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Evaluation of the quality of life in adults with cochlear implants: As good as the healthy adults?

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ABSTRACT

Purpose: The aim of this study was to compare the quality of life (QoL) of adult CI users with the QoL of adults in the healthy and normal-hearing population.
Materials and methods: 31 patients with CIs were included in the CI group, and 31 normal-hearing subjects were included in the control group. The QoL was evaluated using the World Health Organization Quality of Life-BREF (WHOQOL-BREF) for all subjects.
Results: A comparison of the QoL of the CI group to that of the control group found that the QoL of healthy adults was better than that of the CI users. The results obtained for the subdomains of physical health, psychological health, and social relations showed statistically significant differences between the two groups ($p < 0.05$). There were no statistically significant differences between the groups in the subdomains of environment and general health ($p > 0.05$).
Conclusions: The effect of a hearing disability on daily life continues after the CI. As expected, adults with CIs still face challenges in their daily lives due to the hearing impairment.

1. Introduction

Cochlear implant (CI) surgery is a treatment method for severe hearing loss in pediatric and adult populations [1]. The CI is inserted into the inner ear to restore hearing [2]. There are many benefits of the CI for people with hearing loss, such as improvement in academic skills, speech, and language development [3]. Several studies have focused on the effect of the CI on the quality of life (QoL) for CI users. The CI is important for social relations and the individual's ability to communicate. Because these parameters affect QoL, it is necessary to know about QoL in CI users to achieve the best possible rehabilitation [4,5]. The aim of this study was to evaluate the QoL of adult CI users with the QoL of adults in the healthy and normal-hearing population.

2. Materials and methods

2.1. Study population

In the present study, 31 patients (16 male and 15 female) with CIs were included in the CI group, and 31 normal-hearing subjects (14 male and 17 female) were included in the control group. Ethical approval was obtained from the Non-Interventional Clinincal Researches Ethics Board of Hatay Mustafa Kemal University (date/number: 11.04.2019/05). Inclusion criteria for the CI group were: regular use of the CI sound processor, at least 12 months of experience with the CI, and older than 18 years of age. Inclusion criteria for the control group were: no health problems, bilateral normal hearing, and older than 18 years of age. Subjects diagnosed with additional health problems or psychological impairment were excluded from the study. Informed consent was obtained from all subjects.

2.2. Quality of life (QoL) assessment

The Nijmegen Cochlear Implant Questionnaire (NCIQ) is a specific instrument commonly used to assess QoL in adult CI users. However, the NCIQ does not have a Turkish version. Therefore, for this study, the QoL was evaluated using the World Health Organization Quality of Life-BREF (WHOQOL-BREF) for all subjects. The WHOQOL-BREF is a shorter version of the original instrument (WHOQOL) that may be more convenient for use in large research studies or clinical trials. The

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Table 1
Demographics of the groups.

	CI group	Control group
Age ± SD (min-max)	40.3 ± 16.9 (19–76 years)	41.3 ± 8.6 (29–63 years)
Gender	16 male, 15 female	14 male, 17 female
Duration of the CI use ± SD	35.5 ± 24.9 (12–107 months)	–

SD: Standard deviation.

WHOQOL-BREF instrument comprises 26 items, which measure the broad domains of physical health, psychological health, social relationships, and environment [6].

2.3. Statistical analysis

Analyses were completed after data were transferred to the IBM SPSS Statistics 22 program. Normal distribution was analyzed with the Kolmogorov-Smirnov (KS) test. The independent *t*-test was used to determine whether the data were normally distributed. Non-parametric groups were analyzed with the Mann-Whitney *U* test. The Pearson correlation test was used for correlation between duration of CI use and QoL. Statistical significance was determined as $p < 0.05$.

3. Results

Thirty-one patients (age range 19–76 years) with cochlear implants and 31 normal-hearing subjects (age range 29–63 years) were included in the current study. The demographics of the groups are given in Table 1.

A comparison of the QoL of the CI group to that of the control group found that the QoL of healthy adults was better than that of the CI users. The results obtained for the subdomains of physical health, psychological health, and social relations showed statistically significant differences between the two groups ($p < 0.05$). There were no statistically significant differences between the groups in the subdomains of environment and general health ($p > 0.05$). The results of WHOQOL-BREF for CI users and normal-hearing individuals are shown in Table 2. An evaluation of the relationship between the duration of CI use and the QoL scores showed no correlation between these two parameters ($p > 0.05$) (Table 3).

Even though the cochlear implant group showed significantly lower scores in physical health, nearly half of the subjects in CI group answered 'not at all' to the question regarding the need of the medical treatment whereas more than half of the subjects in control group reported as 'an extreme amount'. Fifteen subjects in the CI group responded "not at all," eight responded "a little," five responded "a moderate amount," two responded "very much," and one "an extreme amount" (Fig. 1).

When asked how satisfied they were with their bodily appearance, one of the CI group responded, "not at all," three responded "a little," seven responded "moderately," nine responded "mostly," and eleven of them responded "very satisfied" (Fig. 2).

When asked how satisfied they were with their personal relationships, one subject of the CI group responded "very dissatisfied," four of them responded "dissatisfied," eleven of them responded "neither satisfied nor dissatisfied," nine of them responded "satisfied," and six of them responded "very satisfied" (Fig. 3).

Table 2
Results of WHOQoL for CI users and healthy individuals.

	CI group (mean ± SD)	Control group (mean ± SD)	p
General health	58,3 ± 22,1	60,1 ± 19,5	0,835
Physical health	62,0 ± 14,3	71,0 ± 13,9	0,015*
Psychological	61,7 ± 16,5	71,4 ± 14,6	0,018*
Social relations	56,6 ± 24,0	69,3 ± 10,6	0,009*
Environment	64,5 ± 12,3	65,1 ± 13,8	0,848

SD: Standard deviation.
* $p < 0.05$.

Table 3
Correlation between the duration of CI use and the QoL scores in CI group.

CI duration	General health	Physical health	Psychological	Social relations	Environment
r	0,197	0,190	0,247	0,104	0,157
p	0,335	0,353	0,224	0,613	0,443

4. Discussion

The results of this study demonstrated that normal-hearing adults have a significantly better QoL than that of CI users, especially in the physical health, psychological health, and social relations subdomains. The lowest scores were obtained from the social relations subdomains. This may be explained by the direct negative impacts of hearing loss on social communication abilities. With the decrease in social relations brought on by hearing loss, psychological status may also be affected in these adults. Such findings are confirmed by research demonstrating that hearing loss is significantly associated with loss of vitality, social functioning, emotional health, mental health, physical health, and physical functioning. The severity of hearing loss was also associated with a reduced QoL in adults [7]. Sauso et al. assessed the QoL in 26 adults using the Nijmegen Cochlear Implantation Questionnaire and found that the highest scores were obtained in social, psychological, and physical domains [4]. Therefore, in our study we compared the QoL of adults with CI to normal hearing adults. Our results showed that hearing loss had a negative impact on the daily life of adults with CI despite an improvement in hearing after surgery.

In previous papers the QoL was assessed by using the WHOQOL, the Measures of Activities of Daily Living (ADL), the Short Form 36 Health Survey (SF-36), the Hearing Handicap Inventory, the Nijmegen Cochlear Implant Questionnaire (NCIQ), the Health Utility Index (HUI), and Health-related Quality of Life (HRQOL) in adults with hearing loss [7–10]. Due to the limited number of validated questionnaires available in Turkish, we could not use hearing loss specific questionnaires for our study. We chose the WHOQOL-BREF for adults with CI in order to investigate the impact of the hearing loss on different aspects of their lives. Another reason for not using the hearing loss specific questionnaire was because of our aim to compare the CI group to the healthy, normal hearing adults. It may not be possible to use the hearing loss specific questionnaire to measure QoL in normal hearing adults. We were not confident that it would be possible to conduct the comparison using a hearing loss specific questionnaire.

Mondelli et al. evaluated the QoL using the WHOQOL-BREF in elderly adults with hearing aids and showed that using an amplification system helps to improve the QoL. One recent study that successfully used the WHOQOL-BREF to compare groups with hearing loss and normal hearing groups was conducted by Mondelli et al. These researchers evaluated the QoL using. The WHOQOL-BREF group, measures a patient's personal perceptions about his/her life, personal goals, expectations, standards, and concerns within the context of the patient's cultural structure and values [5,6]. Examining QoL provides a more effective treatment method and more positive results because it allows researchers to look at the patient's complaints through the patient's eyes. This allows for the analysis of QoL based on the physical, functional, social, and emotional needs so that diseases can be overcome more easily [7].

Further evidence of patient improvement was noted in the study by

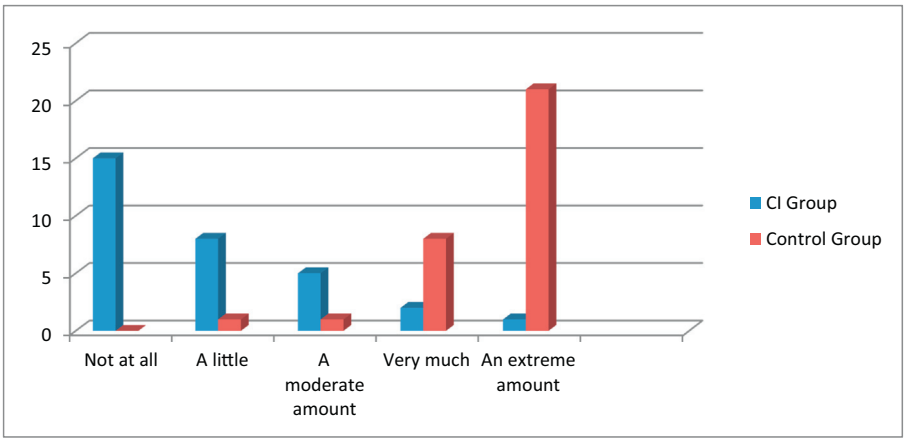

Fig. 1. Responses to the question "How much do you need any medical treatment to function in your daily life?"

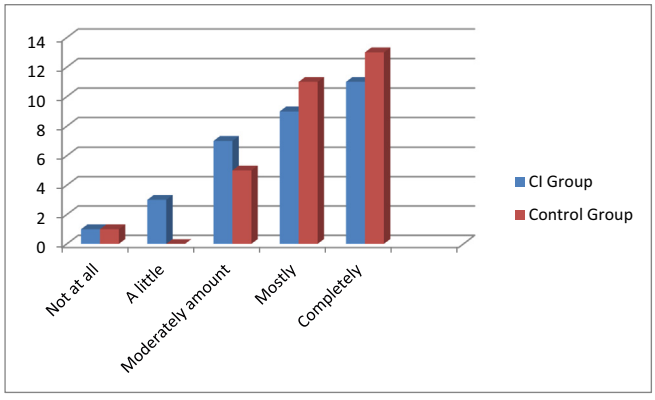

Fig. 2. Responses to the question "Are you able to accept your bodily appearance?"

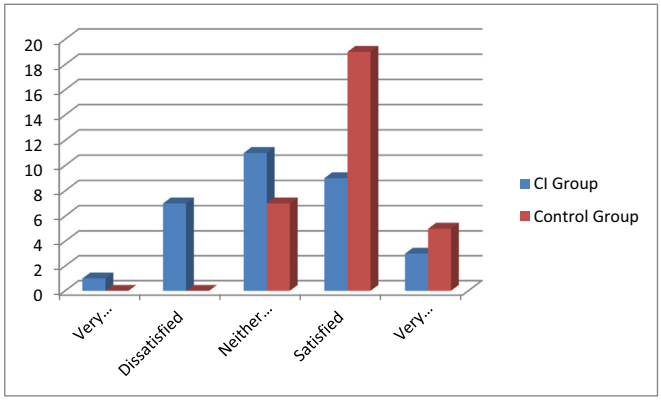

Fig. 3. Responses to the question "How satisfied are you with your personal relationships?"

Contrera et al., which found that treatment of hearing loss with CI or a hearing aid increased the QoL. The increase was particularly noticeable after six months, but continued to rise for up to 12 months [11]. In our study, we selected adults with CI whose duration of CI use was at least 12 months. Thus, we included subjects who had reached the time at which the implant was shown to optimally improve QoL. Although the duration of CI use covered a wide range (from one to nine years), we could not find a relationship between the duration of CI use and QoL scores in our study.

Prior studies examined the impact of the CI on QoL in different groups. Manrique-Huarte et al. evaluated depression, anxiety, and QoL indexes, post-treatment, for patients older than 65 years with moderate to profound hearing loss. They found that hearing aids and CIs had positive effects on anxiety, depression, health status, and QoL in older adults [12]. The outcomes of CI have been investigated not only in elderly groups but also in pediatric groups. İncesulu et al. reported improvement in social relations, communication skills, and self-confidence in children with CI post-surgery, as reported by parents [13]. Even though these studies showed improvement in QoL for adults and children after implantation, according to our study, hearing loss still has a negative impact on daily life in the hearing impaired population.

Our study demonstrates that the effect of a hearing disability on daily life continues after the CI. As expected, adults with CI still face challenges in their daily life due to the hearing impairment. One of the limitations of this study is that the QoL was evaluated with only one questionnaire. Using different questionnaires may strengthen the current study. In future studies, we recommend that researchers evaluate the improvement in QoL following an implant in adult CI users by using a larger cohort with multiple, different questionnaires.

Declaration of Competing Interest

None.

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All participants signature informed consent form.

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