



PARENTAL KNOWLEDGE AND UNDERSTANDING OF CARE AND MAINTENANCE OF COCHLEAR IMPLANT DEVICE IN HEARING IMPAIRED POPULATION

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ABSTRACT

Introduction: The present study was carried out to assess the parental information about cochlear implant (CI) monitoring and maintenance.

Methods: A questionnaire was translated in Tamil language during the study period aimed toward assessing parental knowledge, perception, and information with respect to Cochlear implants monitoring and maintenance. This questionnaire was used to interview the parents of children implanted under the assistance to disabled persons for purchase/fitting of aids and appliances 74 parents of cochlear implants were interviewed in this study. The feedbacks of the parents were recorded and later analyzed to compute the results.

Results: The results showed a good internal consistency between the questions with a Cronbach's alpha value >0.7 . The results are suggestive of the need for better training programs post-implantation for parents as these could aid in the reduction of maintenance costs in the form of replacement of parts and troubleshooting appointments.

Conclusion: The study showed a poor knowledge and understanding of cochlear implant in parents and showed a need for better training programs and counselling.

Keywords: Cochlear implant, rehabilitation

INTRODUCTION

Hearing loss is defined as a decrease in hearing sensitivity over a range of frequencies caused by a variety of factors, which can lead to difficulty perceiving speech for daily communication. The usage of proper amplification devices can help overcome such communication challenges. Over the years, cochlear implants have been used to help many children and adults regain their hearing. The cochlear implant, on the other hand, is a bio-electronic device that bypasses the hair cells and stimulates the auditory nerve directly.

Deafness, according to the WHO, it defined as the full loss of hearing ability in one or both ears in any individual. Hearing loss of more than 90 decibels in ear can denote (profound impairment) or entire loss of hearing in both ears will be included in this group.

In India, 6.3 percent of the population suffers from serious hearing loss. SNHL affects four out of every 1000 children. Every year, more than 90,000 babies are born with hearing loss. In India, adult prevalence of deafness was projected to be 9.6%, while childhood onset deafness was assessed to be 3%. According to the study by Parab et al. 2009 done in a rural place in India for a duration of 2 years, the incidence of hearing loss was calculated as 1.68 in 1000 normal babies and 10.6 in 1000 high-risk babies constituting to an overall incidence of 4.54.

Paul AK has measured an incidence of 20.3/1000 live birth and 0198/1000 live birth in risk and well-baby categories after his study for a period of 7 years.

Vocabulary development has been identified as an essential skill for literacy development Marschark & Spencer et al 2016. In addition to having a well-developed vocabulary, phonological awareness has also been identified as a key skill that is necessary for literacy development Muter et al, 2004. Ching and Cupples et al 2015 said phonological awareness “refer to an awareness or conscious knowledge of the sound structure of a language and/or the ability to manipulate this sound structure” Phonological awareness involves being able to separate sounds in words (segmentation), blend sounds in words (blending), and auditory discriminating between the sounds in words. This is a difficult task for children who have SNHL. Several studies have examined that the hearing loss play major role on reading ability and academic achievement in children who are deaf and Qi and Mitchell et al 2012 found the normative performance levels of deaf and hard of hearing students between the ages of 8 and 17 on reading comprehension subtests of the SAT-9 never exceeded the fourth-grade equivalent for any cohort from 1974 - 2003.

Qi and Mitchell 2012 found that achievement gaps between deaf and hard-of-hearing students and their hearing peers that had been reported in the literature almost 100 years ago remained consistent Pinter & Paterson et al 1917 To continue with the review of the impact of hearing loss on overall development, it should be noted that hearing loss may negatively impact social development in children. Ear the WHO defines QOL as "an individual's self-perception of their situation in life in the context of culture and value systems, as well as in connection to their objectives, standards, and concerns." The QOL evaluation tool is critical for gathering data on treatment success and how it affects family dynamics. As a result, the QOL scale surveys emerged as a tool for evaluating the outcomes of the CI operation.

Need of this study

In recent years, parental knowledge about early detection and knowledge about the management and treatment & working of cochlear implant devices is becoming an important topic to understand. There are various aspects of intervention in which parents play a significant role, and their involvement is very crucial for the children's development & to gain information about care and maintenance methods to provide for their children Kasturi Arun et al in 2017. The aim of the present study is to gather information or knowledge among the parents about the care and maintenance of cochlear implant device.

1. This study will help us to understand the parental knowledge about the care and maintenance of cochlear implant device post-surgery and see the parental knowledge about device in mainly in Tamil population.

3. This study will facilitate in the development or implementation of an effective parents training program in the area of Cochlear Implant, essentially needed for providing proper care and maintenance to cochlear implant device.

4. This study will also be of helpful in counselling purpose to the parents regarding the care and maintenance of cochlear implant.

OBJECTIVES OF THE STUDY

1. To adapt the care and maintenance of CI questionnaire in Tamil.
2. To assess the parental knowledge and understanding of care and maintenance of CI.

METHODOLOGY

The present study aimed is to evaluate the parental knowledge and understanding of care and maintenance of cochlear implant device the parents of those individual who had undergo cochlear implant surgery at Madras ENT Research Foundation (P) Ltd center situated in Chennai (T.N). This study investigates the knowledge of cochlear Implant device within the parents and caregiver of the children's & familiarity of maintenance and monitoring of CIs performance. Study was Conducted non- experimental descriptive research methodology was used to evaluate the individual & the study is been conducted major 3 phases. In first phase the questionnaire been adapted and translated into Tamil language (APPENDIX I), second phase The translated (Tamil) questionnaire was given to 5 Audiologists who are native Tamil speakers & 2 linguists for the validation process & in third Phase Administration of the questionnaire in parents of children with CI to understand their perception regarding use, care & maintenance of the device. A total of 74 parents of those individual who had undergo cochlear implant surgery age range 2 to 7 years males 45 and females 29 took the online survey. The online questionnaire as a Google form link was circulated by email/WhatsApp to parents and caregivers of children's using cochlear implant and they have been receiving rehabilitation program form a period of time in Madras ENT Research Foundation (P) Ltd center in Chennai.

On clicking the link, the participants would be displayed a consent form to which they agreed by clicking 'Yes' and then proceeded to answer a set of 20 questions which the participants need to fill voluntary on parental knowledge of care and maintenance of cochlear implant device. It took an approx. 15 to 20 minutes to complete the questionnaire. The responses of the participants were extracted from the Google Forms and later scored appropriately. Statistical Analysis was carried out using SPSS software version 21. The data was subjected to descriptive statistical analysis. All the participants in this study are undergoing rehabilitation period post cochlear implant surgery center situated in Chennai.

Inclusion Criteria

1. All the parents participating in this study their children were using the cochlear implants (Unilateral / Bilateral).
2. All the participants Children's regularly using their cochlear implant device.
3. All The parents who are Native speakers of Tamil language

Exclusion criteria

1. All Children with behavioral problems like Attention Deficit Hyperactive Disorder/ Autistic features or Intellectual Disability.
2. Children who were re-implanted with cochlear implanted.

RESULT & DISCUSSION

Results showed that out of 74 participants around (99%) of the parent responded for "YES" that they have received training for cochlear implant care & maintenance, about 1 participant (1%) responded they didn't received training for cochlear implant maintenance, finding mainly suggest that large population have received post cochlear implantation training & they have been instructed regarding cochlear implant care and maintenance. Result shows that (73%) parents responded for "Audiologist" profession individual that did the training and counselling regarding the cochlear implant device and about its maintenance, 20% responded for "company representative" explained about the use & maintenance of CI device, 5% participants responded for

AVT therapist. Significant finding mainly suggests that most of the population according to their prospective audiologist provided the training and the least percentage of individuals have a perception that other than the audiologist has provided the training. *Bipolar* choice options were given to the individual as it is shown in figure 4.3. Result findings show that out of 74 participants 100% of the individual responded for “YES” they own for the CI battery tester & Moisture kit. This suggest that individual has an adequate knowledge about the ownership of CI battery tester & Moisture kit items. Have you been told regarding any additional items purchase? Results finding suggest that out of 74 participants 71.6% responded for “YES” that they been oriented regarding purchase item, least participants responded for “NO” around 28.4% that they were no oriented from where they have to purchase the items.

Please indicate how frequently you use the items listed below when checking or cleaning your child’s cochlear implant Finding shows for how frequently do you perform checking or cleaning CI device shown in figure 1 individual need to responded by their own perception. Results mainly indicated for CI battery individual responded more frequently for “2- 3 days a week” which means out of 74 individuals around 41.9% on the basis of and training they use to perform checking & cleaning of Cochlear implant device. Least frequently around 24.3% individual perform checking and cleaning “once in a week” least responses gathered in the present study. Feather question were asked about “moisture kit checking and cleaning” of cochlear implant device in this out of 74 participant 39.2% individual responded for “2- 3 days a week” they use to perform checking and cleaning of cochlear implant with moisture kit and 33.8% response for “once in a week”.

On the basis of parental perception few question were asked to the participants for understand the knowledge among parent they know about the cochlea implant .Question were asked to the participant regarding what do you typically do in the event that you find a problem with your child’s cochlear implant in result finding suggest that particular situation majority of the individual responded for they will “call the audiologist “ which indicates (83.3%) participant responds for “audiologist”, Other than this (4.1%)participants responded for AVT therapist ,(4.1%) participant responded for Company representative & lastly (6.8%)individual responded for Other .Supporting study was done by Dutt el al in 2020it was seen that typically, on finding a problem, 66.66% of the parents reported calling their audiologist, 16.66% parents reported waiting for their audiologists next visit, and 16.66% consulted their AVT therapist . This suggest that on finding any difficulty related to cochlear implant majority of the parents will call the audiologist because for surgery to post surgery counselling audiologist palled a major role.

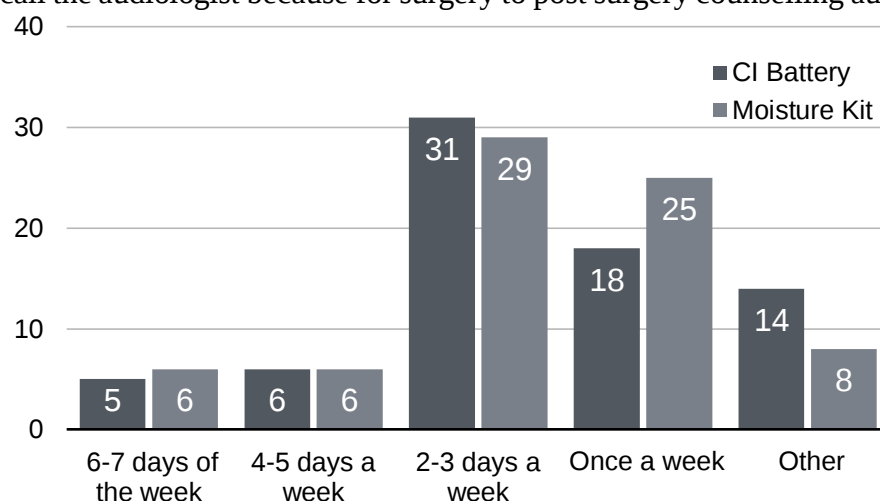


Figure 1 showing the percentage of responses for question

On Perception basis participant were ask to indicate how adequately you feel you have been instructed regarding daily check, clean/maintain, troubleshooting of cochlear implant device after collecting responses. Supporting study done by Sanghamitra Dey, 2020, When they asked as to how adequately they had been instructed to check the CI daily, 76.66% reported being trained very well, whereas 23.33% reported as good. Similar statistics were found when asked regarding level of instruction regarding daily cleaning of CI. Along similar lines, when asked

about how adequately they had been instructed regarding troubleshooting, 43.33% reported very well, 40% responded with very good, 13.33% reported poor, and 3.3% responded with very poor. This suggest that there is a adequate need to perform training regarding daily check, clean/maintain, troubleshooting of cochlear implant device among children's parents for better outcome result. Supporting study done by Elizabeth H 2014, When the parents were inquired regarding their level of comfort and then proficiency, 50% reported being very comfortable, 40% being comfortable, and 10% being having an okay level of comfort. Similarly, with level of proficiency for trouble shooting, 63.33% reported being very proficient, 30% being somewhat proficient, and 6.6% reported being barely proficient. Supporting study done by Sanghamitra Dey, 2020 he administered the questionnaire on the parents on children who had undergone cochlear implantation result revealed that 83.33% of the parents reported additional training for cochlear implant care & maintenance, around 14% responded negatively. This suggest that after cochlear implantation surgery parents need additional training for cochlear implant care & maintenance, there should be a training program. On perception basis participants need to respond for more training in cochlear implant monitoring, care, and troubleshooting do you feel you need.

Results indicate (13.5%) individual have a perception they are "DOING WELL" so there don't required training, (70.3%) responded that they "NEED TRAINING" & (14.9%) responded they need a "BRIEF REVIEW IS NEEDED". results mainly suggested that there should be a training programme in which caregiver and parents should be trained regarding to different aspects of cochlear care, maintenance, cleaning & lesioning check on the daily bases and the needs should be briefly explained to all the individual for better understanding of cochlear implant device.

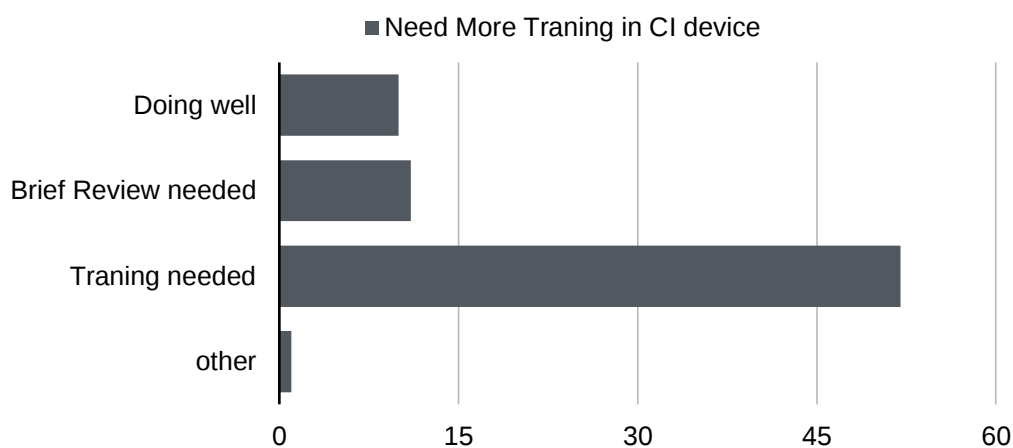


Figure 2 Showing the percentage of responses for Training Need.

SUMMARY AND CONCLUSION

According to early studies Unfortunately, most parents do not receive appropriate not adequate training in CI visual and listening checks. The development and implementation of an effective parent training program in the area of CI

listening checks is essentially needed. These programs will help Cochlear implanted child's habilitation effective in overcoming the difficulties imposed by the child's hearing impairment. The same holds good in terms of effective parent training program for the CI users too. Families may benefit from audiological counselling that acknowledges the multifaceted challenges that arise. Audiologists can work in collaboration with families to promote consistent device usage in daily life situations. Under CMCHIS (*Chief Minister's Comprehensive Health Insurance*) Scheme many children with hearing impairment over these years have been fitted with CI in Tamil Nadu state. Most of the parents of these children are reported to be belonging from lower socioeconomic status and lack of understanding about the cochlear implant. The present aim is to check the parental knowledge and understanding of care and maintenance of cochlear implant devices among the parents of those people who had undergone cochlear implant surgery

CLINICAL IMPLICATIONS

The results of this study revealed that parental knowledge about care & maintenance about CI was inadequate in certain domains. Although some basic aspects of CI usage, such as daily listening checks & cleaning are been oriented, the knowledge of the parents were not adequate enough to perform the procedures periodically. However basic troubleshooting at home was not done due to lack of knowledge and confidence. The findings highlight the need for frequent care and maintenance training and availability of simple audio visual explanation of care and maintenance will be very useful and handy for better device maintenance, eventually reducing the intermittent hearing deprivation.

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Nil.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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௮ செவிச்ச்சுருள் அறுவைசிகிச்சை கருவியின் கண்காணிப்புகள் மற்றும் பராமரிப்புகள்

1^௮ செவிச்ச்சுருள் அறுவைசிகிச்சை கருவியின் பராமரிப்பிற்கான பயிற்சிகள்
உங்களுக்கு கிடைக்கப்பெற்றதா

ஆம்இல்லை

2^௮ ஆம் என்றால் யாரால் உங்களுக்கு அந்த பயிற்சிகள் கற்று தர பட்டது என கூறவும்

- கேட்பியல் நிபுணர் ;செவிச்ச்சுருள் அறுவைசிகிச்சை கருவியை
குழந்தைக்கு பொருந்தியவர்
- நிறுவனத்தை சேர்ந்த பயிற்சியாளர்
- செவிவழி வாழ்விடம் பயிற்சியாளர் ; டீம்மெம்பர்
- மற்றோரு பெற்றோர்
- மற்றவர்

3^௮ கீழ்க்கண்டவற்றில் உங்களுக்கு சொந்தமாக உள்ளதா

1^௮ செவிச்ச்சுருள் அறுவைசிகிச்சை கருவியின் மின்கலம் ;இன்ஜமதல
சோதிப்பான் ஆம்இல்லை

2^௮ செவிச்ச்சுருள் அறுவைசிகிச்சை கருவியின் உலரவைக்கும் சாதனம்
;சுவுபெனதம டயஜன் ஆம்இல்லை

4^௮ உங்களுக்கு ஏதேனும் கூடுதல் சாதனங்கள் பற்றி கூறப்பட்டுள்ளதா

ஆம்இல்லை

5^௮ பின்வரும் சாதனங்களை நீங்கள் எப்போது பரிசோதனை ;ஆசுத்தம் செய்விர்கள்
என கூறுங்கள்

1^௮ செவிச்ச்சுருள் அறுவைசிகிச்சை கருவியின் மின்கலம் ;இன்ஜமதல
சோதிப்பான்

- ஆறு . ஏழு நாட்கள் வாரங்களில்
- வாரத்தில் நான்கு . ஐந்து நாட்கள்
- வாரத்தில் ரெண்டு . மூன்று நாட்கள்
- வாரத்தில் ஒருமுறை
- மற்றவை_____

௪௪ செவிச்ச்சுருள் அறுவைசிகிச்சை கருவியின் உலரவைக்கும்) சாதனம் उपपेजनतम
1994 டி.

- ஆறுஏழு நாட்கள் வாரங்களில் -
- வாரத்தில்நான்கு - ஐந்து நாட்கள்
- வாரத்தில்ரெண்டு - மூன்று நாட்கள்
- வாரத்தில்ஒருமுறை
- மற்றவை_____

௪௫ உங்கள் குழந்தையின் செவிச்ச்சுருள் அறுவைசிகிச்சை கருவியை வாரத்திற்கு
எதனை முறை சோதனை செய்விர்கள்?

- ஆறு . ஏழு நாட்கள் வாரங்களில்
- வாரத்தில் நான்கு . ஐந்து நாட்கள்
- வாரத்தில் ரெண்டு . மூன்று நாட்கள்
- வாரத்தில் ஒருமுறை
- மற்றவை_____

௪௬ உங்கள் குழந்தையின் செவிச்ச்சுருள் அறுவைசிகிச்சை கருவியை வாரத்திற்கு
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- வாரத்தில் ரெண்டு . மூன்று நாட்கள்
- வாரத்தில் ஒருமுறை
- மற்றவை_____

ஊ ப் பெற்றோரின் அறிவு மற்றும் பழக்கங்கள்

8^௮ உங்கள் குழந்தையின் செவிச்சூருள் அறுவைசிகிச்சை கருவியில் பழுதுகோளாறு ஏற்பட்டுள்ளது என்பதை நீங்கள் கண்டறிந்ததும் உடனடியாக மேற்கொள்ளும் நடவடிக்கை என்ன?

- கேட்பியல் நிபுணருடன் தொடர்புகொள்வது
- செவிவழி வாழ்விடம் பயிற்சி ; नकपजवतल टमतइंस जेमतंचल ङ्ग .
அமர்வுக்காக காத்திருப்பது
- கேட்பியல் நிபுணர் சந்திப்பதற்கான அடுத்த அமர்வு வரை காத்திருப்பது
- நிருபுனத்தின் பிரதிநிதியை தொடர்பு கொள்வது
- மற்றவை

9^௮ பின்வருபவர்களில் யாருடைய பராமரிப்பும் மற்றும் பயிற்சிக்கான சீரான நபராக கூறுவீர்கள் ; உங்கள் குழந்தையின் செவிச்சூருள் அறுவைசிகிச்சை பார்த்து கொள்ளுங்கள்

- கேட்பியல் நிபுணருடன் தொடர்புகொள்வது
- செவிவழி வாழ்விடம் பயிற்சி ; नकपजवतल टमतइंस जेमतंचल ङ्ग .
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10^௮ உங்கள் குழந்தையின் செவிச்சூருள் அறுவைசிகிச்சை கருவியினை தினசரியில் நடவடிக்கையில் எவ்வாறு பார்த்து கொள்ள வேண்டும் என உங்களுக்கு செய்யப்பட்டுள்ள பரிந்துரைகளை பற்றி உங்கள் கருத்து?

- மிக நன்று
- நன்று
- பரவாயில்லை
- மோசம்
- மிக மோசம்

¹¹ உங்கள் குழந்தையின் செவிச்சூருள் அறுவைசிகிச்சை கருவியினை எவ்வாறு சுத்தம்செய்து பார்த்துக்கொள்ள வேண்டும் என உங்களுக்கு போதுமான அளவு பரிந்துரைகள் கூறப்பட்டதை என கூறவும்^௧

- மிக நன்று
- நன்று
- பரவாயில்லை
- மோசம்
- மிக மோசம்

¹² உங்கள் குழந்தையின் செவிச்சூருள் அறுவைசிகிச்சை கருவியினை எவ்வாறு பழுது பார்க்க வேண்டும் என உங்களுக்கு போதுமான அளவு பரிந்துரைகள் கூறப்பட்டுள்ளதா^௨

- மிக நன்று
- நன்று
- பரவாயில்லை
- மோசம்
- மிக மோசம்

¹³ பின்வரும் சாதனங்களை தன்னம்பிக்கையுடன் உங்களால் எந்த அளவு கையாள முடிகிறது என தெரிவிக்கவும்^௩

^௪ செவிச்சூருள் அறுவைசிகிச்சை கருவியின் மின்கலம் ;इजमतलद्ध
சோதிப்பான்^௪

- 100:
- 75:
- 50:
- 25:
- ௨5:

செவிச்சுருள் அறுவைசிகிச்சை கருவியின் ஈரப்பத சாதனதனம்

- 100:
- 75:
- 50:
- 25:
- ௨25:

14^௮ உங்கள் குழந்தையின் செவிச்சுருள் அறுவைசிகிச்சை கருவி நன்றால் வேலை செய்கிறது என எவ்வளவு முறை நம்புகிறீர்கள்^௨

- 100:
- 75:
- 50:
- 25:
- ௨25:

15^௮ உங்கள் குழந்தையின் செவிச்சுருள் அறுவைசிகிச்சை கருவியினை பரிசோதிக்கும் முறை உங்களுக்கு எவ்வளவு வசதியாக இருக்கிறது என என உணர்கிறீர்கள்^௨

- மிகவும் வசதி
- வசதி
- பரவாயில்லை
- வசதி குறைவு
- மிகவும் வசதி குறைவு

16^௮ உங்கள் குழந்தையின் செவிச்சுருள் அறுவைசிகிச்சை கருவியினை பழுது பார்ப்பதும் உங்கள் செயல்திறனை அளவிட செய்யவும்^௮

- மிகுதியான செயல்திறன்
- சற்றே ^௨ சிறிதளவு செய்திறன்
- சமாளிக்க கூடியளவு செயல்திறன்
- மிகவும் குறைவான செயல்திறன்
- செயல்திறன் இல்லை

17^௮ உங்கள் குழந்தையின் செவிச்ச்சுருள் அறுவைசிகிச்சை கருவியினை பற்றி வேறு ஏதேனும் தெரிந்து கொள்ள விரும்புகிறீர்களாஃ

ஆம்ஃஃஃஃஃ இல்லைஃஃஃஃஃஃஃ

ஆம் என்றால் எதைப்பற்றி தெரிந்துகொள்ள விளைகிறீர்கள்ஃ

18^௮ உங்கள் குழந்தையின் செவிச்ச்சுருள் அறுவைசிகிச்சை கருவியில் அடிக்கடி ஏற்பட்ட பழுது என்ன என்பதை குறிப்பிடவும்ஃ

19^௮ உங்கள் குழந்தையின் செவிச்ச்சுருள் அறுவைசிகிச்சை கருவியினை தினமும் ஏன் சுத்தம் செய்து பராமரிப்பது இல்லைஃ

- நான் மிகவும் பரபரப்பாக இருப்பதால் நேரம் கிடைப்பது இல்லை
- நான் பரிசோதிக்க நினைப்பான் அனால் மறந்து விடுவேன்
- எனக்கு என்ன செய்யவேண்டும் என்று தெரியாது
- தினசரி அதை பரிசோதிர்பதற்கான காரணங்கள் எனக்கு கிடைத்தது இல்லை
- அதை எவ்வாறு சுத்தம் செய்து பார்த்துக்கொள்ள வேண்டும் என கூறியிருக்கிறார்கள் ஆனால் நான் எனக்கு செயல்திறன் குறைவாக இருப்பதாக எண்ணுகிறேன்
- மற்றவைஃ

20^௮ செவிச்ச்சுருள் அறுவைசிகிச்சை கருவியின் பராமரிப்பு பாதுகாப்பது மற்றும் அதை பழுது பார்க்கும் பயிற்சிகள் உங்களுக்கு எந்த அளவு தேவைப்படுவதாக நினைக்கிறீர்கள்ஃ

- நான் நன்றாக செயல்புரிகிறேன்
- சற்று விரிவான செயல்விளக்கம் மிகவும் உதவியாக இருக்கும்
- எனக்கு எளிமையாக புரிந்துகொள்ள கூடிய பயிற்சி தேவை
- மற்றவைஃ