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The mediation effect of mental resilience between stress and coping style among parents of children with cochlear implants: Cross-sectional study

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ABSTRACT

Purpose: This study aimed to examine the relationship of stress, mental resilience, and coping style, and the mediation effect of mental resilience between stress and coping style among parents of children with cochlear implants.

Design and methods: A cross-sectional design was used. A total of 231 parents of children with cochlear implants were recruited from May 1, 2022, to February 28, 2023 at a comprehensive tertiary hospital and a cochlear implant rehabilitation center in China. Parenting Stress Index-Short Form (PSI-SF), the Connor-Davidson Resilience Scale (CD-RISC) and the Simplified Coping Style Questionnaire(SCSQ) were used to measure stress, mental resilience, and coping style respectively.

Results: The mean score observed for PSI-SF, CD-RISC, active coping, and passive coping was 87.85 ± 24.59, 55.63 ± 16.11, 21.36 ± 6.73, and 9.05 ± 4.52, respectively.

Mental resilience was a significant mediator explaining the effect of stress on active coping ($\beta = -0.294$; 95% bias-corrected bootstrap *CI*: −0.358 to −0.164).

Conclusions: Attention should be paid to the status of stress, mental resilience and coping style in parents of children with cochlear implants. Mental resilience mediated stress and coping style.

Practice implications: This study provides a theoretical basis for establishing an active coping care program for parents of children with cochlear implants. There is a need to identify strategies that can help increase the level of mental resilience of parents of children with cochlear implants and more subjective and objective social support should be provided to reduce their stress and to encourage active coping style.

Introduction

Hearing loss is the most common sensory disorder in children (Fink, 2021). Approximately 0.1–0.2% of infants are born deaf or hard of hearing (Lieu et al., 2020). Without effective interventions, hearing loss can adversely affect children's speech, language, development, education, and cognitive outcomes (Sharma et al., 2020). Cochlear implant is a primary treatment for patients with profound hearing loss or deafness (Chari & Chan, 2017). An estimated 737,000 cochlear implants were implanted worldwide by the end of 2019 (Loth et al., 2022). Children comprise a significant proportion of those receiving cochlear implants. Unfortunately, cochlear implants are not a permanent solution, better language outcomes can only be obtained through long-term rehabilitation of children, especially for congenital deafness (Monshizadeh et al., 2021). Parents usually play a significant role in the recovery process as the primary caregivers of the children (Ambrose et al., 2015). However, the coping style of parents may affect their child's recovery process (D'Angelo et al., 2019). An active coping style facilitates good clinical outcomes and improves the long-term prognosis of children who receive cochlear implants (Holzinger et al., 2020). Therefore, it is important to identify the factors associated with parental coping styles.

Coping style refers to the cognitive and behavioral actions that individuals take in response to stress, including active and passive behaviors (Labrague et al., 2018). Research shows that parenting stress is an influencing factor in coping style (Bashiri et al., 2020; Sharma & Subedi, 2022). Parenting stress refers to the psychological distress that parents experience while caring for their children (Wiseman et al., 2021). The higher the parenting stress is, the more individuals tend to adopt a passive coping style (Lee et al., 2021). In addition, following Lazarus and Folkman's stress and coping theory, when an individual is

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confronted with a stressor, the stressor serves as a stimulating event that triggers the organism to generate an adaptive response, specifically, an adaptive coping strategies (Folkman et al., 1987). It is clear that parents of children with cochlear implants experience high levels of parenting stress (Cejas et al., 2021). These stress levels are related to factors such as the severity of illness, duration of illness, age of the child, gender and mental health of the parents, marital status, marital quality, and perceived level of support (Pinquart, 2018). In the face of these high levels of parental stress, it is particularly important that parents of children with cochlear implants choose which approach to take in response to stressors (Majorano et al., 2020). Although parenting stress is considered an influential factor for coping style, few studies have examined how to reduce parenting stress and promote an active coping style among parents of children with cochlear implants (Anmyr et al., 2016; Cejas et al., 2021).

Mental resilience refers to the "ability to bounce back" in the face of trauma, adversity, threats, tragedy, hardship, and other life stressors (Aburn et al., 2016). It can also be defined as an adaptive state in response to a lifetime of stress and strain (Lisanti, 2018). Research has shown that an active coping style is associated with high levels of mental resilience (Thompson et al., 2016). Mental resilience may act as a protective factor to enable individuals to adopt an active coping style, but it is also affected by stress levels (Smith et al., 2008). Additionally, according to Schetter and Dolbier (2011) and Richardson (Richardson, 2002; Schetter & Dolbier, 2011), the process of mental resilience encompasses both social factors and psychological factors. Mental resilience serves as an individual's response to stress or as a means to restore their initial state following a stress-induced encounter (Lisanti, 2018). Furthermore, the quality of resilience and previous resilience restructuring processes impact how individuals handle challenges (Friedberg & Malefakis, 2022). When an individual encounters a stressor, they mobilize a number of protective factors against it to maintain a balance between themselves and the environment. If the stress is so great that the "balance of mind and body" is disrupted, the individual will alter their original cognitive patterns and reintegrate them, either consciously or unconsciously. If a higher level of reorganization (increased resilience) is reached, the individual returns to their initial state of equilibrium and respond in a positive way to promote personal growth (Richardson, 2002; VanMeter & Cicchetti, 2020). However, when individuals do not develop the quality of resilience or do not grow through life's challenges, an imbalance (dysfunction) arises, which can result in sabotaging behaviors or other unhealthy stress management behaviors (Pinquart, 2018; Richardson, 2002). Hence, considering the significant role of parenting stress in both mental resilience and coping styles, as well as the crucial role of mental resilience in coping styles, it is reasonable to hypothesize that mental resilience mediates the pathway from parenting stress to coping styles.

We searched the databases of Web of Science and PubMed for articles published from their inception to February 2023 that contained the terms "cochlear implant" and "parenting stress" or "mental resilience" or "coping style". Although we retrieved nearly 140 articles, most studies were focused on identifying risk factors or targeted intervention programs. In addition, some studies had focused on the rehabilitation of children, such as the rehabilitation of language skills. Only 2 cross-sectional studies had specifically investigated the relationship between "cochlear implant" and "parenting stress" or "mental resilience" or "coping style." However, 1 of these articles only focused on the relationship between parental stress and parental attitudes (Piplani et al., 2022). The other article was concerned with parental stress and coping style, but the outcome variable was parents' satisfaction with the family's quality of life (Levinger & Alhuzail, 2018). Although one study explored the role of resilience in people with hearing loss, the cumulative sample size of these studies was small (42 participants in total), and they did not focus on parenting stress and coping style (Teece et al., 2022). In summary, previous studies have not revealed the mediating role of mental resilience in the pathway between parenting stress and coping style for parents of children with cochlear implants.

Although the above studies agreed that mental resilience and parenting stress are critical to coping styles, few studies have examined the specific impact of parenting stress and mental resilience on coping styles. These existing studies provided a basis for us to speculate that mental resilience has a mediating role in the relationship between parenting stress and coping style. Our specific research questions were as follows: (1) What are the coping styles, mental resilience, and the status of parenting stress of parents of children with cochlear implants? (2) Does mental resilience have a mediating role in the relationship between parenting stress and coping style? Fig. 1 shows the tested hypothesis, which was that the effect of parenting stress on coping style is mediated by mental resilience (total mediating effect: a1 × b1).

Methods

Objectives

This study aimed to examine the relationship of stress, mental resilience, and coping style, and the mediation effect of mental resilience between stress and coping style among parents of children with cochlear implants.

Study design

This study used a multicenter, descriptive, cross-sectional design.

Setting

The study setting was a comprehensive tertiary hospital and a cochlear implant rehabilitation center in Changsha, Hunan Province, China. The hospital performs approximately 500 cochlear implant surgeries per year. The cochlear implant rehabilitation center provides services to patients with cochlear implants from Changsha and its surrounding cities and rural areas.

Participants

The participants were parents of children recruited from the Otology Inpatient Department of the comprehensive tertiary hospital and the cochlear implant rehabilitation center from May 1, 2022, to February 28, 2023. The inclusion criteria were as follows: (1) parents of children with cochlear implants, with the child being under 15 years old (China's

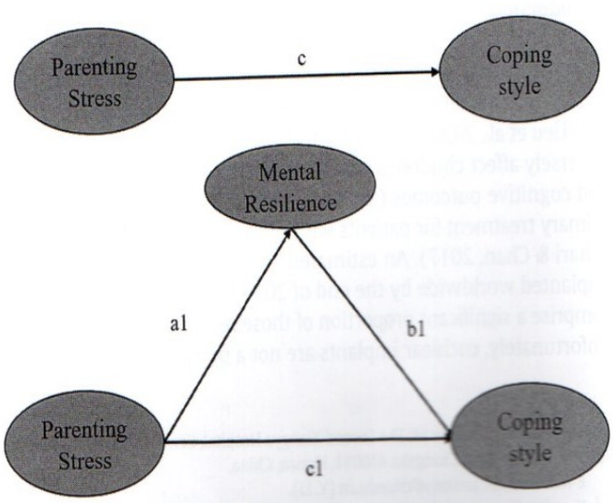

Fig. 1. Hypothetical output model of mental resilience mediator. a1: effects of parenting stress on mental resilience; b1: effects of mental resilience on coping style; c: total effects of parenting stress on coping style; c1: direct effects of parenting stress on coping style; a1 × b1: mediating effects of mental resilience in the relationship between parenting stress and coping style.

seventh population census, conducted in 2020, defines individuals aged 0–14 as children. Moreover, the majority of parents with children aged 0–14 belong to the realm of young adulthood. On one hand, parents within this age category possess social experience, demonstrate heightened concern for their children's well-being, and willingly participated in our survey. On the other hand, they exhibit notable levels of cognitive abilities and comprehension, resulting in their successful completion of our survey); (2) parents who lived with their children; (3) parents who participated in the disease management of their children; (4) parents who were able to listen to and understand the Chinese language and to correctly understand the basic conditions of a questionnaire; (5) each participant belongs to a distinct family; and (6) the provision of informed consent and voluntary participation in this study. The exclusion criteria were as follows: (1) parents whose children had serious physical and mental illnesses and (2) parents with serious physical and mental illnesses.

Ethical considerations

This study was approved by the Ethics Committee of the Second Xiangya Hospital of Central South University (No. LYF2022219). Participants entered this study voluntarily and could terminate or withdraw from the survey at any time. All participants provided informed consent before they registered. The questionnaires were filled out anonymously and retrieved immediately after completion. The time limit for completing the questionnaire was 20 min, and all participants completed the questionnaire within the time limit. Each participant was given a cell phone case and a keychain as a reward for completing the questionnaire. The confidentiality of all data was maintained. Patients' identifying information was replaced by codes.

Measures

Sociodemographic characteristics

The sociodemographic data collection sheets were self-designed. Demographic information of parents included relationship with child (father, mother), education level, occupation, marital status (married, divorced, or widowed), medical payment, and average monthly family income (<CNY3,000, CNY3,000–5000, and >CNY5,000).

Parenting Stress Index-Short Form

The Parenting Stress Index-Short Form (PSI-SF) was used to measure parenting stress and is now widely used in many fields (Jijon & Leonard, 2020). The Chinese version of the PSI-SF was used in this study (Zhao et al., 2021). This scale consists of 3 dimensions, including parental distress (PD), parent-child dysfunctional interaction (PCDI), and difficult child (DC). Each dimension contains 12 items, for a total of 36 items on the entire scale. The scale was used to measure the level of parenting stress in the 3 dimensions for parents of children aged 1 month to 12 years old. Under a 5-point Likert scale (with 1 indicating strongly disagree and 5 indicating strongly agree), the scores of the 12 items on each dimension were summed, and the scores of the 3 dimensions were calculated separately with a range of 12 to 60. The scores of the 3 dimensions were summed to obtain the total score, which ranged from 36 to 180. A score ≤ 85 is a normal level of parenting stress, a score of 86–90 indicates a critical level of parenting stress, a score > 90 indicates a high level of parenting stress and suggests the need for counseling and support for the parents or possible neglect of the children, and a score ≥ 99 indicates a very high level of parenting stress. The Chinese version of PSI-SF has shown good reliability and validity (Hu et al., 2019). For the current study, the internal consistency coefficient of the scale was excellent (Cronbach's $\alpha = 0.847$).

Connor–Davidson Resilience Scale

The Connor–Davidson Resilience Scale (CD-RISC) was developed by American scholars Connor and Davidson (Connor & Davidson, 2003). The Chinese version of the CD-RISC, translated and developed by Yu et al. (Yu & Zhang, 2007), was used in this study. The scale contains 3 dimensions, tenacity, strength, and optimism, and contains 13, 8, and 4 items, respectively, for a total of 25 entries. It is scored on a scale of 0 to 4 (0 for never, 1 for rarely, 2 for sometimes, 3 for often, and 4 for almost always), with higher scores indicating greater mental resilience. The total score ranges from 0 to 100. A score of 60 indicates weak mental resilience, 61–69 average mental resilience, 70–79 good mental resilience, and 80–100 exceptional mental resilience. The Chinese version of PSI-SF has shown good reliability and validity (Yu & Zhang, 2007). For the current study, the internal consistency coefficient of the scale was excellent (Cronbach's $\alpha = 0.830$).

Simplified Coping Style Questionnaire

We used the Chinese version of the Simplified Coping Style Questionnaire (SCSQ) to measure the coping styles that people often adopt in their daily lives (Xie, 2018). It has 2 subscales: active coping and passive coping. The scale contains 20 entries, 12 of which are active coping items and 8 of which are passive coping items. A scale of 0 to 3 was used (0 indicating no use, 1 indicating rare use, 2 indicating occasional use, and 3 indicating frequent use). The total active coping score ranged from 0 to 36, and the total passive coping score ranged from 0 to 24. If the score of the active coping dimension was higher than the score of passive coping dimension, it meant that the respondent mainly adopts an active coping style; otherwise, it meant that the respondent mainly adopts a passive coping style. The scale has shown good reliability and validity for both active coping and passive coping (Huang et al., 2021). In our study, this scale has satisfactory reliability and validity for both active coping (Cronbach's $\alpha = 0.900$) and passive coping (Cronbach's $\alpha = 0.790$).

Sample size

It is important for the adequacy of the sample size to detect any effects that occur between variables. For the mediation analysis, a sample of 115–285 participants was sufficient to detect indirect effects between the employed variables (Fritz & Mackinnon, 2007). We collected 234 questionnaires; after eliminating 3 unqualified questionnaires (had filled-in answers that were mutually exclusive), we ultimately obtained 231 valid completed questionnaires, with a valid return rate of 98.72%.

Data collection

Before initiating this study, we obtained the support of the Otology Inpatient Department and the cochlear implant rehabilitation center. We informed all participants of the purpose of our study and assured them that the study would be used for scientific research only. We sought informed consent from all participants. Participants' personal information was replaced with codes to protect personal privacy. We collected 20 presurvey questionnaire responses, improved the guidelines and informed consent form, and determined the final version of the questionnaire.

The questionnaires were distributed and collected by XZ and JX. Both XZ and JX were trained to distribute and collected the questionnaires. After initial training was completed, the distribution and collection of the questionnaires started only with the consent of YL. Before the final questionnaires were distributed, we explained the purpose of this study to participants, obtained their informed consent, and assured them that this study would follow the principle of confidentiality. In order to ensure the accuracy of data entry, XZ and JX entered the data together, and WW, LC, and ZJ then confirmed the accuracy of the data before sending the data to LZ for evaluation.

Statistical analysis

The data analysis was performed using SPSS 22.0 (IBM Corp., Armonk, NY, USA). The normality of variables was determined using

skewness, kurtosis, and Q-Q plots. Descriptive characteristics were used to determine the distribution of demographic characteristics (relationship with child, education level, occupation, living conditions, health conditions, relationship status, marital status, family structure, medical payment, and average monthly family income) and the main study variables (parenting stress, mental resilience, and coping styles). Continuous variables were reported as the mean and standard deviation (SD). Categorical variables were expressed as frequencies and percentages. One-way analyses of variance (ANOVAs) and *t*-tests were used to compare the differences in mental resilience scores among participants with different demographic characteristics. Moreover, Pearson correlation analysis was used to test the associations between the main study variables (parenting stress, mental resilience, and coping styles). A 2-sided *p*-value of <0.05 was considered statistically significant, and all tests were 2-tailed.

In addition, the structural equation model (SEM) was performed to explore the interrelations between parenting stress, mental resilience, and coping styles. We used SPSS Amos 26.0 (IBM Corp., Armonk, NY, USA) for latent variable path analysis. It has been suggested (Baron & Kenny, 1986) that the conditions for identifying mediating variables are as follows: 1) the independent variable is significantly correlated with the dependent variable; 2) the independent variable is significantly correlated with the mediating variable; and 3) the mediating variable is significantly correlated with the dependent variable. According to this method, this study took parenting stress as the independent variable, coping styles as the dependent variable (active coping and passive coping as dependent variable, respectively), and mental resilience as the mediating variable to construct a relationship model among them.

We used maximum likelihood estimation to correct and fit the model and we used a bias-corrected bootstrap method to test for mediating effects (Hayes & Preacher, 2014). Standard errors were bootstrapped with 2000 samples to obtain bias-corrected confidence intervals. The fit indices were obtained to test the fit of the proposed model. The chi-square ratio (χ^2/df) in the range of <5 indicated an acceptable fit, and the range of 1–3 indicated a superior model fit. The goodness of fit index (GFI), adjusted goodness of fit index (AGFI), normed fit index (NFI), incremental fit index (IFI), and Tucker–Lewis indices (TLI) all >0.90 indicated an acceptable fit. The root mean square residual (RMR) <0.05 and the root mean square error of approximation (RMSEA) <0.08 indicated an acceptable fit, respectively.

In the mediation analysis, the indirect effect was defined as the product of path a1 and path b1 (a1 × b1; Fig. 1). The total effect included both the direct effect (depicted as path c1) and the indirect effect. A 95% bias-corrected bootstrap confidence interval (CI) not including 0 indicated a statistically significant difference.

Results

Sample characteristics

Table 1 presents the sociodemographic characteristics and a comparison of the mental resilience scores of parents of children with cochlear implants with different sociodemographic characteristics. Of the parents in the sample, most (84%) participants were mothers and the rest were fathers (16%). >70% had not attended college. Over 50% were categorized as either a housewife or unemployed. A total of 94.8% of participants were married, and the remaining 5.2% were divorced or widowed. >29% of participants were self-paying, with the rest paid by medical insurance. Over 84% of households had an average monthly family income of less than CNY5,000.

There were significant differences in CD-RISC scores regarding education level, occupation, and average monthly family income (all $p < 0.05$). Higher education level (vs. lower), being employed (vs. housewife or unemployed), and an average monthly family income > CNY5,000 (vs. < CNY5,000) were associated with higher levels of mental resilience. However, there were no significant differences in CD-RISC scores according to the other sociodemographic variables.

Conceptual variables

Table 2 shows the means and SDs of the 3 measures in the current sample.

Correlations between parenting stress, mental resilience, and coping style

Table 3 shows the correlations between the 3 measures. Parenting stress was negatively correlated with active coping at a significant level ($r = -0.460$; $p < 0.01$) and was positively correlated with passive coping at a significant level ($r = -0.180$; $p < 0.01$). Furthermore, parenting stress was negatively correlated with mental resilience at a significant level ($r = -0.502$; $p < 0.01$). In addition, mental resilience was positively correlated with active coping ($r = 0.640$; $p < 0.01$) but did not correlate with passive coping ($p > 0.05$).

SEM results

Overall model fitting index

We used SPSS Amos 26.0 to verify the mediating effect of mental resilience. In the model structure, the active coping of parents of children with cochlear implants was taken as the dependent variable, parenting stress was analyzed as the independent variable, and mental resilience was analyzed as the mediating variable. Model fit indices suggested that the model succeeded (χ^2/df = 4.385, GFI = 0.940, AGFI = 0.860, NFI = 0.953, IFI = 0.963, NFI = 0.953, TLI = 0.935, RMR = 0.044, RMSEA = 0.121).

Although the model had parameters that were not within the allowed range (RMSEA = 0.121), the overall model fit was within an acceptable range. Table 4 shows the overall model fitting index.

Latent variable path analysis of parenting stress, mental resilience, and active coping

With respect to the three measurement models, the standardized factor loadings for each latent variable and observed subscale were as follows: 0.71–0.89 for parenting stress, 0.82–0.94 for mental resilience. The e1–e8, representing the measurement error for each observed variable to estimate the latent variable. Parenting stress was 0.50–0.71, and mental resilience was 0.68–0.88. e7 (0.47) and e8 (0.25), representing the residual terms for active coping and mental resilience, respectively. Fig. 2 illustrates the latent variable path analysis of parenting stress, mental resilience, and active coping of parents of children with cochlear implants.

With respect to the structural mode, we found that parenting stress not only had a direct effect on active coping (β = −0.167, B = −0.134, standard error [SE] = 0.050, 95% bias-corrected bootstrap CI: −0.228 to −0.031), but also an indirect effect on active coping through mental resilience (β = −0.294, B = −0.236, SE = 0.048, 95% bias-corrected bootstrap CI: −0.358 to −0.164). The total effect of parenting stress on active coping was significant (β = −0.461, B = −0.370, SE = 0.062, 95% bias-corrected bootstrap CI: −0.499 to −0.250). This supports the hypothesis that mental resilience played a partial mediating role between parenting stress and active coping, and indirect effects accounted for 63.77% (−0.294/−0.461) of the total effects, which supports our hypothesis. Table 5 shows the results of structural equation modelling analysis.

Table 1
Comparison of mental resilience scores of parents of children with cochlear implants with different sociodemographic characteristics (M ± SD, $n = 231$).

Variables	n	%	Tenacity	Strength	Optimism	CD-RISC
Relationship with child						
father	37	16.02	30.24 ± 8.44	20.30 ± 5.08	8.38 ± 2.23	58.92 ± 14.63
mother	194	83.98	27.24 ± 9.02	19.39 ± 5.21	8.38 ± 3.00	55.00 ± 16.34
t			1.876	0.978	0.005	1.358
p-value			0.062	0.329	0.996	0.176
Education level						
less than high school	82	35.50	24.32 ± 8.30	17.70 ± 4.59	7.60 ± 2.74	49.61 ± 14.53
high school graduates	82	35.50	29.15 ± 8.60	19.87 ± 4.91	8.85 ± 2.92	57.87 ± 15.53
college or vocational school	43	18.61	28.44 ± 9.32	20.49 ± 5.35	8.07 ± 2.81	57.00 ± 16.63
bachelor or higher	24	10.39	33.17 ± 8.06	22.96 ± 5.65	9.96 ± 2.58	66.08 ± 15.31
F			8.382	8.217	5.615	8.584
p-value			<0.001	<0.001	<0.001	<0.001
Occupation						
experts or technicians	15	6.49	35.20 ± 12.21	23.47 ± 7.21	9.60 ± 2.77	68.27 ± 21.76
government officials or management	6	2.60	32.50 ± 11.26	23.50 ± 4.09	9.17 ± 4.62	65.17 ± 19.34
service staff	13	5.63	30.69 ± 7.96	22.23 ± 5.48	8.85 ± 1.52	61.77 ± 14.04
sales staff	22	9.52	30.23 ± 8.53	20.95 ± 4.75	8.82 ± 2.68	60.00 ± 15.00
agricultural or pastoral workers	14	6.06	28.21 ± 9.25	19.64 ± 5.26	8.64 ± 2.73	56.50 ± 15.63
workers	19	8.23	29.05 ± 8.55	20.11 ± 5.37	8.47 ± 3.20	57.63 ± 16.54
housewife or unemployed	142	61.47	25.84 ± 8.14	18.39 ± 4.62	8.06 ± 2.91	52.30 ± 14.71
F			3.935	4.422	0.967	3.399
p-value			<0.001	<0.001	0.448	0.001
Marital status						
married	219	94.81	27.68 ± 8.96	19.51 ± 5.21	8.45 ± 2.86	55.60 ± 16.06
divorced or widowed	12	5.19	28.33 ± 9.87	20.00 ± 5.10	7.75 ± 3.41	56.08 ± 17.83
t			−0.243	−0.320	0.771	−0.100
p-value			0.808	0.749	0.441	0.920
Medical payment						
self-paying	69	29.87	26.33 ± 8.88	18.48 ± 4.83	8.10 ± 2.94	52.91 ± 15.65
medical insurance	162	70.13	28.31 ± 8.99	19.98 ± 5.29	8.49 ± 2.87	56.78 ± 16.22
t			−1.534	−2.028	−0.945	−1.678
p-value			0.126	0.044	0.346	0.095
Average monthly family income						
<CNY3000	85	36.80	25.20 ± 7.71	17.99 ± 4.31	7.68 ± 2.57	50.87 ± 13.58
CNY3000 ~ 5000	110	47.62	27.95 ± 8.77	19.50 ± 5.00	8.25 ± 2.81	55.70 ± 15.53
>CNY5000	36	15.58	32.94 ± 10.22	23.28 ± 5.87	10.42 ± 2.96	66.64 ± 18.26
F			10.231	14.704	12.730	13.417
p-value			<0.001	<0.001	<0.001	<0.001

Note: M, mean; SD, standard deviation; CD-RISC, Connor–Davidson Resilience Scale.

Discussion

This study used a cross-sectional design to examine the levels of stress, mental resilience, and coping styles among parents of children with cochlear implants. This study analyzed the relationships between parenting stress, mental resilience, and coping style while considering the mediating effects of mental resilience. The findings of this study offer insights into how parenting stress and mental resilience are associated with parents' coping styles and provide potential intervention strategies to promote an active coping style among Chinese parents of children with cochlear implants.

Table 2
The scores description of stress, mental resilience, and coping style among parents of children with cochlear implants.

Variables	Mean (SD) of item mean score	Mean (SD) of total score	Score range for tool utilization(min, max)
CD-RISC	2.223 (0.639)	55.628 (16.114)	(0,100)
Tenacity	2.132 (0.691)	27.719 (8.983)	(0, 52)
Strength	2.442 (0.649)	19.532 (5.190)	(0,32)
Optimism	2.094 (0.722)	8.377 (2.888)	(0, 16)
PSI-SF	2.440 (0.683)	87.853 (24.585)	(36, 180)
PD	2.783 (0.782)	33.398 (9.384)	(12, 60)
PCDI	2.092 (0.731)	25.104 (8.771)	(12, 60)
DC	2.446 (0.826)	29.351 (9.915)	(12, 60)
SCSQ AC	1.780 (0.561)	21.359 (6.728)	(0, 36)
SCSQ PC	1.131 (0.565)	9.052 (4.523)	(0, 24)

Note: SD, standard deviation; CD-RISC, Connor–Davidson Resilience Scale; PSI-SF, Parenting Stress Index-Short Form; PD, parental distress; PCDI, parent-child dysfunctional interaction; DC, difficult child; SCSQ, Simplified Coping Style Questionnaire; AC, active coping; PC, passive coping.

Parenting stress, mental resilience, and coping styles among parents of children with cochlear implants

Firstly, the status of stress that we identified among parents of children with cochlear implants was concerning. This study showed that the mean score of PSI-SF of parents of children with cochlear implants was (87.853 ± 24.585), and the mean score of PSI-SF entries was (2.440 ± 0.683). This indicated that parents of children with cochlear implants experienced a critical level of parenting stress, which was higher than that found by Riddhima et al. in a study conducted in Brazil (Riddhima & Ranjan, 2022). Cultural or contextual factors might have contributed to the difference in these findings. However, mean PSI-SF scores vary across populations in different countries. Our findings were consistent with those of Wiseman et al. who employed a sample of parents of school-age children and adolescents with cochlear implants (Wiseman et al., 2021). It is clear that parents of children with developmental disabilities have higher levels of stress compared to parents of typically developing children (Larkin et al., 2021). In addition, we found that the scores of parents on the 3 dimensions of parenting stress, PD, PCDI, and DC, in descending order, were PD, DC, and PCDI. These findings were consistent with findings from previous studies (Aiello & Ferrari, 2015). This indicated that parents of children with cochlear implants felt pressure and distress in fulfilling their role as a parent. A systematic review (Gunjawate et al., 2023) highlighted the factors associated with stress in parents of children with hearing loss, such as parental depression/anxiety due to the child's hearing loss, lack of professional support, lack of family cohesion, and so on. All of these factors can lead to maladaptive parenting roles. Therefore, effective coping strategies should focus on improving parents' awareness of their

Table 3
Pearson correlation between stress, mental resilience, and coping style among parents of children with cochlear implants.

Variables	Tenacity	Strength	Optimism	PD	PCDI	DC	CD-RISC	PSI-SF	SCSQ AC	SCSQ PC
Tenacity	1									
Strength	0.865**	1								
Optimism	0.779**	0.756**	1							
PD	−0.561**	−0.586**	−0.496**	1						
PCDI	−0.357**	−0.399**	−0.304**	0.614**	1					
DC	−0.334**	−0.375**	−0.288**	0.570**	0.771**	1				
CD-RISC	0.946**	0.934**	0.913**	−0.587**	−0.378**	−0.356**	1			
PSI-SF	−0.476**	−0.517**	−0.414**	0.830**	0.902**	0.896**	−0.502**	1		
SCSQ AC	0.631**	0.620**	0.538**	−0.476**	−0.393**	−0.343**	0.640**	−0.460**	1	
SCSQ PC	0.051	0.019	0.137*	0.153*	0.146*	0.173**	0.076	0.180**	0.315**	1

Note: * $p < 0.05$, ** $p < 0.01$. PD, parental distress; PCDI, parent-child dysfunctional interaction; DC, difficult child; CD-RISC, Connor–Davidson Resilience Scale; PSI-SF, Parenting Stress Index-Short Form; SCSQ, Simplified Coping Style Questionnaire; AC, active coping; PC, passive coping.

parenting role and functions, and their confidence in taking care of their children.

Secondly, the outlook regarding mental resilience among parents of children with cochlear implants was not favorable. The findings of this study revealed that the average CD-RISC score for these parents was (55.628 ± 16.114), whereas the mean item score for the CD-RISC was (2.223 ± 0.639). These results indicate that the resilience level of parents with cochlear implant recipients was comparatively low, falling below the levels reported in Wu et al.'s research on parents of children with autism spectrum disorder (Wu et al., 2022). This could be attributed to the societal and social media bias towards directing greater focus on children with autism rather than those with cochlear implants. Additionally, our findings indicated that parents of children with cochlear implants achieved the highest scores in the strength dimension, followed by the tenacity dimension, and the lowest scores in the optimism dimension. This contrasted with the outcomes of studies involving parents of children with disabilities (Zhao et al., 2021). In the study conducted by Zhao et al., the dimension of tenacity exhibited the highest scores, whereas the strength dimension presented the lowest scores. This observation may be attributed to the financial status of the families involved. Specifically, within Zhao et al.'s study, approximately 17.9% of parents reported an average monthly family income exceeding CNY10,000; in contrast, our own study indicated that only about 15.6% of parents had an average monthly family income surpassing CNY5,000. Consequently, parents of children with cochlear implants faced financial challenges, which likely contributed to their concerns regarding their children's auditory and speech rehabilitation. Despite this, it is undeniable that parents of children with cochlear implants face considerable resilience-related difficulties.

Thirdly, we found that parents of children with cochlear implants showed a tendency to adopt an active coping style, which was similar to the results of previous study (Lai et al., 2015). This may be related to the enhanced auditory ability and linguistic proficiency observed in implanted children (Bo et al., 2023; Fang et al., 2014). To some extent, these positive advancements provide psychological encouragement to parents, fostering their inclination towards employing an active coping style. Furthermore, in the majority of Chinese households, children serve as the emotional glue that sustains family dynamics, and in certain cases, occupy a central role. When a child becomes unwell, adopting a negative coping style can be detrimental, particularly for children with cochlear implants who stand to benefit from improved auditory and language skills. The long-term prognosis of these children is closely intertwined with their parents' coping style, thus prompting them to adopt an active coping style (Holzinger et al., 2020). Interestingly, some studies (Lai et al., 2019; Zięba et al., 2022) have highlighted that personality characteristics influence individual coping styles, and positive coping strategies can promote individual post-traumatic growth. Therefore, it is recommended that healthcare staff should promptly guide parents of children with cochlear implants to explore these favorable personality characteristics and promote parental coping abilities.

Table 4
Overall model fitting index.

χ2/df	GFI	AGFI	NFI	IFI	TLI	RMR	RMSEA
4.385	0.940	0.860	0.953	0.963	0.935	0.044	0.121

Note: χ2/df, chi-square ratio; GFI, goodness of fit index; AGFI, adjusted goodness of fit index; NFI, normed fit index; IFI, incremental fit index; TLI, Tucker–Lewis indices; RMR, root mean square residual; RMSEA, root mean square error of approximation.

Effects of education level, occupation, and average monthly family income on mental resilience

We found that parents with higher levels of education exhibited higher levels of mental resilience than those with lower education levels. This result is consistent with the findings of others (Habibpour et al., 2019). This may be related to the fact that parents with higher levels of education have lower levels of trait anxiety (Yaşar et al., 2020). Our study identified that occupation had a significant impact on levels of mental resilience. Individuals who were gainfully employed exhibited higher levels of mental resilience in comparison to those who were either a housewife or unemployed. Employment status is mainly determined by the levels of education, which had been identified as a significant predictor of resilience in previous studies (Dong et al., 2021; Eilertsen et al., 2016). Furthermore, financial status has been considered an important predictor of mental resilience (Habibpour et al., 2019). Our investigation revealed that parents with good financial status were associated with higher mental resilience. A correlation was detected between education level, employment status, and financial status.

Educational level significantly influences employment status, which in turn shapes financial status (Habibpour et al., 2019). On the one hand, having a favorable employment status can provide parents with additional support from their workplace or social connections. On the other hand, when the child requires long-term rehabilitation due to a cochlear implant, it often necessitates one or both parents leaving their jobs to dedicate more time and energy to their children's care. Unfortunately, this frequently leads to financial hardship, which impinges upon the mental resilience of parents. In our research, <11% of the participants possessed a bachelor's degree or an advanced educational attainment. Furthermore, over 50% of participants were categorized as either a housewife or unemployed, and >84% reported an average monthly family income lower than CNY5,000. These statistics imply that the mental resilience of parents of children with cochlear implants warrants attention. As a result, it is imperative for pediatric care managers and nurses to prioritize parents with limited educational backgrounds, who are unemployed or a housewife, along with those facing financial hardships. Timely implementation of efficacious support mechanisms and interventions aimed at bolstering mental resilience becomes crucial in this context.

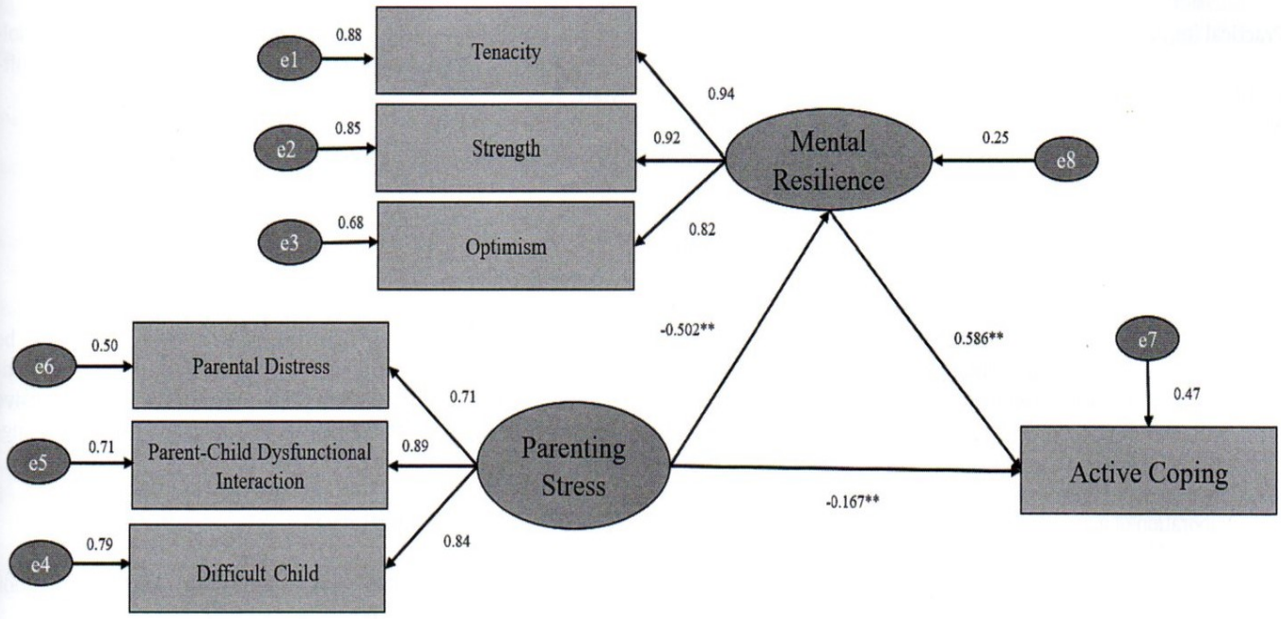

Fig. 2. Latent variable path analysis of parenting stress, mental resilience, and active coping of parents of children with cochlear implants.
Note. ** $p < 0.01$. e1–e8 represent the measurement errors of each observed variable (rectangle) to estimate the latent variable (ellipse); e7 (0.47) and e8 (0.25) represent the residual value of active coping and mental resilience.

The mediating role of mental resilience between parenting stress and active coping style

We tested our mediational hypotheses regarding mental resilience, parenting stress, and coping style. The results supported the mediation effect of mental resilience between parenting stress and coping style. We found that the significant association between parenting stress and active coping style was mediated by the level of mental resilience. Therefore, measures to enhance the level of mental resilience are the focus of interventions. Fortunately, many studies have reported methods and strategies to increase parents' levels of mental resilience, such as resilience training programs, CBT, and mindfulness intervention (Cousineau et al., 2019; Happer et al., 2017). However, resilience interventions for parents of children with cochlear implants are rare in the Chinese population, so interventions should be evaluated for effectiveness and individualized differences. In addition, more complex models of resilience are necessary because mental resilience may be influenced by other factors in daily life, such as social support, family support, personal beliefs, and economic status. More importantly, future research should further investigate the design, feasibility, and effectiveness evaluation of interventions centered on enhancing parental mental resilience.

Strengths and limitations

The strength of this study is that this is one of the few studies in China to focus on the mental resilience of parents of children with cochlear implants. More importantly, the findings of this study indicate that mental resilience significantly contributes to the promotion of active coping styles. Firstly, these results offer empirical evidence supporting the utilization of constructive and efficacious psychological intervention strategies to foster active coping among parents of children with cochlear implants. Additionally, it highlights the pivotal role of mental resilience in facilitating the adoption of positive coping strategies among individuals, thus establishing a theoretical foundation for enhancing the mental resilience of parents in clinical practice within the context of children with cochlear implants. However, this research had some limitations. First, although the results suggest that parenting stress influences coping style partly through mental resilience, the cross-sectional study design did not accurately investigate the causal process. Further longitudinal studies are needed to fill this gap. Second, the factor structure of the resilience scale used in the current sample may differ from that used in other studies. Different settings, such as in the Brazilian, Dutch, and Swedish populations, may have different factor structures (Lundman et al., 2007; Pesce et al., 2005; Portzky et al., 2010). Therefore, future research should test the factor structure and its stability before applying the resilience scale to other populations to ensure that the items of the resilience scale capture the same underlying structure. However, some studies have reported that the underlying structure of the resilience scale is sufficiently stable (Nygren et al., 2004; Pesce et al., 2005). In addition, the Chinese version of the CD-RISC used in our study has been used with individuals of different ages and socioeconomic backgrounds and has been shown to be a reliable and valid tool in various study populations (Wu et al., 2017; Ye et al., 2017; Zhang et al., 2021). Third, forthcoming studies should employ more extensive sample sizes and implement stratified or random sampling across diverse centers, including hospitals, community centers, and rehabilitation facilities. This approach would provide additional empirical support for the implementation of mental resilience interventions.

Table 5
Results of structural equation modelling analysis ($N = 231$).

Model	Estimate (β)	Estimate (B)	SE	Bias-correct 95%		
				Lower	Upper	*p*-value
Total effects: Parenting stress→ Active coping style	−0.461	−0.370	0.062	−0.499	−0.250	0.002
Direct effects: Parenting stress→ Active coping style	−0.167	−0.134	0.050	−0.228	−0.031	0.008
Indirect effects: Parenting stress→ mental resilience→ Active coping style	−0.294	−0.236	0.048	−0.358	−0.164	0.001

Note: SE, standard error.

Practical implications

First, the nursing department can implement supportive strategies for children and parents with cochlear implants, with the involvement of pediatric nurses. Pediatric nurses are on the front lines of clinical practice and spend a significant amount of time with children and their parents. As such, pediatric nurses play an important role in assessing the needs of children and parents and adopting proactive care strategies. This facilitates the parent's parenting function and promotes the physical and psychological well-being of the children. Second, although parents of children with cochlear implants face parenting stress, this negative emotional state can be mitigated by increasing levels of mental resilience, which has positive implications for parents to adopt an active coping style. Suggested strategies to improve mental resilience include interventions such as psychoeducational therapy and behavioral management, which notably requires the collaboration of a multidisciplinary team including pediatric nurses in particular. Third, strategies to improve coping levels can begin with reducing parenting stress. Parents should be provided with more subjective and objective social support, such as psychological counseling, financial support, encouragement of positive support-seeking behaviors, and meeting parental self-development needs. In addition, it is also important to focus on the impact of personal characteristics on coping styles.

Conclusion

This study further demonstrates that parents of children with cochlear implants have difficulties with parenting stress and their level of mental resilience needs to be improved. Parenting stress has a direct effect on active coping style and may also have an indirect effect on active coping style through the mediating role of mental resilience. Mental resilience levels are influenced by education level, occupation, and average monthly family income. Strategies to improve mental resilience should be emphasized, with a focus on parents with limited educational attainment, who are unemployed or a housewife, and poor financial status. Paying special attention to delivering effective mental resilience intervention support to parents of children with cochlear implants holds significance in enhancing their coping styles.

Consent to participate

All participants provided informed consent.

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Ethics approval

Ethical approval was obtained from the Ethics Committee of Second Xiangya Hospital of Central South University in China (NO. LYF2022219).

CRediT authorship contribution statement

Xiaodan Zhang: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing. **Jiao Xie:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing. **Weijing Wu:** Conceptualization, Formal analysis, Funding acquisition. **Lifang Cao:** Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **Zheyi Jiang:** Supervision, Data curation, Methodology. **Zhu Li:** Supervision, Data curation, Methodology. **Yamin Li:** Methodology, Project administration, Resources, Software, Supervision, Validation.

Declaration of Competing Interest

The authors declare that they have no competing interests.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.pedn.2023.10.042.

References

Aburn, G., Gott, M., & Hoare, K. (2016). What is resilience? An integrative review of the empirical literature. *Journal of Advanced Nursing, 72*(5), 980–1000. https://doi.org/10.1111/jan.12888.

Aiello, C. P., & Ferrari, D. V. (2015). Teleaudiology: Efficacy assessment of an online social network as a support tool for parents of children candidates for cochlear implant. *Codas, 27*(5), 411–418. https://doi.org/10.1590/2317-1782/20152013061.

Ambrose, S. E., Walker, E. A., Unflat-Berry, L. M., Oleson, J. J., & Moeller, M. P. (2015). Quantity and quality of caregivers' linguistic input to 18-month and 3-year-old children who are hard of hearing. *Ear and Hearing, 36*(Suppl. 1), 48s–59s. https://doi.org/10.1097/aud.0000000000000209.

Anmyr, L., Larsson, K., & Olsson, M. (2016). Parents' stress and coping related to children's use of a cochlear implant: A qualitative study. *Journal of Social Work in Disability & Rehabilitation, 15*(2), 150–167. https://doi.org/10.1080/1536710x.2016.1162123.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173–1182. https://doi.org/10.1037//0022-3514.51.6.1173.

Bashiri, S., Cheraghi, F., Roshanaei, G., Farahani, F., & Hasan Tehrani, T. (2020). Relationship between parental stress and their attitudes towards cochlear implantation outcomes in children referred to besat cochlear implant Center in Hamadan 2018. *Journal of Pediatric Nursing, 53*, e1–e5. https://doi.org/10.1016/j.pedn.2019.11.004.

Bo, D., Huang, Y., Wang, B., Lu, P., Chen, W. X., & Xu, Z. M. (2023). Auditory and speech outcomes of cochlear implantation in children with auditory neuropathy spectrum disorder: A systematic review and meta-analysis. *The Annals of Otology, Rhinology, and Laryngology, 132*(4), 371–380. https://doi.org/10.1177/00034894221092201.

Cejas, I., Mitchell, C. M., Barker, D. H., Sarangoulis, C., Eisenberg, L. S., & Quittner, A. L. (2021). Parenting stress, self-efficacy, and involvement: Effects on spoken language ability three years after cochlear implantation. *Otology & Neurotology, 42*(10s), S11–S18. https://doi.org/10.1097/mao.0000000000003374.

Chari, D. A., & Chan, D. K. (2017). Diagnosis and treatment of congenital sensorineural hearing loss. *Current Otorhinolaryngology Reports, 5*(4), 251–258. https://doi.org/10.1007/s40136-017-0163-3.

Connor, K. M., & Davidson, J. R. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety, 18*(2), 76–82. https://doi.org/10.1002/da.10113.

Cousineau, T. M., Hobbs, L. M., & Arthur, K. C. (2019). The role of compassion and mindfulness in building parental resilience when caring for children with chronic conditions: A conceptual model. *Frontiers in Psychology, 10*, 1602–1617. https://doi.org/10.3389/fpsyg.2019.01602.

D'Angelo, C. M., Mrug, S., Grossoehme, D., Schwebel, D. C., Reynolds, N., & Guion Reynolds, K. (2019). Coping, attributions, and health functioning among adolescents with chronic illness and their parents: Reciprocal relations over time. *Journal of Clinical Psychology in Medical Settings, 26*(4), 495–506. https://doi.org/10.1007/s10880-018-9597-0.

Dong, C., Wu, Q., Pan, Y., Yan, Q., Xu, R., & Zhang, R. (2021). Family resilience and its association with psychosocial adjustment of children with chronic illness: A latent profile analysis. *Journal of Pediatric Oncology Nursing, 60*, e6–e12. https://doi.org/10.1016/j.pedn.2021.02.010.

Eilertsen, M. E., Hjemdal, O., Le, T. T., Diseth, T. H., & Reinfjell, T. (2016). Resilience factors play an important role in the mental health of parents when children survive acute lymphoblastic leukaemia. *Acta Paediatrica, 105*(1), e30–e34. https://doi.org/10.1111/apa.13232.

Fang, H. Y., Ko, H. C., Wang, N. M., Fang, T. J., Chao, W. C., Tsou, Y. T., & Wu, C. M. (2014). Auditory performance and speech intelligibility of Mandarin-speaking children implanted before age 5. *International Journal of Pediatric Otorhinolaryngology, 78*(5), 799–803. https://doi.org/10.1016/j.ijporl.2014.02.014.

Fink, D. (2021). Review of hearing loss in children. *Jama*, *325*(12), 1223–1224. https://doi.org/10.1001/jama.2021.0387.

Folkman, S., Lazarus, R. S., Pimley, S., & Novacek, J. (1987). Age differences in stress and coping processes. *Psychology and Aging*, *2*(2), 171–184. https://doi.org/10.1037//0882-7974.2.2.171.

Friedberg, A., & Malefakis, D. (2022). Resilience, trauma, and coping. *Psychodyn Psychiatry*, *50*(2), 382–409. https://doi.org/10.1521/pdps.2022.50.2.382.

Fritz, M. S., & Mackinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science*, *18*(3), 233–239. https://doi.org/10.1111/j.1467-9280.2007.01882.x.

Gunjawate, D. R., Ravi, R., & Driscoll, C. (2023). Stress among parents of children with hearing loss and how they deal with it: A systematic review. *International Archives of Otorhinolaryngology*, *27*(1), e166–e177. https://doi.org/10.1055/s-0042-1743273.

Habibpour, Z., Mahmoudi, H., Nir, M. S., & Areshtanab, H. N. (2019). Resilience and its predictors among the parents of children with cancer: A descriptive-correlational study. *Indian Journal of Palliative Care*, *25*(1), 79–83. https://doi.org/10.4103/ijpc.Ijpc_128_18.

Happer, K., Brown, E. J., & Sharma-Patel, K. (2017). Children's resilience and trauma-specific cognitive behavioral therapy: Comparing resilience as an outcome, a trait, and a process. *Child Abuse & Neglect*, *73*, 30–41. https://doi.org/10.1016/j.chiabu.2017.09.021.

Hayes, A. F., & Preacher, K. J. (2014). Statistical mediation analysis with a multicategorical independent variable. *The British Journal of Mathematical and Statistical Psychology*, *67*(3), 451–470. https://doi.org/10.1111/bmsp.12028.

Holzinger, D., Dall, M., Sanduvete-Chaves, S., Saldaña, D., Chacón-Moscoso, S., & Fellinger, J. (2020). The impact of family environment on language development of children with cochlear implants: A systematic review and meta-analysis. *Ear and Hearing*, *41*(5), 1077–1091. https://doi.org/10.1097/aud.0000000000000852.

Hu, X., Han, Z. R., Bai, L., & Gao, M. M. (2019). The mediating role of parenting stress in the relations between parental emotion regulation and parenting behaviors in Chinese families of children with autism spectrum disorders: A dyadic analysis. *Journal of Autism and Developmental Disorders*, *49*(10), 3983–3998. https://doi.org/10.1007/s10803-019-04103-z.

Huang, Y., Su, X., Si, M., Xiao, W., Wang, H., Wang, W., ... Qiao, Y. (2021). The impacts of coping style and perceived social support on the mental health of undergraduate students during the early phases of the COVID-19 pandemic in China: A multicenter survey. *BMC Psychiatry*, *21*(1), 530–542. https://doi.org/10.1186/s12888-021-03546-y.

Jijon, A. M., & Leonard, H. C. (2020). Parenting stress in parents of children with developmental coordination disorder. *Research in Developmental Disabilities*, *104*, 103695–103703. https://doi.org/10.1016/j.ridd.2020.103695.

Labrague, L. J., McEnroe-Petitte, D. M., Leocadio, M. C., Van Bogaert, P., & Cummings, G. G. (2018). Stress and ways of coping among nurse managers: An integrative review. *Journal of Clinical Nursing*, *27*(7–8), 1346–1359. https://doi.org/10.1111/jocn.14165.

Lai, H. L., Chen, C. I., Lu, C. Y., Yao, Y. C., & Huang, C. Y. (2019). Relationships among personality, coping, and concurrent health-related quality of life in women with breast cancer. *Breast Cancer*, *26*(5), 544–551. https://doi.org/10.1007/s12282-019-00954-7.

Lai, W. W., Goh, T. J., Oei, T. P., & Sung, M. (2015). Coping and well-being in parents of children with autism spectrum disorders (ASD). *Journal of Autism and Developmental Disorders*, *45*(8), 2582–2593. https://doi.org/10.1007/s10803-015-2430-9.

Larkin, F., Hayiou-Thomas, M. E., Arshad, Z., Leonard, M., Williams, F. J., Katseniou, N., ... Meins, E. (2021). Mind-mindedness and stress in parents of children with developmental disorders. *Journal of Autism and Developmental Disorders*, *51*(2), 600–612. https://doi.org/10.1007/s10803-020-04570-9.

Lee, E. Y., Neil, N., & Friesen, D. C. (2021). Support needs, coping, and stress among parents and caregivers of people with Down syndrome. *Research in Developmental Disabilities*, *119*, 104113–104127. https://doi.org/10.1016/j.ridd.2021.104113.

Levinger, M., & Alhuzail, N. A. (2018). Bedouin hearing parents of children with hearing loss: Stress, coping, and quality of life. *American Annals of the Deaf*, *163*(3), 328–355. https://doi.org/10.1353/aad.2018.0022.

Lieu, J. E. C., Kenna, M., Anne, S., & Davidson, L. (2020). Hearing loss in children: A review. *Jama*, *324*(21), 2195–2205. https://doi.org/10.1001/jama.2020.17647.

Lisanti, A. J. (2018). Parental stress and resilience in CHD: A new frontier for health disparities research. *Cardiology in the Young*, *28*(9), 1142–1150. https://doi.org/10.1017/s1047951118000963.

Loth, A., Vazzana, C., Leinung, M., Guderian, D., Issing, C., Baumann, U., & Stöver, T. (2022). Quality control in cochlear implant therapy: Clinical practice guidelines and registries in European countries. *European Archives of Oto-Rhino-Laryngology*, *279*(10), 4779–4786. https://doi.org/10.1007/s00405-022-07263-4.

Lundman, B., Strandberg, G., Eisemann, M., Gustafson, Y., & Brulin, C. (2007). Psychometric properties of the Swedish version of the resilience scale. *Scandinavian Journal of Caring Sciences*, *21*(2), 229–237. https://doi.org/10.1111/j.1471-6712.2007.00461.x.

Majorano, M., Guerzoni, L., Cuda, D., & Morelli, M. (2020). Mothers' emotional experiences related to their child's diagnosis of deafness and cochlear implant surgery: Parenting stress and child's language development. *International Journal of Pediatric Otorhinolaryngology*, *130*, 109812–109821. https://doi.org/10.1016/j.ijporl.2019.109812.

Monshizadeh, L., Vameghi, R., Rahimi, M., Sajedi, F., Hashemi, S. B., Yadegari, F., & Kasbi, F. (2021). Is there any association between language acquisition and cognitive development in cochlear-implanted children? *Journal of International Advanced Otology*, *17*(3), 195–199. https://doi.org/10.5152/iao.2021.8990.

Nygren, B., Randström, K. B., Lejonklou, A. K., & Lundman, B. (2004). Reliability and validity of a Swedish language version of the resilience scale. *Journal of Nursing Measurement*, *12*(3), 169–178. https://doi.org/10.1891/jnum.12.3.169.

Pesce, R. P., Assis, S. G., Avanci, J. Q., Santos, N. C., Malaquias, J. V., & Carvalhaes, R. (2005). Cross-cultural adaptation, reliability and validity of the resilience scale. *Cadernos De Saude Publica*, *21*(2), 436–448. https://doi.org/10.1590/s0102-311x2005000200010.

Pinquart, M. (2018). Parenting stress in caregivers of children with chronic physical condition-A meta-analysis. *Stress and Health*, *34*(2), 197–207. https://doi.org/10.1002/smi.2780.

Piplani, S., Kalaiah, M. K., & Shastri, U. (2022). Relationship between parental stress and attitude towards cochlear implantation outcomes in children in an Indian context. *Codas*, *34*(5), e20210125–e20210130. https://doi.org/10.1590/2317-1782/20212021125.

Portzky, M., Wagnild, G., De Bacquer, D., & Audenaert, K. (2010). Psychometric evaluation of the Dutch Resilience Scale RS-nl on 3265 healthy participants: A confirmation of the association between age and resilience found with the Swedish version. *Scandinavian Journal of Caring Sciences*, *24*(Suppl. 1), 86–92. https://doi.org/10.1111/j.1471-6712.2010.00841.x.

Richardson, G. E. (2002). The metatheory of resilience and resiliency. *Journal of Clinical Psychology*, *58*(3), 307–321. https://doi.org/10.1002/jclp.10020.

Riddhima, U., & Ranjan, R. (2022). Knowledge, attitude and practice about hearing impairment among the parents of children posted for Cochlear implantation. *The International Tinnitus Journal*, *25*(2), 154–161. https://doi.org/10.5935/0946-5448.20210028.

Schetter, C. D., & Dolbier, C. (2011). Resilience in the context of chronic stress and health in adults. *Social and Personality Psychology Compass*, *5*(9), 634–652. https://doi.org/10.1111/j.1751-9004.2011.00379.x.

Sharma, S., & Subedi, J. (2022). Stress and coping among caregivers of differently able children. *Journal of Nepal Health Research Commission*, *20*(1), 186–193. https://doi.org/10.33314/jnhrc.v20i01.4069.

Sharma, S. D., Cushing, S. L., Papsin, B. C., & Gordon, K. A. (2020). Hearing and speech benefits of cochlear implantation in children: A review of the literature. *International Journal of Pediatric Otorhinolaryngology*, *133*, 109984–109989. https://doi.org/10.1016/j.ijporl.2020.109984.

Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine*, *15*(3), 194–200. https://doi.org/10.1080/10705500802222972.

Teece, K., Oeding, K., & Nelson, P. (2022). Adults with hearing loss demonstrate resilience during COVID-19 pandemic: Applications for postpandemic services. *American Journal of Audiology*, *31*(2), 392–402. https://doi.org/10.1044/2022_aja-21-00234.

Thompson, G., McBride, R. B., Hosford, C. C., & Halaas, G. (2016). Resilience among medical students: The role of coping style and social support. *Teaching and Learning in Medicine*, *28*(2), 174–182. https://doi.org/10.1080/10401334.2016.1146611.

VanMeter, F., & Cicchetti, D. (2020). Resilience. *Handbook of Clinical Neurology*, *173*, 67–73. https://doi.org/10.1016/b978-0-444-64150-2.00008-3.

Wiseman, K. B., Warner-Czyz, A. D., & Nelson, J. A. (2021). Stress in parents of school-age children and adolescents with cochlear implants. *Journal of Deaf Studies and Deaf Education*, *26*(2), 209–222. https://doi.org/10.1093/deafed/enaa042.

Wu, L., Tan, Y., & Liu, Y. (2017). Factor structure and psychometric evaluation of the Connor-Davidson resilience scale in a new employee population of China. *BMC Psychiatry*, *17*(1), 49–56. https://doi.org/10.1186/s12888-017-1219-0.

Wu, Y., Dong, C., Cen, Y., Huang, L., Chen, S., & Yu, K. (2022). Status quo of family resilience of families with autism spectrum disorder children and its influential factors. *Military Research*, *08*(39), 34–37.

Xie, Y. N. (2018). A preliminary study of the reliability and validity of the simplified coping style scale. *The Chinese Journal of Clinical Psychology*, *6*(2), 114–115.

Yaşar, Ö., Vural-Batık, M., & Özdemir, Ş. (2020). Investigating resilience, perceived social support and trait anxiety levels of mothers of school-age children who stutter. *Codas*, *32*(2), e20190093–e20190099. https://doi.org/10.1590/2317-1782/20192019093.

Ye, Z. J., Qiu, H. Z., Li, P. F., Chen, P., Liang, M. Z., Liu, M. L., ... Quan, X. M. (2017). Validation and application of the Chinese version of the 10-item Connor-Davidson Resilience Scale (CD-RISC-10) among parents of children with cancer diagnosis. *European Journal of Oncology Nursing*, *27*, 36–44. https://doi.org/10.1016/j.ejon.2017.01.004.

Yu, X., & Zhang, Y. X. (2007). Factor analysis and psychometric evaluation of the Connor-Davidson resilience scale(CD-RISC)with Chinese people. *Social Behavior and Personality*, *1*(35), 19–31.

Zhang, X., Mo, Y., Yan, C., Li, Y., & Li, H. (2021). Psychometric properties of two abbreviated Connor-Davidson Resilience scales in Chinese infertile couples. *Quality of Life Research*, *30*(8), 2405–2414. https://doi.org/10.1007/s11136-021-02820-6.

Zhao, M., Fu, W., & Ai, J. (2021). The mediating role of social support in the relationship between parenting stress and resilience among Chinese parents of children with disability. *Journal of Autism and Developmental Disorders*, *51*(10), 3412–3422. https://doi.org/10.1007/s10803-020-04806-8.

Zięba, M., Wiecheć, K., Wójcik, N. E., & Zięba, M. J. (2022). Prioritizing positivity, styles of rumination, coping strategies, and posttraumatic growth: Examining their patterns and correlations in a prospective study. *Frontiers in Psychology*, *13*, 842979–842991. https://doi.org/10.3389/fpsyg.2022.842979.