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# Impact of Humanistic Nursing Intervention on Pediatric Patients with Congenital Deafness after Cochlear Implantation

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**Abstract** **Objective:** To estimate the clinical outcome of humanistic nursing intervention after cochlear implantation in pediatric patients with congenital deafness. **Methods:** Pediatric participants who suffered from congenital deafness were included. A total of 85 participants were assigned to a control subgroup (n=42), which adopted routine nursing intervention, and an observation subgroup (n=43), which adopted humanistic nursing intervention. Cochlear implantation was performed in both subgroups. The language and auditory rehabilitation, quality of life, and the incidence of complications were evaluated. **Results:** After nursing, there was a notable distinction between the observation subgroup and control subgroup in the language and hearing levels, the scores of SIR, CAP, and MAIS. As for the quality of life, it was corroborated by a notable distinction of the scores for two subgroups in somatic, physiological, social, and psychological functions. In terms of the incidence of complications, it was notably lower incidence for the observation subgroup (2.32%) versus the control subgroup (14.28%). **Conclusion:** The application of humanistic nursing in pediatric patients with congenital deafness undergoing cochlear implantation is beneficial to promote the rehabilitation of language and hearing, improve the quality of life and, reduce the incidence of postoperative complications.

**Keywords** Congenital Deafness, Cochlear Implantation, Humanistic Nursing

## 1. Introduction

Congenital deafness is a common otorhinolaryngological disease in the clinic [1]. According to the epidemiological survey results [2], the incidence of congenital deafness in China is about 1% - 3%, which is also one of the most common birth defects of newborns. Pediatric patients with congenital deafness not only have a serious hearing impairment but also are not conducive to the development of the language system, which seriously affects the growth and quality of life of pediatric patients [3]. At present, cochlear implantation is the main treatment for congenital deafness, which can effectively improve the hearing function of pediatric patients. However, cochlear implantation is a relatively complicated operation, and effective nursing interventions for pediatric patients after operation are of great significance in reducing the risk of

complications and promoting the recovery of pediatric patients [4-5]. For estimating the clinical application outcome of humanistic nursing intervention after cochlear implantation in pediatric patients with congenital deafness, 85 pediatric patients with congenital deafness were selected for this study, and the following report is made (Figure 1).

### 1.1. Humanistic Nursing Care & Routine Nursing Care

Humanistic care is also called caring about human nature and human love, which are both the core of nursing work and the central task it contains [6]. Humanistic care in nursing is more helpful in controlling patients' negative emotions and improving their self-management ability and nursing satisfaction. The combination of humanistic nursing care and nursing practice helps patients recover as soon as possible and return to society [7]. The nursing care process with humanistic nursing care is the most important emerging part of nursing care [8]. Humanistic nursing care given by nursing staff based on humanistic concepts essentially confers positive effects on patients, which are no less substantial than those of therapeutic behaviors such as administration and control of complications. Humanistic care aims to help patients regain states of physical, mental, social, energetic and, spiritual recovery. Humanistic care carries out exercise and health guidance according to the patient's postoperative physical condition, which can enhance their self-care ability so that they can recover as quickly as possible [9-10].

Routine nursing care is medical care that is not urgent or emergent in nature. Routine nursing care represents the nurses' experience in care delivery based on the evaluation of patient's needs and conditions, planning of nursing actions/interactions, performing care actions/interactions with more and less autonomy, and partially recording them. Most of the time, these prescriptive actions/interactions have an immediate resolution and come first about pending conditions, needs, and conditions of risk, with little time for attentive listening or for developing a close relationship with patients [11].

## 2. Methods

### 2.1. Design and Procedures

This was a randomized controlled double-arm trial with repeated measurements from April 2020 to May 2022. In this randomized controlled trial, the routine nursing intervention subgroup was compared with the humanistic nursing intervention subgroup to expect a significant improvement in the scores of somatic, physiological, social and, psychological functions and incidence of complications at two follow-up points. Two assessments were conducted: At baseline, before surgery and, 1 week after intervention, when the child is still hospitalized. The routine nursing intervention was used for the control subgroup. The humanistic nursing intervention was used for the observation.

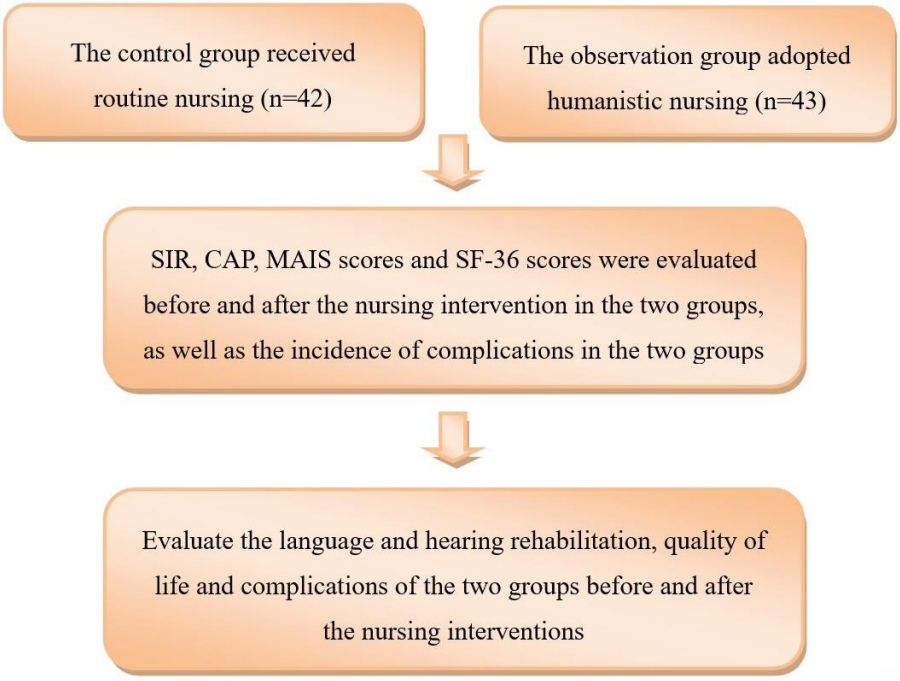


**Figure 1.** The report of 85 pediatric patients with congenital deafness selected for study

### 2.2. Setting and Participants

The eligibility and exclusion criteria of subjects were evaluated according to the inclusion situation. After screening, the participants were randomly assigned. Inclusion criteria: 1. All of them were examined by imaging and met the diagnostic criteria of congenital deafness [12]; 2. All were deaf in one ear; 3. No surgical contraindication, patients were performed cochlear implantation operation; 4. The ethics committee of the hospital approved this study, and the study has obtained the informed consent of patients and their families. It was sent to the control group or the observation subgroup through a random number table. The subjects were not dropped out.

### 2.3. Methods

Cochlear implantation was performed in both subgroups. The control subgroup received routine care: The changes in physiological indexes of pediatric patients were closely observed after the operation. Pediatric patients and their families were given simple health education to inform them of the use and maintenance of cochlear implants as well as routine preventive measures for complications such as infection. The observation subgroup adopted humanistic nursing intervention:

Before the operation, the family members of the patients were introduced to the disease-related knowledge and surgical methods in an easy-to-understand language so that the family members could improve their awareness of cochlear implantation. At the same time, the nursing staff should smile and cooperate with the body movements to actively communicate with the pediatric patients. They could play with toys, games, and other ways to improve the relationship with the pediatric patients, and could place objects of interest to the pediatric patients (toys, pictorials, etc.) in the ward, to create a warm ward environment for the pediatric patients and reduce the pediatric patient's tension, fear and, other negative emotions.

During the operation, the aseptic operation procedure should be strictly followed, the anesthesia should be prepared in advance, the pediatric patients should be anesthetized quickly, and the gentle movements should be paid attention to when placing the position of the pediatric patients.

**Prevention of postoperative complications:**

1. Closely observed the facial condition of the child after operation, and instructed the family members to massage or hot compress the face regularly. If the child had facial paralysis symptoms such as a crooked mouth and facial convulsions, the doctor should be informed of the effective treatment measures in time.
2. The cochlear implant electrode was fixed after operation. Pediatric patients and their families were also advised to avoid large-scale activities, including sneezing, to prevent electrodes from falling off.
3. Observewhether there was bleeding and infection at the incision of the child after the operation, regularly replaced the dressing, keep it clean and dry, and give preventive antibiotic treatment. In case of redness, swelling, bleeding and, other symptoms, timely inform the doctor.
4. Some pediatric patients may have nausea, vomiting, dizziness and, other symptoms after surgery. Sedative drugs could be applied to relieve the symptoms. If the symptoms of pediatric patients were serious, glucocorticoid injection could be applied.
5. Instruct pediatric patients to carry out rehabilitation training: To promote pediatric patients' communication ability by playing games during hospitalization. After being discharged from the hospital, the family members are urged to carry out voice teaching to the pediatric patients regularly. When necessary, pediatric patients could learn in professional hearing and language rehabilitation institutions to improve their language communication ability and promote their recovery.

### 2.4. Observation Index

1. Speech Intelligibility Rate (SIR), categories of Auditory Performance (CAP), and Meaningful Auditory Integration Scale (MAIS) were applied to evaluate the language and auditory rehabilitation of the two subgroups before and after nursing. The SIR score was 1-5. The higher the score, the higher the level of language function. CAP score was 0-7. Higher scores were concerned with better audit function. There were 10 items in the MAIS scale, with 0-4 points for each item and 0-40 points in total. Higher scores were concerned with better auditory development levels.
2. The quality-of-life scale (SF-36) was applied to evaluate the quality of life of the two subgroups of pediatric patients before and after nursing. The SF-36 scale was mainly composed of four dimensions of somatic, physiological, social, and psychological functions, with a total score of 0-100 points for each dimension. Higher scores were concerned with a better quality of life level.
3. The complications were evaluated.

### 2.5. Statistical Analysis

SPSS22.0 software was applied for the statistical processing, "%" was applied to represent counting data, the $\chi 2$ test was performed, and "±s" was applied to indicate that it accorded with normal distribution measurement data and the t-test was performed. $P < 0.05$ was concerned with the notable difference.

# 3. Result

## 3.1. Baseline Data, Language, and Auditory Rehabilitation

In the control subgroup, males (n=24) and females (n=18) were included, and the mean age was (5.52 ±0.82) years. In the observation subgroup, males (n=27) and females (n=16) were included, the mean age was (5.64 ± 0.84) years. The general data had no notable distinction between the two subgroups (P>0.05).

## 3.2. Language and Auditory Rehabilitation

Before nursing, the language and auditory level had no notable distinction (P > 0.05). The language and hearing levels of the two subgroups were improved after nursing. Versus the control subgroup, the scores of SIR, CAP and, MAIS in the observation subgroup were boosted (P < 0.05) (Table 1), (Figure 2-4).

**Table 1.** Language and auditory rehabilitation (*x±s,* score)

| Grouping | n | SIR | | CAP | | MAIS | |
|---|---|---|---|---|---|---|---|
| | | Before nursing | After nursing | Before nursing | After nursing | Before nursing | After nursing |
| The observation subgroup | 43 | 1.36±0.20 | 2.44±0.36a | 2.30±0.34 | 3.81±0.57a | 20.31±3.04 | 31.27±4.69a |
| The control subgroup | 42 | 1.33±0.19 | 1.72±0.25a | 2.25±0.33 | 2.90±0.43a | 20.24±3.03 | 26.65±3.99a |
| t | | 0.708 | 10.686 | 0.687 | 8.294 | 0.106 | 4.886 |
| P | | 0.480 | <0.001 | 0.493 | <0.001 | 0.915 | <0.001 |

Note: a marked as contrasted to that before nursing, P < 0.05.

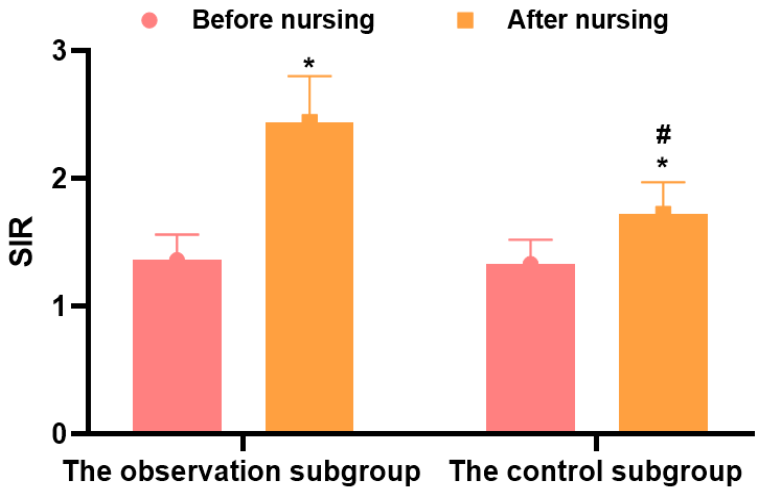


**Figure 2.** SIR score

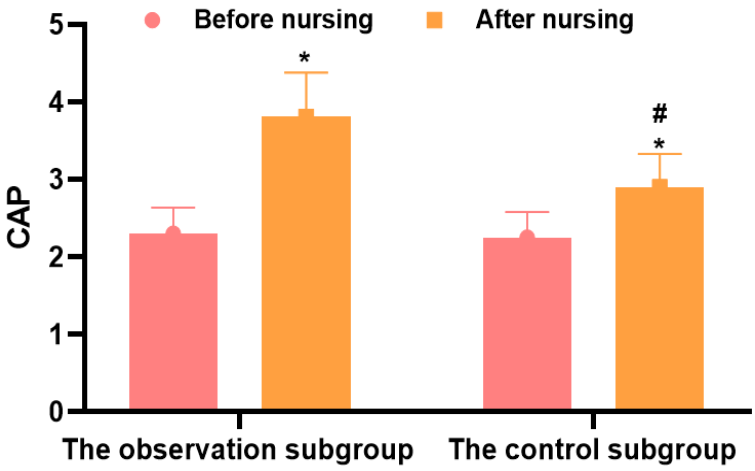


**Figure 3.** CAP score

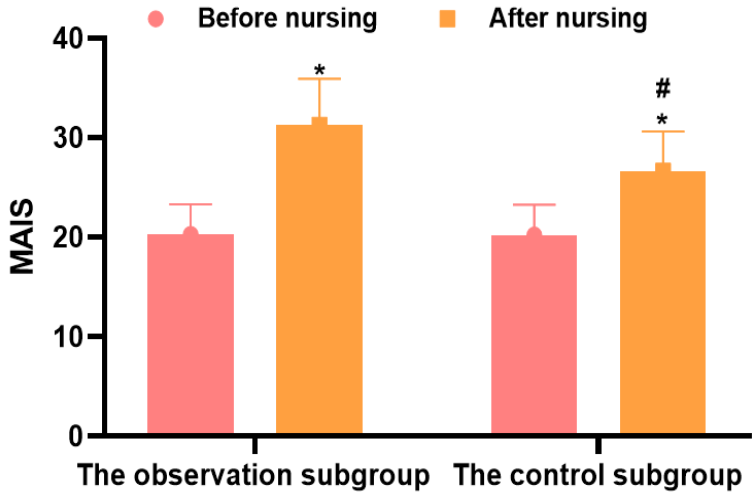


**Figure 4.** MAIS score

### 3.3. Quality of Life

For scores of all dimensions of SF-36, the scores were boosted in both subgroups after nursing. Versus the control subgroup, the scores of somatic, physiological, social, and psychological functions in the observation subgroup were higher (P < 0.05) (Table 2), (Figures 5-8).

**Table 2.** Quality of life (*x*±*s*, score)

| Grouping | n | Somatic function | | Physiological function | | Social function | | Psychological function | |
|---|---|---|---|---|---|---|---|---|---|
| | | Before nursing | After nursing | Before nursing | After nursing | Before nursing | After nursing | Before nursing | After nursing |
| The observation subgroup | 43 | 60.82 ± 9.12 | 74.93 ± 11.23[a] | 62.11 ± 9.31 | 76.42 ± 11.46[a] | 60.33 ±9.04 | 73.19 ± 10.97[a] | 62.54 ± 9.38 | 75.27 ± 11.29[a] |
| The control subgroup | 42 | 61.17 ± 9.17 | 68.56 ± 10.28[a] | 62.05 ± 9.30 | 67.34 ± 10.10[a] | 60.46 ± 9.06 | 67.52 ± 10.12[a] | 62.38 ± 9.35 | 70.42 ± 10.71[a] |
| *t* | | 0.176 | 2.725 | 0.029 | 3.871 | 0.066 | 2.475 | 0.078 | 2.044 |
| *P* | | 0.860 | 0.007 | 0.976 | <0.001 | 0.947 | 0.015 | 0.937 | 0.044 |

Note: a marked as contrasted to that before nursing, P < 0.05.

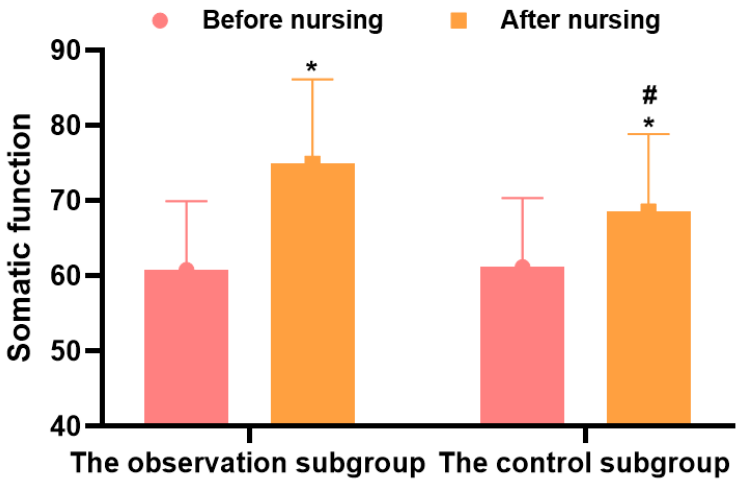


**Figure 5.** Somatic function

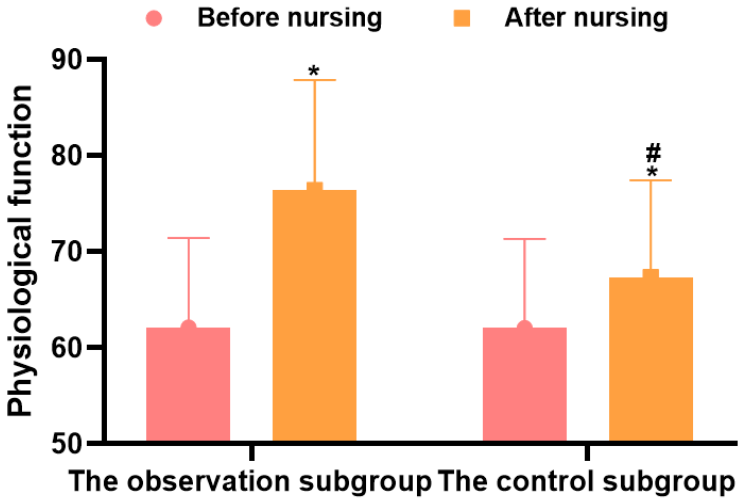


**Figure 6.** Physiological function

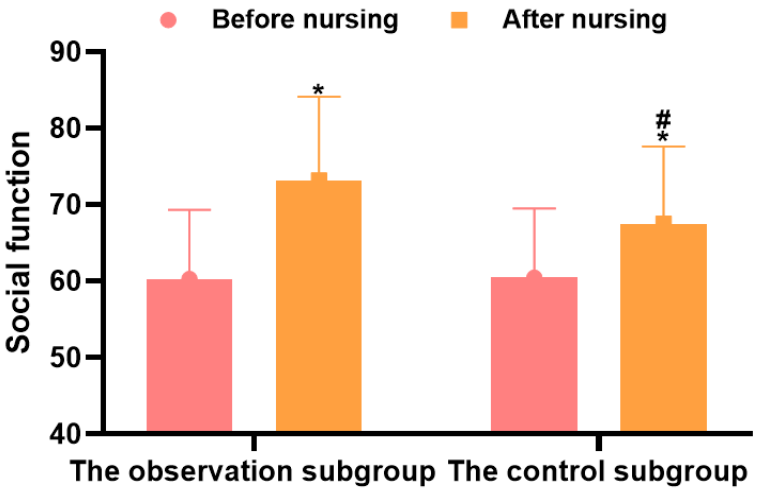


**Figure 7.** Social function

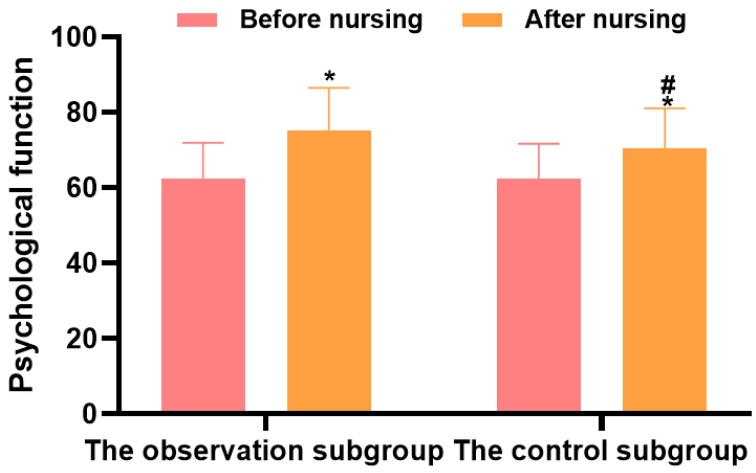


**Figure 8.** Psychological function

### 3.4. Complications

Versus the control subgroup (14.28%), the incidence of complications in the observation subgroup (2.32%) was notably lower (P < 0.05) (Table 3), (Figure 9). Figures 2-9: Versus the same subgroup before nursing, * P < 0.05, versus the observation subgroup after nursing, # P<0.05.

**Table 3.** Complications [n (%)]

| Grouping | n | Wound infection | Wound bleeding | Cerebrospinal fluid leakage | Meningitis | Total incidence rate |
|---|---|---|---|---|---|---|
| The observation subgroup | 43 | 0 (0.00) | 1 (2.32) | 0 (0.00) | 0 (0.00) | 1 (2.32) |
| The control subgroup | 42 | 2 (4.76) | 3 (7.14) | 1 (2.38) | 0 (0.00) | 6 (14.28) |
| $\chi^2$ | | | | | | 4.021 |
| *P* | | | | | | 0.044 |

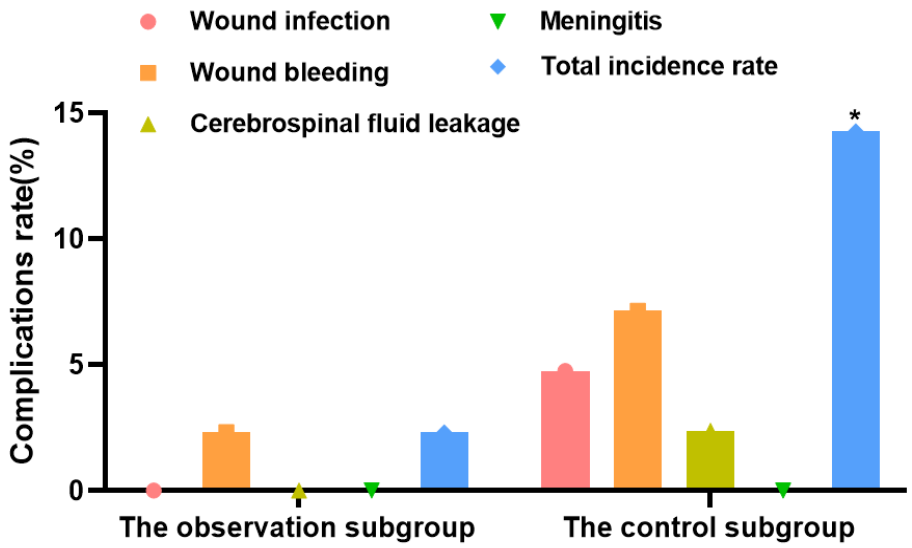


**Figure 9.** Complications

# 4. Discussion

At present, the pathogenesis of congenital deafness has not been completely clarified clinically, which is mainly believed to be related to genetic, drug, disease damage, and other factors [13]. Cochlear implantation is the first choice for the treatment of congenital deafness in clinical practice. The voice is collected by microphone, and the speech processor digitizes, processes and, edits the collected voice, and then transmits the processed information to the cochlea through the transmission coil, at the same time, some implants in the patient's body turn the decoded speech information into electric current, which plays a certain role in stimulating the auditory nerve, to help the patient's brain receive nerve impulses, generate hearing, and reconstruct hearing [14-16]. However, cochlear implantation is a relatively complex operation, and pediatric patients are extremely prone to complications after the operation, so it is particularly important to provide effective nursing interventions for pediatric patients during the perioperative period [17].

Humanistic nursing, as a new nursing model in recent years, specifically refers to following the principle of "patient-centered" and giving effective nursing intervention measures to meet the physical, psychological, and spiritual needs of patients and achieve the purpose of improving nursing quality [18-20]. It was corroborated that versus the control subgroup, the scores of SIR, CAP, and MAIS in the observation subgroup were higher after nursing, suggesting that humanistic nursing intervention for pediatric patients with congenital deafness who underwent cochlear implantation has a positive significance in promoting pediatric patient's language and hearing rehabilitation. The reason for consideration may be that the use of easy-to-understand language before operation to introduce the relevant knowledge of cochlear implantation and the use and maintenance of cochlear implants to the family members and pediatric patients is beneficial to the rational use of cochlear implants. It can effectively promote the recovery of hearing and language of pediatric patients [21-23]. At the same time, nurses guide pediatric patients to carry out rehabilitation training after surgery, encourage pediatric patients to communicate more by playing games and other methods and urge their families to continue to carry out voice teaching for pediatric patients after discharge. If necessary, pediatric patients can learn in professional hearing and language rehabilitation institutions, which is conducive to improving pediatric patient's ability to communicate with hearing and language [24-25]. In addition, applying humanistic nursing, following the preferences of pediatric patients, placing toys and pictorials that pediatric patients are interested in in the ward, and actively creating a warm ward environment for pediatric patients, is conducive to easing pediatric patients' tension, anxiety, fear, and other negative emotions, can effectively promote the development of postoperative rehabilitation, improve pediatric patients hearing and language functions, and thus improve their quality of life [26-28]. Therefore, in this experiment, contrasted to the control subgroup, the SF-36 scores of the observation subgroup after nursing were significantly higher. In terms of the risk of complications, the incidence of complications in the observation subgroup was significantly lower than that in the control subgroup, it is suggested that humanistic nursing can effectively reduce the incidence of postoperative complications in pediatric patients with congenital deafness undergoing cochlear implantation. The reason may be that the preventive nursing intervention for complications was actively carried out after the operation, and the incision site and face of the child were closely observed after the operation. If the child's incision had bleeding, infection, facial twitching, deflection of the angle of the mouth and other symptoms, the doctor was timely informed to give effective treatment measures and antibiotic treatment could be given to reduce the risk of infection [29-31].

### Limitations of the Study

To conduct this study, participants can be separated into subgroups based on their age and gender. Patients who are postlingually deaf, prelingually deaf, or adventitiously deaf can also participate in the study.

# 5. Conclusions

To sum up, humanistic nursing intervention for pediatric patients with congenital deafness undergoing cochlear implantation can effectively promote the rehabilitation of pediatric patients' language and hearing, improve their quality of life, and has positive significance in reducing the incidence of postoperative complications, which is worthy of clinical promotion and application.

# Future Scope

Future study on humanistic nursing care has a lot of potential. Future research should concentrate on comparing humanistic nursing and routine nursing interventions for various illnesses and complications. It is also possible to research the effects of humanistic nursing interventions on various illnesses and complications.

# Abbreviations

SIR: Speech Intelligibility Rate; CAP: Categories of Auditory Performance; MAIS: Meaningful Auditory Integration Scale.

# Acknowledgements

None

## Availability of Data and Materials

The datasets used and/or analyzed during the current study were available from the corresponding author on reasonable request.

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