patients. Furthermore, a significant positive correlation between TEI and disease-specific QoL was found.

On the basis of our results, an intervention program for VS patients could focus on the improvement of emotional behavior because these strategies seem to have an association with the QoL in these patients. We need patients to recognize, acknowledge, and accept their emotions with the therapeutic goal to change their emotions and cognitions, which can lead to a reduction of the intensity of it. Hopefully, these findings will assist in the implementation of improved counseling and will provide clinicians information that may be instrumental in their choice of the proposed treatment for patients with VS in the future as this vulnerable group of patients seems to be prone to a diminished QoL.

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