Turkish Journal of Audiology and Hearing Research
Türk Odyoloji ve İşitme Araştırmaları Dergisi
E-ISSN: 2667-6877

**RESEARCH ARTICLE /** ARAŞTIRMA MAKALESİ

**TJAHR 2022;5(2):29–34**
https://doi.org/10.34034/tjahr.1092354

# The effects of covid-19 pandemic on children with hearing aids

**Cennet ÖZ, Müslüme Kübra KOÇ, Betül ÇİÇEK ÇINAR**

Hacettepe University, Faculty of Health Science, Department of Audiology

## ABSTRACT

**Aim:** During the COVID-19 pandemic, especially children experienced adverse effects due to social isolation and lack of physical activity and peer communication. Communication and interaction and also special education are very critical for especially children with special needs, such as hearing-impaired children. The main objective of this study is to reveal the effect of the COVID-19 pandemic on children with hearing aids.

**Method:** In this current study, there were 22 children (6F,16M) with hearing aid with at least one year of hearing aid experience. The mean age was 9,18 (±2.7). Besides the demographic data form, The International Outcome Inventory for Hearing Aids (IOI-HA), World Health Organization Quality of Life-Bref Form (WHOQOL-BREF), Coronavirus Anxiety Scale, and Spence Children's Anxiety Scale for questionnaires were used to reveal hearing aid usage profile.

**Results:** Regarding the hearing-aid care, ear-mold replacement time and frequency of routine audiological assessment were different before and after pandemic (p >0,05) According to the sub-scales of the Spence Children's Anxiety Scale, there were significant correlations between separation anxiety and physical health (Spearman rho=.0.517; p= 0.014; p<0,05); physical health and obsessive-compulsive subscales (Spearman rho =.-477; p= 0.025, p<0,05). Even though these children's perceived quality of life did not change after the pandemic, their social-anxiety levels were increased, especially related to hearing aid follow-ups.

**Conclusion:** Children's social anxiety levels using hearing aids are increasing in the COVID-19 pandemic. Due to social isolation, problems occurred in the routine controls of children with hearing aids. Also, they had problems such as attending and understanding online courses. These children need more special care to catch up with their peers.

**Keywords:** COVID-19, hearing loss, hearing aids, child, anxiety

## ÖZ

### COVID-19'un pediatrik işitme cihazı kullanıcıları üzerindeki etkileri

**amaç:** COVID-19 pandemi sürecinde çocuklar sosyal izolasyon, fiziksel aktivite kısıtlılığı ve akran iletişimi açısından olumsuz etkiler yaşamışlardır. Akranlarıyla iletişim ve etkileşimin yanısıra özel eğitim, özellikle işitme engelli çocuklar gibi özel ihtiyaçları olan çocuklar için çok önemlidir. Bu çalışmanın temel amacı, COVID-19 pandemisinin işitme cihazı kullanan çocuklar üzerindeki etkisini ortaya çıkarmaktır.

**Yöntem:** Bu çalışmaya, en az bir yıllık işitme cihazı deneyimine sahip olan 22 çocuk (6K,16E) katılmıştır. Ortalama yaş 9,18 (±2.7) idi. Demografik veri formunun yanı sıra Uluslararası İşitme Cihazları Envanteri (IOI-HA), Dünya Sağlık Örgütü Yaşam Kalitesi-Bref Formu (WHOQOL-BREF), Coronavirüs Anksiyete Ölçeği ve Spence Çocuklar İçin Kaygı Ölçeği anketleri kullanıldı.

**Bulgular:** İşitme cihazının bakımı ile wswswswilgili olarak, kulak kalıbı değiştirme sıklığı ve rutin odyolojik değerlendirme sıklığı pandemi öncesi ve sonrası önemli oranda değişmiştir (p >0,05). Spence Çocuklar İçin Kaygı Ölçeği'nin alt boyutlarına göre ayrılık kaygısı ile fiziksel sağlık arasında (Spearman rho=.0.517; p= 0.014; p< 0,05); fiziksel sağlık ve obsesif-kompulsif (Spearman rho =.-477; p= 0.025,p< 0,05) alt boyutları arasında anlamlı korelasyonlar elde edilmiştir. Bu çocukların pandemi sonrası yaşam kaliteleri değişmese de özellikle işitme cihazı için rutin kontrol sürelerinin uzamasına bağlı olarak sosyal kaygı düzeyleri yükselmiştir.

**Sonuç:** COVID-19 pandemisinde işitme cihazı kullanan çocukların sosyal kaygı düzeyleri artmaktadır. Sosyal izolasyon nedeniyle işitme cihazlı çocukların rutin kontrollerinde sorunlar yaşanmaktadır. Ek olarak işitme cihazlı çocuklar çevrimiçi derslere katılma ve dersi takip etmede güçlük gibi sorunlar da yaşamaktadır. Bu çocukların yaşıtlarına yetişmek için daha fazla özel bakıma ihtiyaçları vardır.

**Anahtar kelimeler:** COVID-19, işitme kaybı, işitme cihazları, çocuk, kaygı

**Cite this article as:** Öz, C., Koç, M.K., Çiçek Çinar, B. (2022). The effects of covid-19 pandemic on children with hearing aids. Turk J Audiol Hearing Res, 5(2):29–34.

## INTRODUCTION

In November 2019, an acute respiratory disease, new coronavirus type (COVID-19) was reported in Wuhan, China, and then spreaded to the whole world quickly (Chan, Yuan, & Kok,2020; World Health Organisation, 2020b). Symptoms, which includes fever, cough, fatigue, and rarely gastrointestinal infection, of COVID-19 infection may appear 2-14 days after exposure, depending on the incubation period of the COVID-19 virus (Mustafa, 2020).

**Correspondence Address/Yazışma Adresi:** Cennet OZ, Hacettepe University, Faculty of Health Science, Department of Audiology
**E-mail:** odycennetoz@gmail.com

**Received/Geliş Tarihi:** 23.03.2022, **Accepted/Kabul Tarihi:** 01.08.2022, **Available Online Date/Çevrimiçi Yayın Tarihi:** 30.08.2022

The Lancet Commission (2015) stated that 500 million individuals with hearing loss (HL) constituted approximately 6.8% of the world's population and there are more than 34 million children with hearing impairment worldwide. Hearing loss can range from mild to profound, bilateral or unilateral, and cause difficulty in hearing speech or soft sounds making verbal communication hard. Childhood hearing loss, depending on the severity, may prevent language acquisition and needs special attention. Hearing aids and cochlear implants are treatment modalities to restore hearing loss (Ariapooran, & Khezeli, 2021). For individuals with hearing aids need total communication possibilities , such as lip-reading to overcome understanding difficulties (Paiva, Silva, & Machado et al., 2021). However, with the use of masks and social distancing has become widespread to control the spread of the pandemic, the benefits of lip-reading have disappeared (Paiva, Silva, & Machado et al., 2021).

In our country, Turkiye, schools at all stages were closed in March 2020 to prevent the spread of pandemics. And also places such as shopping centers, and restaurants were restricted. These restrictions prevented children from face-to-face interaction with their peers (Charney, Camarata, & Chern, 2021) and resulted in a decrease in physical activity, and increase stress and anxiety in children (Fan, Wang, & Wu, 2021). Besides these physical and social effects, children with hearing loss also experienced difficulties caused by using a mask, which prevents lip-reading, and distance learning through computers, tablets, or TVs. The objective of this current study is to understand how pandemic-related problems affected children with hearing aids.

## MATERIAL AND METHOD

### Study design and patients

This study was conducted at Hacettepe University, Faculty of Health Science, Department of Audiology. The study was approved by the Hacettepe University Non- Interventional Clinical Research Ethics Board (GO 21/126) in March 2021. After the approval, the data was collected between March and June. This study was conducted by the principles of the Declaration of Helsinki. Consent forms were obtained from the parents.

In the current study, there were 22 hearing aid users (6 Females, 16 Males) with a mean age of 9.18 (SD ± 2.7). All participants had bilateral hearing aids. Four participants have additional disabilities apart from hearing loss. The inclusion criteria are using hearing aids at least one year before March 2020, aged between 6-14 years old, being a student in formal education, and volunteering to participate in the study. Informed consent was given to all participants. Participants who used hearing aids for less than one year were excluded . All used questionnaires were completed by the parents of hearing-impaired children via Google Forms. Forms are sent them through their mobile phones. All parents were given verbal consent and information then the Google Form link.

### Measures

*Demographics information*

To evaluate the potential effects of daily use, frequency of regular hearing aid fitting, and audiological evaluations before and after the pandemic, the demographic data form was used. Demographic information is shown in Table 1.

*Hearing aid outcome measures*

The International Outcome Inventory for Hearing Aids (IOI-HA) is a seven item-questionnaire with a five-point rating scale (higher scores indicate better outcomes); each item is designed to measure a specific outcome. These are 1-daily use, 2-benefit, 3-residual activity limitation, 4-satisfaction, 5-residual participation restrictions, 6-impact on others, and 7-quality of life (Cox, Alexander, & Beyer, 2003). Kırkım et.al. conducted the Turkish validity and reliability of IOI-HA (Kırkım, Şerbetçioğlu, & Mutlu, 2008).

*Quality of life measures*

To evaluate health quality of life World Health Organization Quality of Life-Bref Form (WHOQOL-BREF) was used. This form includes 100-items that measure the well-being of the person and enable cross-cultural comparisons. Later, the 100-item form was reduced to 26 items (27 for WHOQOL-BREF (TR)), as a short form to make application easier and faster. WHOQOL-BREF scale consists of four sub-scale related to 1-physical, 2-mental, 3-social, and 4-environmental well-being. The four subscales had their grade so there is no total score for this scale (World Health Organization, 1996). Turkish validity-reliability study conducted by Eser et. al (Eser, Fidaner, & Fidaner et al., 1999).

**Table 1.** Participants' demographic profiles related to hearing aid use

| Questions | Options |
|---|---|
| Daily Usage Before COVID-19 | 0-3 hours, 3-6 hours, 6-9 hours, 9-12 hours, 12+ hours |
| Daily Usage After COVID-19 | 0-3 hours, 3-6 hours, 6-9 hours, 9-12 hours, 12+ hours |
| Daily Online Class Attendance Time | 0-3 hours, 3-6 hours, 6-9 hours, 9-12 hours, 12+ hours |
| Duration of Fitting Sessions Before COVID-19 | 1 month, 3 months, 6 months, 9 months, 12 months |
| Duration of Fitting Sessions After COVID-19 | 1 month, 3 months, 6 months, 9 months, 12 months |
| Earmold Renew Frequency Before COVID-19 | 1 month, 3 months, 6 months, 9 months, 12 months |
| Earmold Renew Frequency After COVID-19 | 1 month, 3 months, 6 months, 9 months, 12 months |
| Duration of Routine Audiologic Testing Before COVID-19 | 1 month, 3 months, 6 months, 9 months, 12 months |
| Duration of Routine Audiologic Testing After COVID-19 | 1 month, 3 months, 6 months, 9 months, 12 months |

*Anxiety Scales*

To measure general and COVID-19 related anxiety levels Spence Children's Anxiety Scale and Coronavirus Anxiety Scale were used. The Spence Children's Anxiety Scale was developed by Spence (1998) to evaluate the different dimensions of anxiety disorders according to the Diagnostic and Statistical Manual of Mental Disorders (DSM) - IV criteria. The scale includes 44-items with 4-point scores and one open-ended question. There were six subscales related to 1-panic attack and agoraphobia, 2-separation anxiety, 3-fear of physical injury, 4-social phobia, 5-generalized anxiety, and 6-obsessive-compulsive disorder. The increased score for total and for each of these domains shows elevated mood (Spence, Barrett, & Turner, 2003). Turkish validity-reliability has been proven by Orbay and Ayvaşık in 2006 (Orbay, & Ayvaşık, 2006).

The Coronavirus Anxiety Scal e (CAS) was developed by Lee et. al. in 2020 to help clinicians recognize the effects of COVID-19 and provide psychological support to people with anxiety due to COVID-19. This scale consists of 5 items (Lee, 2020). Turkish validity-reliability has been proven by Evren et al. in 2020 (Evren, Evren, & Dalbudak et al., 2020). CAS items are given in Table 2.

**Table 2.** CAS Items*

| |
|---|
| 1. I felt dizzy, lightheaded, or faint when I read or listened to news about the coronavirus |
| 2. I had trouble falling or staying asleep because I was thinking about the coronavirus |
| 3. I felt paralyzed or frozen when I thought about or was exposed to information about the coronavirus |
| 4. I lost interest in eating when I thought about or was exposed to information about the coronavirus |
| 5. I felt nauseous or had stomach problems when I thought about or was exposed to information about the coronavirus |

*Lee, S. A. (2020). Coronavirus Anxiety Scale: A brief mental health screener for COVID-19 related anxiety. Death Studies.

*Statistical analysis*

Statistical analysis of the data was done with the SPSS for Windows version 23 software package. Descriptive statistics were done according to daily hearing aid usage, special education time, hearing aid fitting frequency, earmold renew frequency, frequency of routine audiological assessment before and after COVID-19 status, and each patient's daily online class attendance time during COVID-19. The non-parametric evaluation was performed because the sample width was small. Spearman correlation analysis was used because a non-parametric evaluation was performed. Spearman correlation analysis was performed to specify relationships between demographic information and results in subscales of IOI-HA, WHOQOL-BREF, Spence Children's Anxiety Scale, and Coronavirus Anxiety Scale. The margin of error was $p < 0,05$.

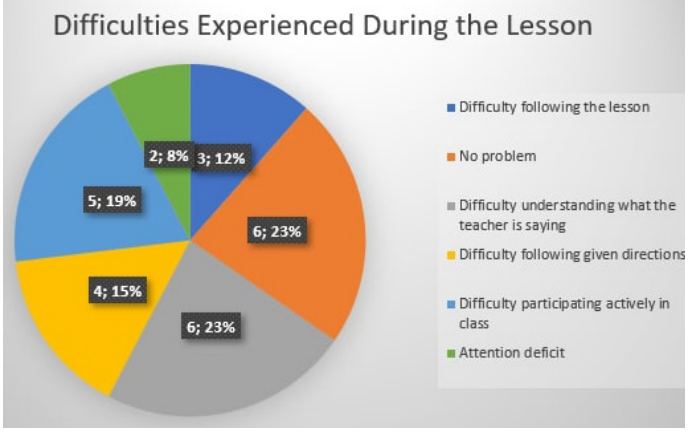


**Figure 1.** Difficulties experienced during the lesson
*A person has the right to choose more than one option.
Two people choose green "attention deficit", three people choose dark blue "difficulty following the lesson", six people choose the orange "no problem", six people choose gray "difficulty understanding what the teacher is saying", four people choose yellow "difficulty following given directions", five people choose blue "difficulty participating actively in class".

## RESULTS

### Descriptive statistics

The mean for hearing aid usage was 7,6 years (±2,7). According to demographic data analysis, the duration between routine audiological tests and follow up hearing aid fitting sessions were increased after COVID-19 however there is no statistically significant difference between before and after daily hearing aid usage, frequency of fitting sessions, earmold renewing, and routine audiological tests ($p > 0,05$). Before the pandemic, all subjects were attending special education regularly and after the COVID-19 pandemic this situation was not changed, but only one subject gave up. The participants stated that they had difficulty participating in online courses, attending, and following the courses, understanding what the teacher said, and following the instructions (Figure 1).

To understand the satisfaction levels of hearing aid users with their current hearing aid, IOI-HA was used. Their mean score for satisfaction was 4.8 over 5. All participants report that they use their hearing aids regularly. IOI-HA items were correlated with WHOQOL-Bref. The social adequacy (Q5) item of IOI-HA had significant correlations with psychological/mental which is factor 2 (Spearman rho=.0.517; $p= 0.014$; $p< 0,05$) and social well-being which is factor 3 (Spearman rho=.511; $p= 0.0015$; $p< 0,05$) of WHOQOL-Bref. Question 7 was related to the quality of life after hearing aids, but there was no significant relation between Q7 and WHOQOL-Bref sub-groups ($p > 0,05$). According to the WHOQOL-Bref results, the participants scored high in each domain. Table 3 shows the descriptive data for WHOQOL-Bref scores. There was no significant correlation between the additional disability and whether or not to attend special education ($p > 0,05$).

For Spence Children's Anxiety Scale all of the participants scored higher than 56 (mean: 74,09) and this means that all of them were in elevated mood and had generalized anxiety according to their age. Correlations between WHOQOL-Bref and Spence

**Table 3.** Domains of WHOQOL-bref

| | Physical | Mental | Social | Environmental | General health |
|---|---|---|---|---|---|
| N | 22 | 22 | 22 | 22 | 22 |
| Mean | 118.2 | 186.4 | 49.8 | 123.5 | 119.5 |
| SD | 13.7 | 11.2 | 6.7 | 13.9 | 8.9 |
| Minimum | 88 | 160 | 32 | 100 | 97 |
| Maximum | 140 | 204 | 60 | 156 | 138 |

Children's Anxiety Scale were evaluated, p< 0,05 was used for significance level. There were significant and negative correlations between separation anxiety and personal injury fear dimensions (Factor 1) of the Spence Children's Anxiety Scale and the physical health domain (Spearman rho=.-565; p= 0.006 p< 0,05),of WHOQOL-Bref questionnaire. Similarly, there were significant and negative correlations between obsessive-compulsive dimension (Factor 4) of Spence Children's Anxiety Scale and physical health domain (Spearman rho =.-477; p= 0.025,p< 0,05 WHOQOL-Bref questionnaire, respectively.

Coronavirus Anxiety Scale did not result in high scores, its total mean was 6.54 over 20. When Spence Children's Anxiety Scale was compared with Coronavirus Anxiety Scale, social phobia subscale (Factor 3), had significant correlations with second (Spearman rho=.443; p= 0.025 p< 0,05), third (Spearman rho =.475; p= 0.023 p< 0,05), and fourth (Spearman rho =.543; p= 0.009 p< 0,01) items.

## DISCUSSION

As the pandemic spreads out around the world, especially children with hearing loss face both short-term and long-term difficulties. In the short term, these children are at increased risk of trauma, physical neglect, and malnutrition given the complexity of everyday life. Long-term risks include delayed social development, decreased literacy, poor self-esteem, and mental health disorders such as academic failure and feelings of anger, loneliness, and depression (Sher, Stamper, & Lundy, 2020). In addition, COVID-19 may have long-lasting effects on the development of communication skills (Charney, Camarata, & Chern, 2021). In addition to all these disadvantages, children with hearing impairment also experience disadvantages of the mask using that interrupt total communication.

All subjects in this study use their hearing aids regularly and had high daily usage. IOI-HA measures the satisfaction levels of hearing aid users. WHOQOL-Bref evaluates the children's quality of life. There are positive correlations between IOI-HA and WHOQOL-Bref. Since the children participating in our study had a high daily hearing aid use, their IOI-HA scores were higher. And these children's WHOQOL- Bref scores were also high. The findings show that children who use hearing aids regularly feel better socially and psychologically. However, due to high scores in WHOQOL-Bref, it is difficult to say COVID-19 changed their quality of life.

Due to social restrictions during the COVID-19 period, children could not socialize, so this situation caused increased anxiety. The closing of schools and the restriction related to COVID-19 and the curfew had detrimental effects on quality of life and physical well-being. It was reported that the anxiety rate was 1.37 times higher in children who had limited physical activity than physically active peers (Paiva, Silva, & Machado et al., 2021). In our study, even though general anxiety levels were high for all participants; Coronavirus Anxiety Scale did not result in high scores. However, the social phobia domain of the Spence Children's Anxiety Scale was significantly and positively correlated with second, third, and fourth items of the Coronavirus Anxiety Scale. It was thought that children with high social phobia also had high COVID-19 specific anxiety.

Abbott et al. (2021) showed that social isolation causes stress and the harmful effects of stress on health increase as the duration increases. Similarly, Xie et. al. (2020) found that children from the 2nd – 6th grades had depressive symptoms (23%) and suffered from anxiety (19%) during the COVID-19 pandemic. The elevated Spence Children's Anxiety Scale score (mean: 74.09) obtained in our study is consistent with the previous studies. These findings show that the COVID-19 and the lock-down processes have detrimental effects on people's psychological states.

Children with hearing loss may be more affected by online education than their normal-hearing peers. Individuals with hearing loss are particularly affected by "Zoom fatigue" resulting from difficulties in interpreting non-verbal cues (for example, inability to lip-reading due to pixelated video), increased listening effort resulting from the poor sound quality (Charney, Camarata, & Chern, 2021). Charney et. al. (2021) reported that listening becomes tedious in difficult auditory environments such as a noisy background or when listeners have deficiencies in auditory processing. These problems increased the anxiety levels of children with hearing aids, and this may lead to refusing to participate in online courses (Sher, Stamper, & Lundy, 2020).

In the current study, the majority of the participants reported that they had difficulty in attending courses and following the lessons, difficulty in understanding what the teacher said, and difficulty in following the instructions. By our results, Zhao et. al. (2020) reported that only 37.7% of students were able to actively interact with their teachers and friends in online lessons. These findings show that the interaction level during online classes is considerably low. One of the class participation indicators is interaction. A high level of interaction in class can increase the learning effects and students' comprehension (Chen, 2020).

Cochlear implanted children experienced similar problems with hearing-aided children during the period of COVID-19. Ayas et. al. (2020) conducted a study with parents of cochlear implanted children, and they reported that COVID-19 disrupted the CI

follow-up process and it was psychologically disturbing. In the same study, nearly all of the participants agreed that online lessons were challenging. 67% of respondents reported that behavioral changes in their children as a result of the restrictions that came with the COVID-19 pandemic (Ayas, Al Amadi, Khaled, & Alwaa, 2020).

We found that the mean online education time is nearly 4.5 hours per day. Although we did not question the exact screen time values, this means the students have at least 4.5 hours of screen time per day which is more than two-fold of the recommendation (≤2 hours a day) of the American Academy of Pediatrics (Atkin, Sharp, Corder, & van Sluijs, 2014). These increased screen time values can cause detrimental effects on eye health and can cause some eye-related problems like myopia.

As the access to primary health care decreased due to restrictions, telehealth services began to be needed (Wong, Ming, Maslow, & Gifford, 2020). All health systems, hospitals, and clinics started to implement telehealth services rapidly, and thus patient care and treatment services changed (Telmesani, Said, Mahrous, & Alrusayyis, 2021). As in most health fields, the audiology unit has also been negatively affected by the traditional face-to-face appointment system. Especially the pediatric group was more affected by these conditions. Studies have shown that hearing aid adjustment and follow-up services with tele-audiology are as effective as face-to-face services (Novak, Cantu, & Zappler et al., 2016). Children who use hearing aids, which are a group that should be followed regularly, should be followed up with tele-audiology and provide regular hearing aid fittings.

The primary limitation of this study is the lack of pre-pandemic data. There is no data related to children's physical and psychological conditions, and level of quality of life before the pandemic. Therefore, we cannot compare results before and after COVID-19. Additionally, the sample size is small due to the limitation caused by the pandemic.

While the pandemic-related anxiety and detrimental effects on child development are predictable, there is not enough study on children who use hearing aids that shows this relationship clearly (Paiva, Silva, & Machado et al., 2021). This current study was conducted to make this connection noticed. In future studies related to COVID-19 and its restrictions, hearing aid usage, quality of life, physical and psychological conditions should be investigated in the long term in children who use hearing aids. In addition, the effects of the COVID-19 period on children with hearing aids and normal hearing should be compared.

## CONCLUSION

Due to social isolation, problems occurred in the routine controls of children with hearing aids. In addition, they had problems such as attending classes and understanding in online classes. As a result, the COVID-19 pandemic had detrimental effects on the physical, psychological and social conditions of children with hearing aids.

**Ethics Committee Approval:** This study was conducted at Hacettepe University, Faculty of Health Science, Department of Audiology. The study was approved by the Hacettepe University Non- Interventional Clinical Research Ethics Board (GO 21/126) in March 2021.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept – CO, BCC, MKK; Design – CO, MKK, BCC; Supervision –BCC; Resources– CO, MKK; Data Collection and/or Processing – CO, BCC; Analysis and/or Interpretation – BCC; Literature Search –CO, MKK; Writing Manuscript – CO, MKK

**Conflict of Interest:** No conflict of interest.

**Financial Disclosure:** None.

**Etik Kurul Onayı:** Bu çalışma Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi Odyoloji Bölümü'nde yapılmıştır. Çalışma, Hacettepe Üniversitesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu (GO 21/126) tarafından Mart 2021'de onaylandı.

**Hakem Değerlendirmesi:** Dış Bağımsız.

**Yazar Katkıları:** Fikir –CO, BCC, MKK; Tasarım – CO, MKK, BCC Denetleme – BCC; Kaynaklar –CO, MKK; Veri Toplanması ve/veya İşlemesi – CO, BCC; Analiz ve/veya Yorum – BCC; Literatür Taraması – CO, MKK; Yazıyı Yazan – CO, MKK.

**Çıkar Çatışması:** Yoktur.

**Finansal Destek:** Finansal destek kullanılmamıştır.

## REFERENCES

Abbott, A. (2021). COVID's mental-health toll: Scientists track surge in depression. *Nature*, 194–195. https://media.nature.com/original/magazine-assets/d41586-021-00175-z/d41586-021-00175-z.pdf

Ariapooran, S., Khezeli, M. (2021). Symptoms of anxiety disorders in Iranian adolescents with hearing loss during the COVID-19 pandemic. *BMC Psychiatry*, 21:114. [CrossRef]

Atkin, A. J., Sharp, S. J., Corder, K., van Sluijs, E. M. (2014). Prevalence and correlates of screen time in youth: an international perspective. *American Journal of Preventive Medicine*, 47(6): 803–7. [CrossRef]

Ayas, M., Al Amadi, A.M.H.A., Khaled, D., Alwaa, A.M. (2020). Impact of COVID-19 on the access to hearing health care services for children with cochlear implants: a survey of parents. *F1000Research*, 9:690. [CrossRef]

Chan, J. F. W., Yuan, S., Kok, K.H. (2020). A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. *Lancet*, 395: 514–523. [CrossRef]

Charney, S.A., Camarata, S.M., Chern, A. (2021). Potential Impact of the COVID-19 Pandemic on Communication and Language Skills in Children. *American Academy of Otolaryngology-Head and Neck Surgery*, 165(1):1–2. [CrossRef]

Chen, W. (2020). Disagreement in peer interaction: Its effect on learner task performance. *System*, 88:102179. [CrossRef]

Cox, R.M., Alexander, G.C., Beyer, C.M. (2003). Norms for the International Outcome Inventory for Hearing Aids. *Journal of the American Academy of Audiology*, 14:8. https://pubmed.ncbi.nlm.nih.gov/14655953/

Eser, E., Fidaner, H., Fidaner, C., Yalçın Eser, S., Elbi, H., Göker, E. (1999). WHOQOL-100 ve WHOQOL-BREF'in Psikometrik Özellikleri. *3P Dergisi*. https://www.researchgate.net/profile/Erhan-Eser/publication/291870682_Whoqol-100_and_psychometric_characteristics_of_WHOQOL-bref/links/584817e808aeda696825d91e/Whoqol-100-and-psychometric-characteristics-of-WHOQOL-bref.pdf

Evren, C., Evren, B., Dalbudak, E., Topçu, M., Kutlu, N. (2020). Measuring anxiety related to COVID-19: A Turkish validation study of the Coronavirus Anxiety Scale. *Death Studies, 46*(5), 1052-1058. [CrossRef]

Fan, Y., Wang, H., Wu, Q. (2021). SARS pandemic exposure impaired early childhood development in China. *Nature Portfolio*, 11:8694. [CrossRef]

Kırkım, G., Şerbetçioğlu, M. B., Mutlu, B. (2008). Uluslararası İşitme Cihazları Değerlendirme Envanteri Türkçe Versiyonu Kullanılarak Hastalardaki İşitme Cihazı Memnuniyetinin Değerlendirilmesi. *KBB ve BBC Dergisi*, (3):101-107. http://dergi.kbb-bbc.org.tr/uploads/pdf/kbb16-3-1.pdf

Lee, S. A. (2020). Coronavirus Anxiety Scale: A brief mental health screener for COVID-19 related anxiety. *Death Studies, 44*(7), 393-401. [CrossRef]

Mustafa, M. W. M. (2020). Audiological profile of asymptomatic Covid-19 PCR-positive cases. *American Journal of Otolaryngology*, 102483. [CrossRef]

Novak, R. E., Cantu, A. G., Zappler, A., Coco, L., Champlin, C. A. (2016). The Future of Healthcare of Healthcare Delivery: IPE/IPP Audiology and Nursing Student/Faculty Collaboration to Deliver Hearing Aids to Vulnerable Adults via Telehealth. *Journal of Nursing& Interprofessional Leadership in Quality & Safety, 1*(1). https://digitalcommons.library.tmc.edu/uthoustonjqualsafe/vol1/iss1/1

Orbay, O, Ayvasık, H. B. (2006). Spence Çocuklar için Kaygı Ölçeği-Ebeveyn Formu: Ön Çalışma. *Türk Psikoloji Yazıları*, 9(18):33-48 https://toad.halileksi.net/sites/default/files/pdf/spence-cocuklar-icin-kaygi-olcegi-ebeveyn-formu-toad.pdf

Paiva, E.D., Silva, L.R., Machado, M.E.D., Aguiar, R.C.B., Garcia, K.R.S., Acioly, P.G.M. (2021). Child behavior during the social distancing in the COVID-19 pandemic. *Rev Bras Enferm*, *74*(Suppl 1):e20200762. [CrossRef]

Sher, T., Stamper, G.C., Lundy, L.B. (2020). COVID-19 and Vulnerable Population With Communication Disorders. *Mayo Clinic Proceedings, 95*(9):1845-1847. [CrossRef]

Spence, S. H., Barrett, P. M., Turner, C. M. (2003). Psychometric properties of the Spence Children's Anxiety Scale with young adolescents. *Anxiety Disorders, 17*(6), 605-25. [CrossRef]

Telmesani, L. M., Said, N. M., Mahrous, M. M., Alrusayyis, D. F. (2021). The Difficulties Encountered By Pediatric Cochlear Implant Patients and Their Parents During the COVID-19 Pandemic. *Audiology and Neurotology,27*(1), 48-55. [CrossRef]

World Health Organization. (2020b). Coronavirus disease 2019 (COVID-19) Situation Report – 40. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200229-sitrep-40-covid-19.pdf

World Health Organization. (1996). WHOQOL-BREF Introduction, Administration, Scoring and Generic Version of the Assessment. World Health Organization Programme on Mental Health. https://www.who.int/publications/i/item/WHOQOL-BREF

Wong, C. A., Ming, D., Maslow, G., Gifford, E. J. (2020). Mitigating the Impacts of the COVID-19 Pandemic Response At-Risk Children. *Pediatrics, 146*(1):e20200973. [CrossRef]

Xie, X., Xue, Q., Zhou, Y., Zhu, K., Liu, Q. et. al. (2020). Mental health status among children in home confinement during the coronavirus disease 2019 outbreak in Hubei Province. *JAMA Pediatr.*, *174*(9), 898–900. [CrossRef]

Zhao, Y., Guo, Y., Xiao, Y., Wu, J. (2020). The Effects of Online Homeschooling on Children, Parents, and Teachers of Grades 1–9 During the COVID-19 Pandemic. *Medical Science Monitor*, *26*, e92559 [CrossRef]