Early Intervention in Special Education and Rehabilitation

Beograd 2016.

Early Intervention in Special Education and Rehabilitation

THEMATIC COLLECTION OF INTERNATIONAL IMPORTANCE

Belgrade, 2016

Early Intervention in Special Education and Rehabilitation
Thematic Collection of International Importance

Publisher
University of Belgrade – Faculty of Special Education and Rehabilitation
Publishing Center of the Faculty

For publisher
PhD Snežana Nikolić, Dean

Processing and printing
Planeta print, Belgrade

Cover design
Boris Petrović, MA

Technical Editor
Biljana Krasić

Circulation 150

ISBN 978-86-6203-086-3

By decision no. 3/9 from March, 8th 2008. The Teaching and Research Council of the University of Belgrade – Faculty of Special Education and Rehabilitation initiated Edition: Monographs and papers.

By decision no. 3/122 from August, 30th 2016. The Teaching and Research Council of the University of Belgrade – Faculty of Special Education and Rehabilitation has given approval for the printing of Thematic Collection "Early Intervention in Special Education and Rehabilitation".

QUALITY OF LIFE OF PATIENTS AFTER TOTAL LARYNGECTOMY – SF-36

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SUMMARY

Objective. *The aim of this study was to assess the quality of life of patients after total laryngectomy and to determine the influence of a vocal rehabilitation on the improvement of the quality of life of these patients.*

Methods. *The study included 45 patients, 25 patients were in the experimental group and 20 patients were in the control group. The experimental group consisted of male respondents after total laryngectomy who mastered esophageal speech, aged 54 to 72 years. A subjective assessment of voice was conducted, using the SF-36 questionnaire which is valid and culturally adapted version of the Serbian language, consisting of 36 questions, which measures functioning in the following areas: functional ability, physical ability, emotional capacity, vitality, mental health, social functioning, pain and general health.*

Results. *SF-36 has shown that patients after vocal rehabilitation have higher scores on all subtests. Using the t test for large independent samples, a statistically significant difference has been found between the experimental group at the beginning of the measurement and control group on all subtests. Statistical significance is at the 0.01 level. The mean value (M) is lower in the experimental group at the beginning of measurement than the control group. In contrast to this result, there is no statistically significant difference between the experimental group at the end of the measurement and control group.*

Conclusion*. Vocal rehabilitation was significant in patients after total laryngectomy; in addition to mastering some of the methods of speech, these patients were able to overcome the feeling of shame because of their physical appearance after the operation and to strengthen their self-confidence.*

Key words: Laryngeal Neoplasms, Total Laryngectomy, Vocal Rehabilitation, Quality of Life, Measurement, SF-36 scale

INTRODUCTION

Total laryngectomy is a radical operation that leads to permanent loss of the generator and the part of the resonator of voice, larynx, which creates basic laryngeal tone. It leads to change in the normal anatomical relationships in the neck, causing disruption of communication and changing the psychosocial status of the patient (Mitrović, 2008). It is done if the laryngeal tumor advanced (T3 and T4) and partial laryngectomy cannot be done.

Total laryngectomy exposes a patient to a great mental stress, both due to the underlying disease and the loss of a very important organ in the general functioning

of the body (Petrović-Lazić, 2001). It is the result of physical and functional changes that may affect the emotional well-being and some of the most basic functions of life, including breathing, swallowing and communication (Doyl & Keith, 2005).

Head and neck tumors can affect and damage important anatomical and functional structures related to the physical appearance of a person, the power of speech and communication, and lead to social interaction and the decline in the quality of life (Mc Grouther, 1997). Cancer of the larynx is one of the most common malignant tumors of the head and neck. The indicators of the presence of head or neck tumors may be hoarseness, breathing or swallowing difficulties, enlargement of the lymph nodes of the neck, ear pain. About 95% of laryngeal cancer is caused by excessive consumption of tobacco and / or alcohol, infection with human papilloma virus (HPV- type 16), and poor socioeconomic conditions. Head and neck tumors occur mostly between the ages of 50 and 70 (Head and Neck Cancer, 2011).

Voice rehabilitation after laryngectomy is an important aspect of rehabilitation that enables patients with severe speech disabilities easier resocialization and thus maximum mitigation of severe psychological, social and occupational problems (Petrović-Lazić, Ivanović, Kosanović, 2004).

Rehabilitation starts practically from the moment when the patient is told that the larynx has to be removed.

There are three models of speech for patients after total laryngectomy: esophageal speech (which is most common), electrolarynx and tracheoesophageal speech. Voice rehabilitation integrates elements of psychological and social rehabilitation.

In the preoperative preparation of patients it is desirable to display one or more laryngectomy patients well-speaking rehabilitated who will demonstrate their speaking skills, emotional and social stability. The role of family of laryngectomy patient is undoubtedly of great importance for his complete rehabilitation and resocialization (Stanković, Đukić, Janošević, 2004).

It is believed that quality of life is multidimensional, because it includes a wide range of aspects, including physical, functional, emotional and social well-being and satisfaction. It is also subjective, because it can be understood from the patient's point of view (Cella, 1992; Bowling, 2005).

Although quality of life is not easy to define, the literature provides a number of attempts to define this subjective expression. Some of these attempts define quality of life as a state of well-being that includes two components: the patient's ability to perform daily activities that maintain physical, mental and social well-being; and satisfaction of the patient in the levels of functioning and control of the disease (Bottomley, 2002).

Personality traits have great impact on the quality of life of the laryngectomy patient, as well as previous way of life, social relations, interests, occupations.

Therefore, the aim of this study was to assess the quality of life of patients after total laryngectomy and to determine the impact that a vocal rehabilitation has on the improvement of the quality of life of these patients.

METHODS

Research involved 25 male participants of the experimental group, and the control group consisted of 20 respondents. Experimental group consisted of patients after total laryngectomy. The age of respondents ranged from 54 to 72 years, an average of 61.08 years. Three-year study was conducted in the period from April 2012 to September 2015. Patients were sent to speech therapy after completion of treatment (only operative or combination of operative treatment with radiation therapy) in order to master a method of speech: esophageal or electrolarynx. In this case, the patients have mastered esophageal speech. Treatments for 23 patients were carried out twice a week and once a week for two patients because of the distance of residence from a given facility. A treatment lasted from 25 to 45 minutes, and the time to master esophageal speech ranged from four to seven months (average 5.5 months). A subjective voice assessment has been conducted using a Questionnaire SF-36, which has 36 questions, of which 35 questions are grouped in eight domains: physical functioning, physical ability, emotional well-being, vitality, social functioning, mental health, physical pain and general health, and one question refers to a change in the health relative to one year preceding the study, i.e. whether the current health is better, the same or worse (Ware & Sherbourne, 1992). The resulting scores range from 1 to 100, where higher scores indicate better quality of life. Respondents completed a questionnaire for the first time when they came to the clinic and for the second time 15 to 30 days after the completion of vocal rehabilitation. Time of completing the questionnaire was not restricted. Before the beginning of the questionnaire, each respondent was explained the research plan.

Of the measures of descriptive statistics, the mean was used with accompanying standard deviation as well as minimum and maximum. The frequency and percentages were used. Differences between groups were determined using the t test for large independent samples, as well as the t test for paired samples. The Pearson correlation coefficient was used to test the connection between two continuous variables. Statistical significance was defined at the level of probability of the null hypothesis from $p \leq 0.05$ to $p < 1$. Statistical processing and analysis were done in the computer program SPSS ver. 20 (Statistical Package for the Social Sciences).

RESULTS

The study involved 45 respondents, 25 respondents were in the experimental group and 20 respondents were in the control group. The experimental group consisted of male respondents after total laryngectomy that mastered esophageal speech (Table 1). All respondents were smokers, with different education (mainly secondary school) and professions. Respondents were mainly coming from urban areas.

Table 1 *Descriptive indicators, the experimental group*

		Frequency	Percentage
Gender	Female	0	0
	Male	25	100
Smoking status	Smoker	25	100
	Non-smoker	0	0
Education	Primary school	2	8
	High school	17	68
	VSS and more	6	24
Interest	Engineer	4	16
	Craftsman	10	40
	Farmer	4	16
	Economist	2	8
	Trader	2	8
	Cop	1	4
	Baker	1	4
	Waiter	1	4
City life	Village	8	32
	City	17	68
Vocal rehabilitation	Esophageal speech	25	100
	Electrolarynx	0	0

The age of respondents ranges from 54 to 72 years, while the average age is 61.08 years (Table 2). The smoking duration ranges from 19 to 50 years, average 33 years. Length of service ranges from 17 to 40 years. The average length of service is 29.9.

Table 2 *Descriptive indicators, the experimental group*

	N	Min	Max	M	SD
Age	25	54.00	72.00	61.0800	5.07379
Smoking duration (years)	25	19	50	33.00	7.159
Length of service	21	17	40	27.90	6.518

N- number of respondents, Min- minimum, Max- maximum, M-arithmetic mean (median),SD-standard deviation,

SF-36 scale was used to measure the functioning of the respondents in the following areas: functional ability, physical ability, emotional capacity, vitality, emotional well-being, social functioning, pain and general health. The Table 3 shows the values of the SF-36 scale before and after vocal rehabilitation. The mean values (M) show that before treatment the respondents had the lowest score on the subscale related to physical ability, 0.00, and the score after treatment significantly increased and amounted to 97.00. Lower score before treatment was also on the subscales related to social functioning, 13.50, general health 15.80 and vitality 17.00, while the high scores were on the subscales involving pain, 94.60 and functional capacity, 66.20, which can be seen in the Figure 1.

After treatment there was a significant increase in output on all subtests, which can be seen in the Figure 2. The obtained lower scores on subtests suggest a very poor general health condition of the patients before treatment, and the increase in scores after treatment shows its improvement in the whole.

Table 3 *SF-36 scale in the experimental group before and after treatment*

		N	Min	Max	M	SD
Before treatment	Physical functioning	25.00	40.00	85.00	66.20	11.57
	Role limitations due to physical health	25.00	0.00	0.00	0.00	0.00
	Role limitations due to emotional problems	25.00	33.33	33.33	33.33	0.00
	Energy/ fatigue	25.00	0.00	40.00	17.00	10.90
	Emotional well being	25.00	0.00	44.00	20.96	10.47
	Social functioning	25.00	0.00	25.00	13.50	8.00
	Pain	25.00	67.50	100.00	94.60	8.25
	General health	25.00	5.00	35.00	15.80	8.50
After treatment	Physical functioning	25.00	65.00	100.00	89.60	6.91
	Role limitations due to physical health	25.00	25.00	100.00	97.00	15.00
	Role limitations due to emotional problems	25.00	33.33	66.67	64.00	9.23
	Energy/ fatigue	25.00	70.00	95.00	85.20	6.37
	Emotional well being	25.00	68.00	100.00	87.36	8.14
	Social functioning	25.00	100.00	100.00	100.00	0.00
	Pain	25.00	100.00	100.00	100.00	0.00
	General health	25.00	55.00	85.00	71.60	7.74

N- number of respondents, Min- minimum, Max- maximum, M-arithmetic mean (median), SD-standard deviation,

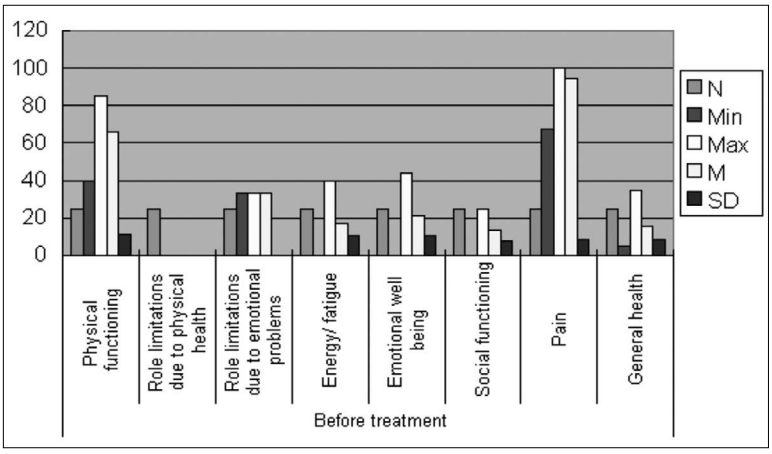

Figure 1 Before vocal rehabilitation

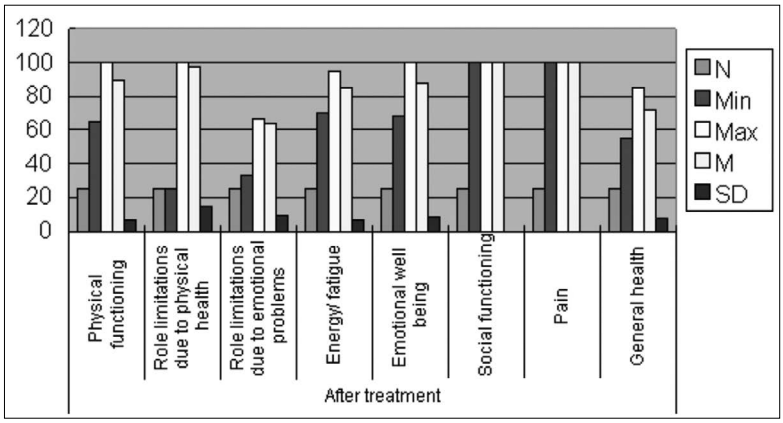

Figure 2 After vocal rehabilitation

The Table 4 presents the results obtained in the control group, which has relatively high scores on all subtests; the highest score was on the subscales concerning the absence of pain, adequate social functioning and absence of physical limitations in daily activities and work. The results show good, very good and excellent functioning at these respondents in all areas.

Table 4 *SF-36 scales in the control group*

	N	Min	Max	M	SD
Physical functioning	20.00	90.00	100.00	99.50	2.24
Role limitations due to physical health	20.00	100.00	100.00	100.00	0.00
Role limitations due to emotional problems	20.00	66.67	66.67	66.67	0.00
Energy/ fatigue	20.00	80.00	95.00	89.00	7.00
Emotional well being	20.00	68.00	100.00	85.80	10.74
Social functioning	20.00	100.00	100.00	100.00	0.00
Pain	20.00	100.00	100.00	100.00	0.00
General health	20.00	45.00	95.00	73.00	16.42

N- number of respondents, Min- minimum, Max- maximum, M-arithmetic mean (median), SD-standard deviation

The t test for paired samples was used to examine whether it has come to change in the results of the respondents measured by the SF-36 scale before and after the treatment (Table 5).

It has come to changes in all subtests, i.e. measured functionalities. All statistical significances are at the 0.01 level. A higher score on the SF-36 scale means better functionality, so it can be seen that the mean value (M) is higher after the treatment on all subtests. Therefore, the functionality of all measured elements is better after the treatment.

Table 5 *The difference before and after the treatment of the SF-36 scale, the experimental group*

	M	SD	t	df	***p***
Physical functioning, before	81	18.85	-6.108	44	***.000***
Physical functioning, after	94	7.28			
Role limitations due to physical health, before	44.44	50.25	-6.782	44	***.000***
Role limitations due to physical health, after	98.33	11.18			
Role limitations due to emotional problems, before	48.15	16.75	-7.026	44	***.000***
Role limitations due to emotional problems, after	65.19	6.95			
Energy/ fatigue, before	49	37.35	-3.017	44	***.000***
Energy/ fatigue, after	86.89	6.85			
Emotional well being, before	49.78	34.22	5.1	44	***.000***
Emotional well being, after	86.67	9.3			
Social functioning, before	51.94	43.87	6.54	44	***.000***
Social functioning, after	100	0.00			
Pain, before	97	6.67	0.99	44	***.000***
Pain, after	100	0.00			
General health, before	41.22	31.34	4.67	44	***.000***
General health, after	72.22	12.23			

M-arithmetic mean (median), SD-standard deviation, t-test, df-degree of freedom, p –statistical significance

The t test for large independent samples was used to examine whether there has been a statistically significant difference between the experimental group at the beginning of the measurement and control group, and between the experimental group at the end of the measurement and control group (Table 6). There is a statistically significant difference between the experimental group at the beginning of the measurement and control group on all subtests. Statistical significance is at the 0.01 level. When observing the mean values (M), it can be seen that the mean value is lower in the experimental group at the beginning of the measurement than the control group.

Table 6 *The difference between the experimental and control group in the SF-36 scale*

		M	SD	t	df	p
Physical functioning, before treatment	Experimental	66.20	11.57	-14.06	26.22	0.00
	Control	99.50	2.24			
Role limitations due to physical health, before treatment	Experimental	0.00	0.00	/	/	/
	Control	100.00	0.00			
Role limitations due to emotional problems, before treatment	Experimental	33.33	0.00	-14.02	26.52	0.00
	Control	66.67	0.00			
Energy/ fatigue, before treatment	Experimental	17.00	10.90	-26.84	41.27	0.00
	Control	89.00	7.00			
Emotional well being, before treatment	Experimental	20.96	10.47	-20.35	40.40	0.00
	Control	85.80	10.74			
Social functioning, before treatment	Experimental	13.50	8.00	-54.04	24.00	0.00
	Control	100.00	0.00			
Pain, before treatment	Experimental	94.60	8.25	-3.27	24.00	0.00
	Control	100.00	0.00			
General health, before treatment	Experimental	15.80	8.50	-14,14	27.04	0.00
	Control	73.00	16.42			
Physical functioning, after treatment	Experimental	89.60	6.91	-6.74	30.04	0.00
	Control	99.50	2.24			
Role limitations due to physical health, after treatment	Experimental	97.00	15.00	-1.00	24.00	0.33
	Control	100.00	0.00			
Role limitations due to emotional problems, after treatment	Experimental	64.00	9.23	-1.44	24.00	0.16
	Control	66.67	0.00			
Energy/ fatigue, after treatment	Experimental	85.20	6.37	-1.88	38.99	0.07
	Control	89.00	7.00			
Emotional well being, after treatment	Experimental	87.36	8.14	0.54	34.68	0.59
	Control	85.80	10.74			
Social functioning, after treatment	Experimental	100.00	.00000a	/	/	/
	Control	100.00	.00000a			
Pain, after treatment	Experimental	100.00	.00000a	/	/	/
	Control	100.00	.00000a			
General health, after treatment	Experimental	71.60	7.74	-0.35	25.71	0.73
	Control	73.00	16.42			

M-arithmetic mean (median), SD-standard deviation, t-test, p-statistical significance, df-degrees of freedom

In contrast to this result, there is no statistically significant difference between the experimental group at the end of the measurement and control group on most subtests. Furthermore, a difference is found on one subtest only, Physical functioning, after the treatment. Physical functioning of the control group is somewhat better (M=99.50) compared to experimental one after the treatment (M=89.60). Although there is a

statistically significant difference, however, the score of the physical functionality and the experimental group after the treatment is good because the average is high (M=89.60), if we know that the maximum is 100.

DISCUSSION

Results of this study show that cancer of the larynx occurs more frequently in men than in women, which is similar to results of previous studies. Carcinoma of the larynx is 4-5 times more common in men than in women (Petrović-Lazić et al., 2004). The percentage of patients with laryngeal cancer is higher among male respondents (Dragičević, 2013). Carcinoma of the larynx is discernible more frequently in male subjects than women, the ratio was 91.5%:8.55 (Rosso et al., 2012), while the ratio of 90.9% in men and 9.1% among women (Mumović, 2008).

The age of the respondents in this study ranged from 54 to 72 years, an average of 61.08 years. Other studies have had similar results. The average age of respondents was 63 years (Woodard et al.,2007). According to (Mumović, 2008), 80% of patients are aged between 50 and 70 years. Laryngeal carcinoma occurs over a period of 61 to 70 years (Dragičević, 2013).

Assessment of quality of life in this study was conducted by scale SF-36. This is one of the most commonly used instruments in patients with cancer of the larynx, which proved to be highly reliable and valid (Masconi et al., 2000; Weymuller et al., 2000; Armstrong et al., 2001).

These patients have many symptoms in various domains: impaired general health and pain, impaired communication, nutrition, psychological symptoms that include depression, irritability, loss of self-esteem (occasional sense of shame), impaired social relationships, including problems with a partner (sexual relations) and with other family members, a reduction of income and a sense of uselessness. All these have a negative impact on the everyday life of these patients (Babin, et al., 2008), and therefore the quality of life. Results of this study have shown that patients before a vocal rehabilitation have poorer quality of life. Because of their physical appearance the mean value of which was M=0.00 after the operation and before a vocal rehabilitation, they were limited in social activities and work (M=13.50), which had a negative impact on their overall health condition (M=15.80) and created a sensation of exhaustion (M=17.00). Compared with the results of the control group, a big difference can be noticed. There is a statistically significant difference between the experimental group at the beginning of the measurement and control group on all subtests. Statistical significance is at the 0.01 level.

When observing the mean values (M), it can be seen that it is lower in the experimental group at the beginning of measurement than in the control group.

The difference is also present in physical functioning in comparison with the results of the control group (Schuster et al., 2003).

In this study physical appearance and inability to speak reflected negatively on the emotional state of the patient and therefore the decline in the quality of life of these patients, as it can also be seen in previous studies (Mc Grouther, 1997; Doyl et al., 2005).

Physical consequences which leaves a total laryngectomy restrict the patient in further social activities (Mohide et al., 1992). Removed larynx is a major psychological stress for the patient, which reflects badly on his functional capacity, and quality of life (Morton, 2003). The presence of tracheostomy causes discomfort and loss of self-esteem and inability of communication with family and friends can lead to social isolation (Trzcieniecka-Green et al., 2007).

However, (DeSanto et al., 1995) suggest that patients who underwent total laryngectomy are much more concerned about the presence of tracheostomy and disrupted social activities than the disturbed communication.

After vocal rehabilitation, the score on the SF-36 scale increased significantly, and a higher score means better functional ability. The mean value (M) was higher on all subtests, particularly in the physical functioning (M=97.00). The inclusion of patients in the process of vocal rehabilitation and mastering speech is one of the important factors in this study that influenced the improvement of the emotional state of these patients, but also their quality of life.

In their study, (Silva et al., 2015) suggest that patients after total laryngectomy compared with normal population have lower quality of life, but mastering esophageal speech has led to improved physical and functional abilities. The inclusion of patients in the process of vocal rehabilitation and mastering speech is of great importance to maintaining and improving the quality of life. Speech and appearance are important domains that affect functional abilities of patients, as reported by other authors (Vilascea et al., 2006).

Vocal rehabilitation has a positive impact on the quality of life of patients after total laryngectomy, as well as the method of mastering speech, trahoezofagealna prosthesis has had a positive impact on the quality of life in relation to esophageal speech (Giordano et al., 2011).

The emotional state of the patient may affect positively on the physical condition and social functioning of the patient. Family members should be with the patient from the beginning of treatment, in order to provide support and encouragement for the further treatment. During vocal rehabilitation, it is important to establish an appropriate relationship between the patient and speech therapist-vocal therapist, which enables on the one hand faster overcoming of disturbed functional abilities and better mastery of some of the methods of speech.

CONCLUSION

Vocal rehabilitation has great significance in patients after total laryngectomy. The positive effect is achieved primarily by mastering some of the methods of speech, then overcoming a sense of shame because of different physical appearance after the operation, strengthening self-confidence and creating a sense of security. Quality of life is currently most commonly measured through various written questionnaires, by which we obtain information about how much the patient is able to perform daily activities through which we observe his mental, physical and functional state, but also how much the patient is satisfied with the achieved level of functioning and control of the disease.

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