Am J Transl Res 2020;12(10):6637-6645
www.ajtr.org /ISSN:1943-8141/AJTR0111560

Original Article

Reduction of depression symptoms in laryngeal cancer patients receiving psychology services

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Received March 28, 2020; Accepted July 15, 2020; Epub October 15, 2020; Published October 30, 2020

Abstract: Depression is prevalence in patients with laryngeal cancer. In this study, we aim to investigate whether psychological intervention could reduce the depression of patients receiving cancer treatment. In this study, 258 patients with laryngeal cancer were assigned into two groups with or without psychological intervention. The depression symptoms of all patients were assessed using Hamilton depression rating scale (HAMD) and Hamilton anxiety rating scale (HAMA). Europe Organization for research and Treatment of cancer Quality of life Questionnaire (EORTC QLQ-C30) was used to measure the life quality of the participants. Other measurements including general attitudes towards psychology services, hospitalization duration and expenses were analyzed. We found that patients with intervention showed more positive attitudes towards psychology services compared to those in control group. Hospitalization duration and expenses were significantly less in intervention group compared to control group. In addition, the intervention group showed a significantly lower HAMD and HAMA scores and improved life quality than control group. Patients aged lower than 40 years showed more obvious reductions in HAMD and HAMA scores and better life quality compared to older patients. In conclusion, our study demonstrated that psychological intervention was necessary and effective in patients with laryngeal cancer during treatment.

Keywords: Laryngeal cancer, depression, psychological intervention, hamilton depression rating scale (HAMD), hamilton anxiety rating scale (HAMA)

Introduction

Early studies demonstrated that the prevalence of depression was dramatically higher in cancer patients than it in general populations [1, 2]. Depression has been considered and evidenced as an important factor contributing to reduced quality of life, compromised outcomes of cancer treatment, higher suicide rate and longer hospitalization duration [3-5]. Cancer patients with depression show an about 25% to 39% increase of mortality risk [6].

It was stated that the types of primary cancer affected depression prevalence rate [7]. Compared to patients with other cancer types such as breast cancer and skin cancer, patients with head and neck cancer (HNC) were reported to have the highest level of anxiety. Up to 57% patients with head and neck cancer are suffering from depression [8, 9], which is far more than the average incidence rate of other cancers. This may be due to numerous factors such as disfigurement and impairments in daily activities including breathing, swallowing, and taste [10]. Nowadays, early diagnosis and appropriate treatment lead to the increase of the 5-year survival rate of HNC [11, 12]. Posttreatment depression therefore becomes a major concern that may affect the survival of patients.

Psychological intervention has been shown as an effective method to alleviate the depression symptoms of cancer patients [13]. Most previous studies reported that life quality was significantly improved in patients with HNC after psychological intervention [13]. It was suggested that psychological intervention was needed for patients with HNC as early as diagnosis [14]. However, due to the lack of psychosocial service in China and low compliance of patients for psychological treatment, patients receiving psychological intervention are relatively rare [15]. On the other hand, patients are not aware of

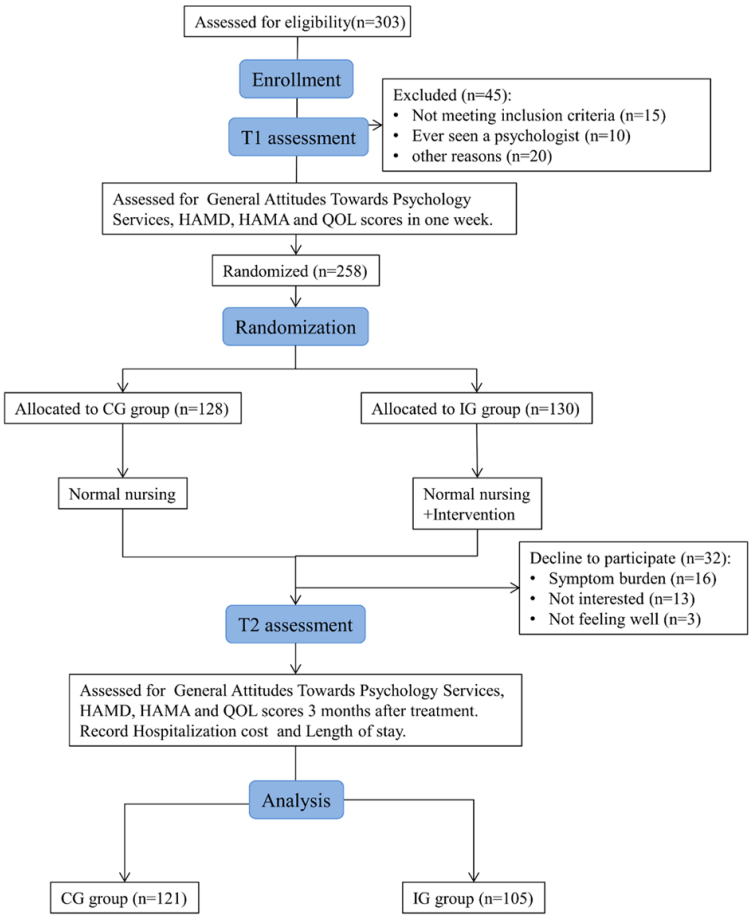

Figure 1. Outline of the study. CG, control group. IG, intervention group. HAMA, Hamilton anxiety rating scale; Hamilton depression rating scale, HAMD; EORTC QLQ-C30, Europe Organization for research and Treatment of cancer Quality of life Questionnaire.

the importance of psychological services and even reluctant to receive the services [16]. In particular, it remains unclear whether the old and young patients have different responses to the psychological intervention. Therefore, since 2016, our hospital had specially organized a group of psychologists and counselors, aiming to improve emotional well-being of patients with laryngeal cancer as an important part of standard treatment. This clinical study aimed to evaluate the patient own awareness of their psychological state and the impact of psychological intervention on depression and life quality.

Methods

Patients

Patients who were over 18 years old, pathologically diagnosed with laryngeal cancer (within one month), had normal level of consciousness, were able to understand the essence of this clinical trial and recognized the entire operation process were eligible in this study. Patients who previously had received treatment from a psychologist or distress symptom was confirmed to be too severe to participate by the caregiver were excluded in this study. All eligible participants were required to provide written consents and complete a questionnaire to further confirm their eligibility to ensure the balance of subsequent randomization. The questionnaire survey mainly assessed demographics, symptom distress scores (Edmonton Symptom Assessment System, ESAS), current emotional distress (Hospital Anxiety and Depression Scale, HADS), and previous experience of receiving psychiatric/psychology services elsewhere.

The detailed procedure of this study is shown as **Figure 1**. In the end, 258 participants were randomly divided into two groups using the Pocock-Simon randomization method according to their age, gender, and HADS scores: control group (n = 128) and intervention group (n = 130). For the control group, only standard nursing care was provided. For the intervention group, we provided psychological intervention. All assessments were collected at two time points: baseline (T1) and 3 months after treatment (T2). Researchers and principal investigators were blind about the group, and study participants do not know the purpose of this study. All studies were approved by the Ethics Commitment of Weifang People's Hospital, and written consent was derived from each patient.

Intervention procedure

For intervention group, doctor introduced the entire treatment process to the patients, and informed possible surgical treatment risks, complications, and psychological pressures

that the patient may confront during the entire treatment process. Pre-trained and professional psycho-oncologists were assigned to educate a group of the patients (6-8 patients each group). Each week, the psycho-oncologists provided 6 lessons until patients were not able to continue due to the cancer treatment. These 6 lessons are structurally composed of the following topics: 1. Tumor-specific depression; 2. Health improvement and coping strategies; 3. Treatment sequelae; 4. Postoperative tumor progression and fear of recurrence; 5. Doctor-patient communication; 6. Social resources and professional support. All the lessons were designed for patients to fully understand the psychological problems they may confront to during the treatment process and the psychological service which they may obtain help. The concept of the psychological intervention was to reduce their sense of shame of having psychological problem and to lead them to accept that psychological problem is a normal physiological response to external pressure. Each lesson was about 120 min including explanation using PowerPoint, group discussions, worksheets, and guided scenario simulations. All patients were free to contact with psycho-oncologists when necessary.

Control group

For control group, doctor introduced the patients about the entire treatment process and informed the possible surgical risks and complications. Control group did not receive the lesions but were free to contact with psycho-oncologists. The Intervention group and Control group received the same routine nursing care. Patients were suggested to communicate using body language, keep oral cleanliness, and stop drinking and smoking.

Outcomes

The general attitudes towards psychology service were assessed using five questions. The questions were modified from a previous report [15]. Hospitalization expenses and duration were analyzed from the records of the hospital. Expenses includes the cost from outpatient department, emergency, hospitalization and counselling costs. Patients were blind to their group assignment, and the doctors measuring HAMD, HAMA and QOL scores were also blind to the patient group assignment.

The Hamilton depression rating scale (HAMD) and Hamilton anxiety rating scale (HAMA) were used to evaluate the depression severity patients at T1 and T2. Europe Organization for research and Treatment of cancer Quality of life Questionnaire (EORTC QLQ-C30) [17] was used to measure the overall life quality of the participants.

Statistical analysis

All data analysis was conducted using SPSS software (version 17.0; SPSS Inc., Chicago, IL, USA). To compare the difference between the groups, a Student's t-test and chi-square test were used. Paired student's t-test was used to compared the difference in one group at T1 and T2. A p value less than 0.05 was considered to be statistical significance.

Results

Patient characteristic

Totally 258 patients were included and 226 patients were analyzed in this study. The sociodemographic and medical history of all patients were recorded and compared between control and intervention groups. No significant difference was noted as shown in **Table 1**.

General attitudes to psychology services

We firstly confirmed the attitudes of all participants to psychology services using several main questions as shown in **Table 2**. For patients in control group, their attitudes to psychology services did not change over time. The attitudes in intervention group and control group had no significant difference before intervention. However, patients received intervention showed dramatically more positive attitudes to psychology services. Significantly higher proportion of patients who received intervention believed the services were helpful compared to patients in control group.

Hospitalization duration and hospitalization expenses

We compared the hospitalization duration and expenses between control and intervention groups. It was found that patients received intervention showed a shorter time of hospitalization and less hospitalization expense (**Table**

Table 1. Sociodemographic and medical data of the participants

Characteristic	Control group (n = 121)	Intervention group (n = 105)	*P* value
	N (%)	N (%)	
Sociodemographic data			
Age (y)			0.499
< 40	55 (45.4)	47 (44.8)	
≥ 40	66 (54.6)	58 (55.2)	
Sex			0.647
Male	82 (67.8)	70 (66.7)	
Female	39 (32.2)	35 (33.3)	
Marital status			0.342
Single	23 (19.0)	19 (18.1)	
Married	98 (81.0)	86 (81.9)	
Highest level of education			0.151
High school or higher	60 (49.6)	51 (48.6)	
Secondary school	53 (43.8)	47 (44.8)	
Primary school or lower	8 (6.6)	7 (6.6)	
Employment status			0.808
Full- or part-time	103 (85.1)	91 (86.7)	
Not employed	18 (14.9)	14 (13.3)	
Smoking history			0.615
Never smoked	39 (32.2)	33 (31.4)	
Former smoker	35 (29.0)	30 (28.6)	
Current smoker	47 (38.8)	42 (40.0)	
Alcohol history			0.670
Never	33 (27.3)	26 (24.8)	
Active drinker	57 (47.1)	51 (48.6)	
Former Drinker	31 (25.6)	28 (26.6)	
Medical data			
TNM stage			0.522
Phase I	35 (29.0)	30 (28.6)	
Phase II	42 (34.7)	37 (35.2)	
Phase III	25 (20.7)	21 (20.0)	
Phase IV	19 (15.6)	17 (16.2)	
Treatment type			0.387
Surgery	83 (68.6)	74 (70.5)	
Radiotherapy	54 (44.6)	42 (40.0)	
Chemotherapy	44 (36.4)	37 (35.2)	

TNM, tumor node metastasis.

3), suggesting that intervention may improve the body status of those patients.

Improved psychological status by intervention

To evaluate whether intervention was useful in the patients, we evaluated HAMD, HAMA, EORTC QLQ-C30, cognitive and social functions in the two groups. As expected, at T2 time, HAMD and HAMA scores were significantly reduced in patients received intervention compared to those in control group (**Table 4**), as no significant change was observed at T1 between the two groups. The life quality of patients in intervention group were similar at T1. However, at T2, the life quality and social function of patients in intervention group were significantly higher than those in control group. Although there was no significant difference in cognitive function between these two groups, it could be implicated that intervention functioned positively for improvement of psychological status and life quality of these patients.

Age affects intervention results

As the stress of patients at different ages may be varied, we further investigated whether age plays a role in the intervention outcomes. We compared the changes of HAMD score, HAMA score and EORTC-QLQ-C30 in the two groups. Interestingly, in control group, we found that patients aged ≥ 40 showed significantly higher reduction of HAMD than patients < 40 age (**Table 5**), implicating that younger patients may be more vulnerable to depression compared to older patients. However, the intervention group showed that patients aged ≥ 40 had a lower reduction of HAMD score compared to the patients < 40 age. The change in HAMA score of the intervention group showed the same trend as HAMD score. However, compared to control group, intervention apparently improved the psychological status of patients regardless of ages.

We also found that patients < 40 had a less reduction of life quality compared to older

Table 2. General attitudes towards psychology services

Outcomes	Control group (CG = 121)		Intervention group (IG = 105)		*P* value between two groups§
	T1	T2	T1	T2	
Do you think psychology services is helpful for your treatment?					
Yes	47 (38.8)	51 (42.1)	43 (41.0)	71 (67.6)†††	< 0.001
No	34 (28.1)	32 (26.4)	27 (25.7)	15 (14.3)†††	< 0.001
Don't know	40 (33.1)	38 (31.5)	35 (33.3)	19 (18.1)†††	< 0.001
Who would you seek for help when you think you are in depression?					
Friends and family	77 (63.6)	78 (64.5)	67 (63.8)	69 (65.7)	0.314
Religious organization	13 (10.7)	11 (9.1)	10 (9.5)	9 (8.6)†	0.117
Psychologist	30 (24.8)	31 (25.6)	27 (25.7)	60 (57.1)†††	< 0.001
General practitioner	26 (21.5)	27 (22.3)	22 (21.0)	24 (22.9)	0.230
others	12 (10.0)	11 (9.1)	10 (9.5)	8 (7.6)††	0.016
How do you feel about talking to a psychologist?					
Open	41 (33.9)	39 (32.2)	36 (34.3)	53 (50.5)†††	< 0.001
Hesitated	52 (43.0)	55 (45.5)	44 (41.9)	40 (38.1)†††	< 0.001
rejective	28 (23.1)	27 (22.3)	25 (23.8)	12 (11.4)†††	< 0.001
Patients consulting psycho-oncologists for help					
	N/A	33 (27.3)	N/A	69 (65.7)	< 0.001

†P < 0.05, ††P < 0.01, †††P < 0.001 T2 vs T1. §, comparison of T2 between Intervention group and Control group.

Table 3. Comparison of the hospitalization duration and hospitalization expenses between the two groups

Outcomes	Control group Mean ± SD	Intervention group Mean ± SD	*P* value
Hospitalization duration (days)	23.4±5.5	18.5±6.7	0.007
Hospitalization expenses (RMB)	21,154±3,416	20,731±2,653	0.043

Table 4. Comparison of HAMD, HAMA and QOL score of each dimension between the two groups

Outcomes	Control group		Intervention group		*P* value between two groups§
	T1	T2	T1	T2	
HAMD score	27.2±3.4	21.9±4.6††	27.6±3.3	16.5±3.5†††	< 0.001
HAMA score	25.8±4.9	16.7±8.1†††	26.2±4.5	8.3±2.2†††	< 0.001
EORTC QLQ-C30					
Global QOL	83.4±5.2	61.3±8.3†††	84.9±5.5	72.5±6.9††	0.007
Physical function	92.6±4.7	75.3±6.9†††	91.8±4.4	82.6±7.3††	0.003
Role function	89.4±6.4	72.7±8.8†††	90.2±5.9	88.6±9.0†	< 0.001
Emotional function	90.3±4.6	57.8±15.2†††	90.5±4.9	83.5±12.7††	< 0.001
Cognitive Function	84.1±7.5	73.2±13.7†††	84.7±7.8	75.2±12.8†††	0.074
Social Function	87.2±6.5	56.7±15.7†††	88.5±6.4	66.3±15.4†††	0.005

Data were expressed as mean ± SD. †P < 0.05, ††P < 0.01, †††P < 0.001 T2 vs T1. §, comparison of T2 between Intervention group and Control group.

patients over time in both control and intervention group. However, compared to control group, intervention significantly improved the life quality of all patients.

Discussion

Depression after cancer diagnosis is not a neglected factor that could influence the sur-

Table 5. Effect of Psychology Services intervention on HAMD, HAMA and QOL scores by age

Outcomes	Age			
	< 40		≥ 40	
	Control group (n = 55) Δin score	Intervention group (n = 47) Δin score	Control group (n = 66) Δin score	Intervention group (n = 58) Δin score
HAMD score	-5.37±4.89	-12.69±8.53***	-6.46±5.27$^{\&}$	-11.83±8.14$^{***,\&}$
HAMA score	-9.42±6.05	-19.49±10.83***	-9.73±7.01	-16.24±9.06$^{***,\&\&}$
EORTC QLQ-C30				
Global QOL	-20.58±13.35	-9.59±6.27***	-26.44±14.16$^{\&\&}$	-14.35±7.61$^{***,\&\&}$
Physical function	-15.49	-7.45***	-18.21$^{\&\&}$	-11.23$^{***,\&\&}$
Role function	-15.57	-1.27***	-16.91$^{\&}$	-2.31$^{***,\&\&}$
Emotional function	-32.04	-5.49***	-33.28$^{\&}$	-9.04$^{***,\&\&\&}$
Cognitive Function	-7.26	-7.44	-14.37$^{\&\&\&}$	-11.16$^{***,\&\&\&}$
Social Function	-24.07	-19.26***	-34.18$^{\&\&\&}$	-25.49$^{***,\&\&\&}$

Data were expressed as mean ± SD. ***P < 0.001, Control group vs Intervention group. $^{\&}$P < 0.05, $^{\&\&}$P < 0.01, $^{\&\&\&}$P < 0.001 age < 40 group vs age ≥ 40 group.

vival of patients. According to previous researches, the prevalence rate of depression was about 12.5% in cancer patients, which was almost four-times higher than others [18]. Depression was suggested to be associated with poor prognosis and worse survival rate [6]. Particularly, antidepressant medication showed little impact on depression assessed using Edinburgh depression scale (EDS) and Patient Health Questionnaire 9 (PHQ9) [19] in patients with advanced cancers. Depression prevention may potentially benefit the outcomes of cancer treatments. The incidence of depression was stated to be associated with a lower survival rate in patients with head and neck cancer [20]. Therefore, it becomes important to confirm whether psychological intervention is effective among patients with head and neck cancer.

In this study, we focused on patients with laryngeal cancer. We assessed whether intervention reduced the psychological distress of patients receiving cancer treatments. Although previous studies demonstrated that depression in cancer patients was associated with various psychosocial stressors such as inflammation, psychological interventions have been shown to benefit individuals with reduced depressive burden [21]. Importantly, psychological intervention could promote patient survival, demonstrated form a study on patients with breast cancer [22]. In a range of other cancer types, psychological intervention was shown to be effective to reduce depression symptoms [23, 24].

A recent study on patients with laryngeal cancer demonstrated that psychological intervention improved HAMD, HAMA, and EORTC QLQ-C30 scores over time and significantly decreased the duration of hospitalization and total expenses [25]. However, in that study, they did not demonstrate the characteristics between the control and intervention groups, which could affect the results of the research. Here, we included sociodemographic and medical data of all participants in the two groups to confirm the results were not dependent on other elements but only intervention treatment. We also analyzed the general attitudes towards psychology services. About half of participants believed in psychology services in both control and intervention groups. Interestingly, patients with positive attitudes to psychology services dramatically increased after intervention. The results, on the other hand, implicated the effectiveness of psychological intervention. Consistent with the study, our data showed that the duration and expenses of hospitalization were also significantly less in intervention group compared to control group, suggesting that intervention could be a positive contributor to postoperative recovery.

Indeed, the decreases of HAMD and HAMA scores in intervention group over time provided a strong evidence indicating the effectiveness

of intervention in those patients. Notably, the HAMD and HAMA scores in intervention group after treatments were significantly reduced compared to those of control group. These results indicate that intervention is a useful method to prevent depression of patients with laryngeal cancer. Although there are a number of studies investigating the impact of surgery such as laryngectomy on postoperative depression of patients with laryngeal cancer [26], whether psychological intervention play positive role for the recovery and psychological status of the patients are rare. Another previous study reported that a Helpless-Hopeless mental adjustment response had a correlation with worse depression, reduced life quality and poorer survival rate in patients with laryngeal cancer [27]. Our study also found that life quality was significantly improved in patients with intervention compared to those without after laryngeal cancer treatment. Taken together, these evidences suggest that psychological intervention may alter the mental adjustment response of patients, and therefore leading to a better outcome. However, we did not assess whether the intervention also had an association with survival rate, which is necessary in further studies. In addition, it is interesting to investigate whether the mental adjustment response is also changed after psychological intervention in further studies.

Importantly, previous data reported that age was an essential factor associated with depression severity [10]. They found that older patients (aged about 62 years) showed significantly higher Beck's Depression Inventory (BDI) score than younger patients (aged about 54 years) with laryngeal cancer [10], implicating that older patients have more severe mental problem. This finding was supported by numerous other previous studies on patients with laryngeal cancer [10, 26]. As depression patients who are older than 65 have a higher risk of suicide [28], further studies not only need to compare the survival rate among patients with different ages after intervention and also considered suicide rate.

Here, we found that patients older than 40 years also had a positive response to intervention. Our study provides the evidence that even in older patients, intervention could be an effective method to treat cancer induced depression. Indeed, the decreases of HAMD and HAMA scores in younger patients aged lower than 40 years were significantly more than older patients after intervention. Inversely, the younger patients showed less global QOL reduction compared to older patients. Despite these results demonstrating that intervention have a better outcome in patients younger than 40 years old compared to older patients, intervention showed dramatically impact on reduction of depression symptoms and improvement of life quality. We suggest that it is better to adjust the methods of psychological intervention when treating older patients, which may significantly improve the outcomes.

Conclusion

In conclusion, we found that psychological intervention during cancer treatment of laryngeal patients significantly reduced HAMD and HAMA scores and improved life quality quantified as EORTC QLQ-C30. Age was an important factor affecting the outcomes of the intervention, as younger patients (< 40 years old) showed higher reductions in HAMD and HAMA scores and lower decrease in QLQ-C30 compared to older patients (≥ 40 years old). Our study demonstrated that psychological intervention had a positive impact on the reduction of depression and improvement of life quality of patients with laryngeal cancer.

Disclosure of conflict of interest

None.

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References

[1] Okamura M, Yamawaki S, Akechi T, Taniguchi K and Uchitomi Y. Psychiatric disorders following first breast cancer recurrence: prevalence, associated factors and relationship to quality of life. Jpn J Clin Oncol 2005; 35: 302-309.

[2] Ciaramella A and Poli P. Assessment of depression among cancer patients: the role of pain, cancer type and treatment. Psychooncology 2001; 10: 156-165.

[3] Colleoni M, Mandala M, Peruzzotti G, Robertson C, Bredart A and Goldhirsch A. Depression and degree of acceptance of adjuvant cytotoxic drugs. Lancet 2000; 356: 1326-1327.

[4] Prieto JM, Blanch J, Atala J, Carreras E, Rovira M, Cirera E and Gastó C. Psychiatric morbidity and impact on hospital length of stay among hematologic cancer patients receiving stem-cell transplantation. J Clin Oncol 2002; 20: 1907-1917.
[5] Henriksson MM, Isometsä ET, Hietanen PS, Aro HM and Lönnqvist JK. Mental disorders in cancer suicides. J Affect Disord 1995; 36: 11-20.
[6] Satin JR, Linden W and Phillips MJ. Depression as a predictor of disease progression and mortality in cancer patients: a meta-analysis. Cancer 2009; 115: 5349-5361.
[7] Linden W, Vodermaier A, MacKenzie R and Greig D. Anxiety and depression after cancer diagnosis: prevalence rates by cancer type, gender, and age. J Affect Disord 2012; 141: 343-351.
[8] Haisfield-Wolfe ME, McGuire DB, Soeken K, Geiger-Brown J and De Forge BR. Prevalence and correlates of depression among patients with head and neck cancer: a systematic review of implications for research. Oncol Nurs Forum 2009; 36: E107-25.
[9] Barber B, Dergousoff J, Slater L, Harris J, O'Connell D, El-Hakim H, Biron VL, Mitchell N and Seikaly H. Depression and survival in patients with head and neck cancer: a systematic review. JAMA Otolaryngol Head Neck Surg 2016; 142: 284-288.
[10] Yılmaz M, Yener M, Yollu U, Akil F, Haciyev Y, Yargic I, Karaman E and Cansiz H. Depression, self-esteem and sexual function in laryngeal cancer patients. Clin Otolaryngol 2015; 40: 349-354.
[11] Gatta G, Botta L, Sánchez MJ, Anderson LA, Pierannunzio D, Licitra L, Hackl M, Zielonke N, Oberaigner W and Van Eycken E. Prognoses and improvement for head and neck cancers diagnosed in Europe in early 2000s: the EUROCARE-5 population-based study. Eur J Cancer 2015; 51: 2130-2143.
[12] Lin SS, Massa ST and Varvares MA. Improved overall survival and mortality in head and neck cancer with adjuvant concurrent chemoradiotherapy in national databases. Head Neck 2016; 38: 208-215.
[13] Calver L, Tickle A, Moghaddam N and Biswas S. The effect of psychological interventions on quality of life in patients with head and neck cancer: a systematic review and meta-analysis. Eur J Cancer Care (Engl) 2018; 27: e12789.
[14] Richardson AE, Morton R and Broadbent E. Psychological support needs of patients with head and neck cancer and their caregivers: a qualitative study. Psychol Health 2015; 30: 1288-1305.
[15] Ann-Yi S, Tanco K, Carmack CL, Liu DD, Bansal S, Williams J, Lim KH and Bruera E. Introducing psychology services to advanced cancer patients: a randomized double blind trial. Psychooncology 2019; 28: 1978-1986.
[16] Holland JC. IPOS sutherland memorial lecture: an international perspective on the development of psychosocial oncology: overcoming cultural and attitudinal barriers to improve psychosocial care. Psychooncology 2004; 13: 445-59.
[17] Aaronson NK, Ahmedzai S, Bergman B, Bullinger M, Cull A, Duez NJ, Filiberti A, Flechtner H, Fleishman SB and de Haes JC. The European organization for research and treatment of cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology. J Natl Cancer Inst 1993; 85: 365-376.
[18] Lutgendorf SK and Andersen BL. Biobehavioral approaches to cancer progression and survival: mechanisms and interventions. Am Psychol 2015; 70: 186.
[19] Lloyd-Williams M, Payne S, Reeve J and Kolamunnage Dona R. Antidepressant medication in patients with advanced cancer-an observational study. QJM 2013; 106: 995-1001.
[20] Rieke K, Schmid KK, Lydiatt W, Houfek J, Boilesen E and Watanabe-Galloway S. Depression and survival in head and neck cancer patients. Oral Oncol 2017; 65: 76-82.
[21] Wang ZY, Liu L, Shi M and Wang L. Exploring correlations between positive psychological resources and symptoms of psychological distress among hematological cancer patients: a cross-sectional study. Psychol Health Med 2016; 21: 571-582.
[22] Andersen BL, Yang HC, Farrar WB, Golden-Kreutz DM, Emery CF, Thornton LM, Young DC and Carson WE 3rd. Psychologic intervention improves survival for breast cancer patients: a randomized clinical trial. Cancer 2008; 113: 3450-3458.
[23] Faller H, Schuler M, Richard M, Heckl U, Weis J and Küffner R. Effects of psycho-oncologic interventions on emotional distress and quality of life in adult patients with cancer: systematic review and meta-analysis. J Clin Oncol 2013; 31: 782-793.
[24] Hart SL, Hoyt MA, Diefenbach M, Anderson DR, Kilbourn KM, Craft LL, Steel JL, Cuijpers P, Mohr DC and Berendsen M. Meta-analysis of efficacy of interventions for elevated depressive symptoms in adults diagnosed with cancer. J Natl Cancer Inst 2012; 104: 990-1004.
[25] Li X, Li J, Shi Y, Wang T, Zhang A, Shao N and Wang Z. Psychological intervention improves life quality of patients with laryngeal cancer. Patient Prefer Adherence 2017; 11: 1723.

[26] Batıoğlu-Karaaltın A, Binbay Z, Yiğit Ö and Dönmez Z. Evaluation of life quality, self-confidence and sexual functions in patients with total and partial laryngectomy. Auris Nasus Larynx 2017; 44: 188-194.
[27] Johansson M, Rydén A and Finizia C. Mental adjustment to cancer and its relation to anxiety, depression, HRQL and survival in patients with laryngeal cancer-a longitudinal study. BMC Cancer 2011; 11: 283.
[28] Conwell Y. Suicide in the elderly. Schneider L, Reynolds C and Lebowitz B. 1994.