


**FACTORS INFLUENCING GRADE 1 SCHOOL PLACEMENT AND
SUBSEQUENT CHANGES IN SCHOOL PLACEMENT OF
LEARNERS WITH COCHLEAR IMPLANTS**

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requirements for the degree of Master of Audiology
at the Stellenbosch University**

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DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the owner of the copyright thereof (unless to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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ABSTRACT

Over the past decade an increasing number of learners with cochlear implants have been placed in mainstream settings in South Africa (Müller & Wagenfeld, 2003). The aim of the present study was to describe possible factors that influence the initial grade 1 school placement as well as subsequent changes in placement of learners with cochlear implants. Data collection consisted of a retrospective record review of the children implanted at the Tygerberg Hospital-University of Stellenbosch Cochlear Implant Unit and a questionnaire aimed at assessing parental perceptions regarding the basis of grade 1 school placement for their children. The record review incorporated children implanted in 1988, the year of inception of the unit and included the most recently implanted children who have already started grade 1. Results of the 47 participants indicated that multiple factors influenced the selection of grade 1 school placement. Recommendations by professionals and parental preference were the most important determinants in the selection process. The mainstreamed learners were implanted at a much younger age than the learners placed in special school settings and therefore had a longer duration of implant use at the start of grade 1. Subsequent to grade 1 placement, the number of learners in mainstream placement, increased from 55% to 70%. The aspects identified in the study could be utilised when counselling parents during the school placement decision making process. Long term monitoring of the academic achievement of these learners needs to be an aim of future research.

Keywords: cochlear implants; school placement; mainstream; special school; grade 1

ABSTRAK

Oor die afgelope dekade het die aantal leerders met kogleêre inplantings wat in hoofstroomskole geplaas is toegeneem (Müller & Wagenfeld, 2003). Die doel van die huidige studie was om die faktore wat die aanvanklike graad 1-skoolplasing en latere wysigings in die plasing van leerders met kogleêre inplantings, te beskryf. Data-insameling het bestaan uit 'n retrospektiewe lêeroorsig van kinders wat kogleêre inplantings by die Tygerberg Hospitaal-Stellenbosch Universiteit Kogleêre Inplantingseenheid, ontvang het. Die lêeroorsig het kinders ingesluit wat in 1988, die jaar wanneer die eenheid gestig is, geïmplanteer is. Die mees onlangse geïmplanteerde kind wat reeds in graad 1 was, was ook in die lêeroorsig ingesluit. 'n Vraelys is ook gebruik om ouers se persepsies rakende die besluitneming oor skoolplasing, te ondersoek. Die resultate van die 47 deelnemers het aangedui dat veelvuldige faktore die seleksie van graad 1-skoolplasing beïnvloed het. Aanbevelings deur professionele persone en ouervoorkeure was egter die belangrikste bepalers in die seleksie van skoolplasing. Die leerders in hoofstroomskole het op 'n veel jonger ouderdom hul inplantings ontvang in vergelyking met die leerders wat in spesiale skole geplaas is. Die hoofstroomleerders het dus teen die begin van graad 1 langer die voordeel van die inplantings geniet. Na die aanvanklike graad 1-plasing in onderskeidelik hoofstroom- of spesiale skole, het die aantal leerders in hoofstroomskole toegeneem van 55% tot 70%. Die aspekte wat tydens die studie geïdentifiseer is, kan gebruik word in berading van ouers tydens die besluitnemingsproses ten opsigte van skoolplasing. Die langtermyn akademiese prestasie van hierdie leerders behoort gemonitor te word vir toekomstige navorsing.

Sleutelwoorde: kogleêre inplantings; skoolplasing; hoofstroom; spesiale skool; graad 1

TABLE OF CONTENTS

Declaration.....	i
Acknowledgements.....	ii
Abstract (English).....	iii
Abstract (Afrikaans).....	iv
Table of Contents.....	v
List of Tables.....	vii
List of Figures.....	vii
Introduction.....	1
Literature Review.....	3
Methodology.....	18
Aims of the study.....	18
Research Design.....	19
Participants.....	20
Instrumentation.....	23
Ethical considerations.....	31
Data collection procedure.....	31
Data analysis.....	33
Reliability and validity considerations.....	36
Results and Discussion.....	38
Conclusions, Limitations and Practical Implications	86
References.....	92
Appendices.....	111
<i>Appendix A:</i> Table I- Participant description.....	111
<i>Appendix B:</i> Record review form.....	113
<i>Appendix C:</i> Speech perception categories	116
<i>Appendix D:</i> Questionnaire.....	117
<i>Appendix E:</i> Ethical approval to conduct study from the Committee for Human Research, Stellenbosch University.....	123

Appendix F: Letter for permission to conduct study to the Medical Superintendent
of Tygerberg Academic Hospital124

Appendix G: Letter for permission to conduct study to the Head of Tygerberg
Hospital University of Stellenbosch Cochlear Implant Unit.....125

Appendix H: Participation information leaflet and consent form.....126

Appendix I: Table II-Data collection for quantitative analysis.....129

List of Tables

<i>Table 4.1:</i> Average age at implantation.....	39
<i>Table 4.2:</i> Age range of implantation.....	39
<i>Table 4.3:</i> Average duration of hearing impairment before implantation.....	43
<i>Table 4.4:</i> Average duration of implant use at the start of grade 1.....	45
<i>Table 4.5:</i> Age range of duration of implant use.....	46
<i>Table 4.6:</i> Number of learners with additional disabilities.....	53
<i>Table 4.7:</i> A summary of other factors that influenced the selection of grade 1 school placement	69
<i>Table 4.8:</i> Changes in school placement subsequent to grade 1	75
<i>Table 4.9:</i> Factors that influenced a change to mainstream school placement subsequent to grade 1	77
<i>Table 4.10:</i> Factors that influenced a change from one mainstream school to another mainstream school	78
<i>Table 4.11:</i> Factors that influenced a change from a special school to another special school.....	79
<i>Table 4.12:</i> Summary of themes relating to additional information provided by respondents.....	80

List of Figures

<i>Figure 3.1:</i> Flow diagram of the phases of data collection.....	32
<i>Figure 3.2:</i> Flow diagram of the phases of inductive or thematic analysis.....	34
<i>Figure 4.1:</i> Percentage of learners within each school setting relative to the age at implantation.....	41
<i>Figure 4.2:</i> Percentage of learners within each school setting relative to the duration of hearing impairment.....	44
<i>Figure 4.3:</i> Comparison of the percentage of learners within each school setting relative to the duration of implant use at the start of grade 1	47
<i>Figure 4.4:</i> Comparison of the percentage of learners within each school setting and speech perception performance.....	49

<i>Figure 4.5:</i> Comparison of the percentage of learners within each school setting and their primary mode of communication.....	51
<i>Figure 4.6:</i> Percentage of learners within each school setting with bilateral cochlear implants.....	52
<i>Figure 4.7:</i> Comparison of the percentage of learners within each school setting according to additional disabilities.....	53
<i>Figure 4.8:</i> Type of preschool attended.....	55
<i>Figure 4.9:</i> The percentage of learners within each school setting and preschool attended.....	56
<i>Figure 4.10:</i> Percentage of respondents for the factors in the questionnaire that influenced grade 1 school placement.....	58
<i>Figure 4.11:</i> Importance of parental preference in school selection.....	59
<i>Figure 4.12:</i> Importance of educational recommendations in school selection.....	60
<i>Figure 4.13:</i> Importance of geographic site or proximity in school selection	62
<i>Figure 4.14:</i> Importance of availability in school selection	63
<i>Figure 4.15:</i> Importance of the mode of communication in school selection.....	65
<i>Figure 4.16:</i> Importance of accommodations made for LSEN	66
<i>Figure 4.17:</i> Importance of cost implications in school selection	67
<i>Figure 4.18:</i> Comparison of the percentage of respondents within each school setting according to the number of factors selected in the questionnaire.....	68
<i>Figure 4.19:</i> Comparison of the percentage of respondents within each school setting according to other factors that influenced grade 1 school placement	70
<i>Figure 4.20:</i> Graphic comparison of the percentage of mainstream learners in grade 1 and subsequent to grade 1 school placement	76

1. INTRODUCTION

1.1 INTRODUCTION

Continuous and significant advances are being made in the assistive devices available to the hearing impaired population. These include the introduction and development of the cochlear implants. Cochlear implantation is now seen as a safe and successful means of providing rehabilitation for children with severe and profound hearing impairment (Cullen et al., 2006; Hartrampt, Lesinski, Allum, Dahm & Lenarz, 1995; Uziel et al., 2007; Wang, Huang, Wu & Kirk, 2007).

There is growing evidence of positive outcomes of paediatric cochlear implantation (Govaerts et al., 2002), such as improvement in communication skills (Bertram, 2004; Tomblin, Spencer, Flock, Tyler, & Gantz, 1999) and linguistic competence of children with profound hearing impairment (Geers, Nicholas & Sedey, 2003c). The advent of cochlear implants has also placed mainstream educational placement within reach of children with profound hearing impairment (Damen, van den Oever-Goltstein, Langereis, Chute & Mylanus, 2006; Francis, Koch, Wyatt & Niparko, 1999; Nevins & Chute, 1995) who traditionally would have been educated in the special school system (Archbold, 2000; Nevins & Chute, 1995; Sorkin & Zwolan, 2004). Literature on paediatric cochlear implantation further shows that a myriad of factors influences the selection of school placement for learners with cochlear implants.

The present study was undertaken in view of international and national educational laws favouring mainstream or inclusive placement for learners with disabilities and international research showing a trend towards mainstream placement for learners with cochlear implants (Archbold, Nikolopoulos, O'Donoghue & Lutman, 1998; Archbold, Nikolopoulos, Lutman & O'Donoghue, 2002; Boothroyd & Boothroyd-Turner, 2002; Daya, Ashley, Gysin & Papsin, 2000; Nevins & Chute, 1995; Summerfield, Marshall, & Archbold, 1997). The purpose of the present study was to investigate certain factors influencing grade 1 school placement and any subsequent changes in school placement of

children implanted in South Africa at the Tygerberg Hospital-University of Stellenbosch Cochlear Implant Unit (TBH-USCIU).

1.2 FORMAT OF THESIS

The chapters in this thesis are presented in the following order:

- Chapter 1: Introduction – Provides a brief overview of literature which led to undertaking the present study. Outlines the purpose of the study.

- Chapter 2: Literature Review – A review of existing literature relating to the area under investigation in the study.

- Chapter 3: Methodology – Describes the research process of the study, describes the research design, research strategy and method for collecting and analysing the data.

- Chapter 4: Results and Discussion – Presentation of the results and the discussion of the findings of the study.

- Chapter 5: Conclusions, Limitations and Practical Implications- Provides a summary of the findings of the study, identifies limitations of the study and makes suggestions for future research and practical applications of findings.

- Chapter 6: The list of references cited in the report.

- Chapter 7: Appendices, contains data and supplementary documentation.

2. LITERATURE REVIEW

2.1 BACKGROUND OF COCHLEAR IMPLANTS

Conventional hearing aids are adequate assistive listening devices for the management of most children with hearing impairment (O'Donoghue, 1996). However, as early as 1983, cochlear implantation for individuals with profound hearing impairment has demonstrated the potential to facilitate communication and to increase access and awareness of environmental sounds that were previously not available through conventional amplification (Maddox & Porter, 1983). Children using cochlear implants outperformed their profoundly hearing impaired peers who used conventional hearing aids (McConkey Robbins, 2000). Because of hearing with cochlear implants, spoken language competence has now become a possibility for many hearing impaired children, who previously depended on sign language as their mode of communication (Geers, 2004).

Cochlear implantation was initially granted the United States Food and Drug Administration (FDA) approval in 1984 (Kluwin & Stewart, 2000). FDA approval for paediatric implantation followed in 1990 (Holt, Kirk, Eisenberg, Martinez & Campbell, 2005; Moog, 2002). Approval of the Nucleus 22 channel cochlear in 1990 heralded the start of "a new era of technology for deaf children" (Moog & Geers, 1991, p. 69). It has led to advances in the treatment, management and the communicative outcomes in the profoundly hearing impaired population (Moog & Geers, 1991). Rapid development in cochlear implantation technology (Archbold et al., 2002) brought with it broadening candidacy criteria to include children with severe hearing impairment (Holt et al., 2005; Osberger, Zimmerman-Phillips & Koch, 2002). It is now a reliable and effective means of providing improved access to sound for individuals with hearing impairment (Moog & Geers, 2003) and is viewed as the "standard treatment for deaf children worldwide" (Litovsky et al., 2006b, p. 55).

2.2 WHAT IS A COCHLEAR IMPLANT?

A cochlear implant is an assistive listening device which allows speech signals to be represented as electrical stimuli to the auditory nerve (Wilson, 2000). It enables the restoration of the sensation of hearing through the direct stimulation of surviving neurons in the nerve by electrodes placed in the cochlear which bypass the hair cells which are absent in the impaired auditory system (O'Donoghue, 1996; Wilson, 2000). The acoustic speech signal is converted into a digital code while preserving features that are critical for the representation of speech (Niparko & Blankenhorn, 2003).

2.3 BENEFITS OF COCHLEAR IMPLANTATION

Profound hearing impairment of early onset has devastating consequences for spoken language development and can result in substantial delays in the mastery of all facets of communication (McConkey Robbins, 2000). The ultimate aim of cochlear implantation is the provision of sufficient hearing to enable speech and language development via audition (Moog & Geers, 1991; Niparko & Blankenhorn, 2003; Young & Killen, 2002).

Cochlear implantation has made a remarkable impact on the linguistic competence of children with profound hearing impairment (Geers et al., 2003c). An improvement in communication skills is a key intended benefit for children with cochlear implants (Bertram, 2004; Tomblin et al., 1999). Research has clearly outlined the benefits gained from cochlear implants in terms of; speech perception skills (Geers, Brenner & Davidson, 2003b; Stacey, Fortnum, Barton & Summerfield, 2006), receptive language development (McConkey Robbins, Bollard & Green, 1999; Tomblin et al., 1999), expressive language development (McConkey Robbins et al., 1999; Miyamoto, Houston, Kirk, Perdew & Svirksy, 2003; Tomblin et al., 1999; Uziel et al., 2007), reading skills (Geers, 2003d; Moog, 2002) narrative development (Nikolopolous, Lloyd, Starzewski & Gallaway, 2003) and concentration (Bertram, 2004). Research also advocates early implantation to maximise the aforementioned benefits related to the development of speech, language and literacy (Boothroyd & Boothroyd-Turner, 2002; Mukari, Ling & Ghani, 2007).

The reported enhanced development is, however, not uniform across all children who received cochlear implants. Considerable differences in their performance have in fact

been noted (Young & Killen, 2002). Inter-subject variability in language achievement also seems to be a common trend in a variety of studies. Kirk (2000, p. 225) aptly states that “the benefits of cochlear implantation vary tremendously across individuals”. The topic of the benefits gained from implantation is fraught with varying views and ambiguities.

It has been questioned whether the linguistic benefits can be viewed as being adequate (Tomblin et al., 1999) as even after implantation, the majority of children remain delayed in their language abilities (Boothroyd & Boothroyd-Turner, 2002; McConkey Robbins et al., 1999, McConkey Robbins, 2000; Young & Killen, 2002). Cochlear implantation, particularly in prelingually deaf children, may not provide sufficient hearing for the acquisition of skills which would allow adequate involvement in the hearing world (Young & Killen, 2002). There is also concern about whether the acquired linguistic benefits are adequate for the higher level of communication skills required for academic and social achievement (Tomblin et al., 1999).

Even with varying reported outcomes of cochlear implantation in the paediatric population, expectations have been raised substantially since FDA approval in 1990 (Moog, 2002). The “positive benefits of implantation for these children are not in doubt” (Boothroyd & Boothroyd-Turner, 2002, p. 83). Most prelingually deafened individuals are able to derive major long-term benefit from cochlear implantation. The highest expectation from children with cochlear implants is participation in mainstream education, which allows them the same level of opportunity as their normal hearing peers (Daya et al., 2000; Mukari et al., 2007).

2.4 EDUCATIONAL PLACEMENT POLICY FOR LEARNERS WITH HEARING IMPAIRMENT

United States federal educational law favours mainstream placement for learners with disabilities (Bennett & Lynas, 2001). Mandates in the US entitle children with hearing impairment to mainstream education that is appropriate in terms of meeting their individual needs (Withrow, 1981). Inclusive education or integration is placing children

with disabilities in the mainstream classroom (Sorkin & Zwolan, 2004). Inclusive education and mainstreaming are, however, not synonymous. Inclusion involves the provision of support for learners with special needs within the mainstream setting, while no support or specially designed instruction is provided the learner with special needs in mainstreaming (Moore, 1998). When a learner with a hearing impairment is mainstreamed, it involves full integration with hearing children (Daya et al., 2000).

South African legislation and education objectives for individuals with disabilities appear to be following the US trend towards implementing inclusive education. In 2001, the White Paper on an integrated national disability strategy noted that the aim was to provide learners with disabilities with education and training in as normal an environment as possible with the necessary resources available to enable them to realise their highest potential.

The educational system in the United States allows for placement on a continuum, ranging from full mainstreaming to a state school for the hearing impaired with residential facilities (Niparko et al., 2000). This includes options such as partial mainstreaming, in which the learner spends varying amounts of time in the mainstream and special education classroom respectively. This continuum of placement options is not available in South African context.

2.5 EDUCATIONAL PLACEMENT FOR LEARNERS WITH HEARING IMPAIRMENT

The special school setting was traditionally seen as the solution to the inability of a child with a hearing impairment to fit into mainstream placement (Hoversten & Fomby, 1981). Learners with hearing impairment were therefore generally educated in the special school system (Archbold, 2000; Nevins & Chute, 1995; Sorkin & Zwolan, 2004). Special education is the unconventional teaching used when children do not get optimal benefit from or have impaired access to the general educational system due to their disability (Niparko, Cheng & Francis, 2000). For a learner with special needs the special school setting affords accessibility to inherent specialised support services.

The mainstream school placement for the learner with a hearing impairment has become a topic of contention (Afzali-Nomani, 1995). The importance of mainstreaming is related to the possible long term implications (Francis et al., 1999). If mainstreaming does not occur, young deaf adults are less likely to engage in tertiary education which may lead to under or unemployment (Kasen, Ouellette & Cohen, 1990).

Clear cut research regarding the differences between the academic performance of mainstreamed and special school learners with hearing impairment appears unavailable (Davis, 1995). Although there has been some success in mainstreaming children with hearing impairment there is still concern that these learners' needs may be better met in a specialised programme (Brackett, 1997).

2.6 EDUCATIONAL PLACEMENT FOR LEARNERS WITH COCHLEAR IMPLANTS

Education for learners with hearing impairment has historically been a controversial topic with cochlear implantation adding another dimension (Archbold, 2000; Tyler, 1993). The controversy involved the school placement of these learners (i.e. special school versus mainstream school placement). Educational opportunities for children with profound hearing impairment were restricted to special school settings until cochlear implants were introduced (Daya et al., 2000). Previously, participation in the mainstream classroom was only possible for the learner with a moderate hearing impairment (Daya, et al., 2000). The advent of cochlear implants has placed mainstream educational placement within reach of children with profound hearing impairment due to the valuable input the technology provides for the development of speech perception, speech production and language which allows for increasing literacy development (Damen et al., 2006; Francis et al., 1999; Nevins & Chute, 1995).

Children with cochlear implants are educated in a variety of educational settings (Christiansen & Leigh, 2004; Niparko et al., 2000). Research shows a shift towards mainstream placement for learners with cochlear implants (Archbold et al., 1998; Archbold et al., 2002; Boothroyd & Boothroyd-Turner, 2002; Daya et al., 2000; Mukari

et al., 2007; Nevins & Chute, 1995; Summerfield et al., 1997; Thoutenhoofd, 2006; Waltzman et al., 1994). Published studies show a high percentage of learners being mainstreamed: 83% (Mukari et al., 2007), 68% (Sorkin & Zwolan, 2004), 59% (Wang et al., 2007) and 49% (Verhaert, Willems, Van Kerschaver & Desloovere, 2008). In South Africa, mainstream placement of learners with cochlear implants is also taking place (Reeves, 2003). Mainstream and inclusive education is thus becoming the norm (Moores, 2007).

Although mainstream placement is occurring, it does not imply that it is the most effective school placement for these learners (Archbold et al., 2002). The benefit of inclusive education for the child with a cochlear implant is both powerful and very persuasive, but it is attainable only for the learner with the prerequisite skills to function in the mainstream classroom (McConkey Robbins, 2000). Although a range of educational settings as well as modes of communication are available, none have been deemed appropriate for every child with a hearing impairment (Davis, 1995). The solution may therefore not lie in finding the approach that would best suit the widely diverse hearing impaired population, but in defining what is best for an individual child (Bochner & Albertini, 1988; McKirdy & Klimovitch, 1994). One of the aims could be to ensure that the level of skills and educational and communication practices should be of a high standard regardless of the setting or mode of communication (Bochner & Albertini, 1988). Selecting mainstream education should not be the aim at all costs. It might be more important to find an environment where learners with cochlear implants can succeed, expand their cognitive and linguistic repertoire (McConkey Robbins, 2000) and achieve their maximum potential (Archbold et al., 2002). Furthermore, Goldberg, Niehl and Metropoulos (1998, p. 328) aptly state that “no placement decision is final”, which highlights the fact that the school placement of learners with cochlear implants need not be static. There should be flexibility in the educational placement of these learners (Schopmeyer, 2000) which relates to possible changes in school placement subsequent to initial placement.

The selection of appropriate educational placement for a learner with a hearing impairment (Selmi, 1985) and specifically a learner with a cochlear implant (Daya et al., 2000) is a complex process. There are varying philosophies regarding educational placement for learners with cochlear implants (Moore, 2005). Specific guidelines for educational placement of learners with cochlear implants may not, however, be possible (Selmi, 1985). Placing learners with cochlear implants in the mainstream classroom is a very difficult decision (Nevins & Chute, 1995). As pointed out by Tyler (1993, p. 244), “It is difficult to control all the possible factors in attempting to delineate which educational system is the best for an individual child.” Similarly, Francis et al. (1999) notes that a subsequent change in school placement for learners with cochlear implants is likely influenced by a complex array of factors.

2.7 FACTORS INFLUENCING EDUCATIONAL PLACEMENT FOR LEARNERS WITH COCHLEAR IMPLANTS

Literature in paediatric cochlear implantation indicates that a myriad of factors influence performance outcomes with the implant. These factors include: age at implantation (Damen et al., 2006; Geers & Brenner, 2003a; Hassanzadeh, Farhadi, Daneshi & Emamdjomeh, 2002; Kirk, 2000; Uziel et al., 2007; Young & Killen, 2002), duration of the hearing impairment prior to implantation (Damen et al., 2006; Isaacson, Hasenstab, Wohl & Williams, 1996; O’Donoghue, 1996), duration of cochlear implant use (Geers & Brenner, 2003a; Young & Killen, 2002), additional disabilities (Geers & Brenner, 2003a) and the mode of communication employed (Young & Killen, 2002). The factors influencing performance outcomes in paediatric cochlear implantation seem to form, recurring themes in research which are echoed in literature regarding educational placement of these learners. It is difficult, however, to identify the relative influence of the various variables involved in the educational placement of learners with hearing impairment (Archbold et al., 1998). A review of the factors that influence the school placement for learners with cochlear implants follows.

2.7.1 Age at implantation

Clinical experience in the last ten years has highlighted the importance of early implantation (Christiansen & Leigh, 2004; Kirk, 2000; Manrique, Cervera-Paz, Huarte & Molina, 2004a). It reduces auditory deprivation (Francis et al., 1999; Hassanzadeh et al., 2002) and allows for the use of the plasticity of the auditory system which automatically minimizes language delay (Boothroyd & Boothroyd-Turner, 2002). Earlier implantation results in better performance in speech perception skills (Hassanzadeh et al., 2002; Zwolan et al., 2004) and educational attainments (Boothroyd & Boothroyd-Turner, 2002). There is growing evidence that age at implantation is decreasing (Damen et al., 2006; Hamzavi et al., 2000) thus occurring in the young population with hearing impairment (Moores, 2005; Niparko & Blakenhorn, 2003). The ideal age for congenitally deaf children to be implanted is before the age of 3 years (Bennett & Lynas, 2001). Recent findings report that cochlear implantation is safe in infants as young as 6 months of age (Valencia, Rimell, Friedman, Oblander & Helmbrecht, 2008).

There is strong evidence to support the contention that there is a sensitive or critical period for auditory development (Geers, 2004; Valencia et al., 2008; McConkey Robbins, 2000). This contention is echoed by Geers (2004), who stated that the first two years of life is the most important period for language development (Geers, 2004). Research is trying to define the limits of the critical auditory period for cochlear implantation (Manrique et al., 2004a). The critical age for cochlear implantation has variously been reported as being 3 years (Kirk, Miyamoto, Lento, O'Neill & Fears., 2002), 5 years (Fryauf-Bertschy, Tyler, Kelsay, Gantz & Woodworth, 1997; Geers & Brenner, 2003a) and 6 years of age (Papsin, Gysin, Picton, Nedgelski & Harrison, 2000). Geers (2004) reported that more children who were implanted at the age of 2 years, than those who were implanted at age 4, achieved speech and language skills comparable with their normal hearing age-matched peers. It is clear that defining the specific critical age for implantation needs further attention in view of the time-sensitive nature of cochlear implantation (Geers, 2004).

Research indicates that early implantation maximizes the benefits of implantation related to speech-language and literacy development (Mukari et al., 2007). It is, therefore, reasonable to predict that early implantation results in age appropriate language and literacy (Boothroyd & Boothroyd-Turner, 2002). Earlier implantation is not only influential in speech and language development, but it is also a significant predictor of educational placement for learners with cochlear implants (Archbold et al., 1998; Jessop, Kritzinger & Venter, 2007; Uziel et al., 2007). The goal of early cochlear implantation is to allow mainstream schooling (Jessop et al., 2007). The age at implantation was found to be significantly lower for the learners with cochlear implants in mainstream placement in both a national (Jessop et al., 2007) and an international study (Archbold et al., 1998). Summerfield et al. (1997) reported a greater chance of mainstream placement, if implantation takes place before the age of 5, while Govaerts et al. (2002) stated that implantation beyond 4 years hardly resulted in mainstream placement. The age effect of implantation is reflected by the finding that integration into mainstream education tended to decrease as the age at implantation increased (Govaerts et al., 2002).

2.7.2 Duration of hearing impairment prior to implantation

Geers (2004, p. 638) reported that “normal speech and language development is possible for many children who experience only a short period of auditory deprivation during the critical language learning years.” This statement highlights the benefits of limiting the duration of hearing impairment prior to implantation to speech and language development. In addition, better speech perception outcomes have been cited with a shorter duration of hearing impairment (Dowell et al., 2002; Gordon, Daya, Harrison & Papsin, 2000; Kirk, 2000). A longer duration of hearing impairment also negatively affects classroom performance of learners with cochlear implants (Damen et al., 2006). A shorter duration of hearing impairment is also a significant predictor of school placement two years after implantation (Archbold et al., 1998).

2.7.3 Duration of cochlear implant use

The duration of cochlear implant use has been documented to influence speech perception outcomes (Dowell, Blamey & Clark, 1995; Kirk, 2000; Miyamoto et al., 1994;

Stacey et al., 2006) and educational placement (Francis et al., 1999; Niparko et al., 2000) for learners with cochlear implants. The move towards the mainstream classroom setting or at least towards less restrictive educational environments occurs after more experience is gained with the cochlear implant (Geers & Brenner, 2003a; McConkey Robbins, 2000).

Francis et al. (1999) found a positive correlation between the length of cochlear implant use and the rate at which learners were placed in a mainstream classroom on a full time basis. This study concluded that children, who had more than 2 years of implant use, mainstreamed at twice or more the rate of age matched, profoundly hearing impaired children without cochlear implants. This positive correlation between the length of cochlear implant experience and the incidence of mainstream placement of learners with cochlear implants was also reported by Niparko et al. (2000). Francis et al. (1999) pointed out that the increased access to the acoustic information of spoken language provided by cochlear implantation led to higher rates of mainstream educational placement.

2.7.4 Speech perception performance

Speech perception skills have been shown to influence (Pyman, Blamey, Lacey, Clark & Dowell, 2000) or predict (Archbold et al., 2002) the educational placement for learners with cochlear implants. Higher levels of speech perception skills have been observed among learners, who remained in or moved to mainstream educational settings (Daya et al., 2000), or to an integrated or oral educational setting (Dowell, et al., 1995). In contrast, poor speech perception skills are predictive of educational placement in which oral communication is less likely to develop (Geers & Moog, 1987).

2.7.5 Mode of communication

The choice of the mode of communication for a child with a hearing impairment is one of the most important decisions faced by the parents and professionals involved with the child (Davis, 1995). There is evidence that oral communication yields better speech perception, production and language development post implantation than total

communication programmes (Geers & Brenner, 2003a). Oral communication focuses on auditory skills and speech production (Moog & Geers, 1991) and language acquisition through audition (McKirby & Klimovich, 1994), while total communication advocates speech development to whatever degree possible (Moog & Geers, 1991) with simultaneous use of speech and sign language for communication (Daya et al., 2000; Moog & Geers, 2003). The majority of the learners with cochlear implants were found to use oral communication in both national (Jessop et al., 2007) and international studies (Sorkin & Zwolan, 2004; Wang et al., 2007).

The mode of communication is one of the factors, which aids in not only predicting the gains in development following implantation (Isaacson et al., 1996), but also helps in determining educational placement (Selmi, 1985). By definition, a mainstream school would advocate oral communication which would preclude learners using sign language or total communication.

2.7.6 Bilateral cochlear implantation

As pointed out by Litovsky et al. (2006b, p.57) the, “potential benefits of bilateral cochlear implants are yet to be fully understood.” Evidence of the positive effects of bilateral implantations in children includes aspects such as improved hearing thresholds and speech recognition scores (Scherf et al., 2007), sound localization (Litovsky, Johnson & Godar, 2006a), and communication behaviour (Kühn-Inacker, Shehata-Dieler, Müller & Helms, 2004). There is also growing evidence on the impact of bilateral cochlear implants on educational outcomes (Verhaert et al., 2008).

2.7.7 Additional disabilities

Contra-indications still exist to implantation in the multi-handicapped population (Lesinki, Hartrampf, Dahm, Bertram & Lenarz, 1995). Broadening implant candidacy criteria (Kirk, 2000) has, however, lead to cochlear implantation in this population both internationally (Bertram, 2004; Daneshi & Hassanzadeh, 2007; Dettman et al., 2004; Hamzavi et al., 2000; Lesinki et al., 1995; Wiley, Janhke, Meinzen-Derr & Choo, 2005) and nationally (Müller & Wagenfeld, 2003).

The implanted multi-handicapped children reportedly show different progress (Lesinki et al., 1995), usually poorer progress in comparison to those with fewer or without additional disabilities (Dettman et al., 2004; Isaacson et al., 1996; Stacey et al., 2006). Speech perception improvement (Stacey et al., 2006; Waltzman, Scalchunes & Cohen, 2000) and communication progress (Wiley et al., 2005) emerged at a slower rate in implanted children with additional disabilities than those without. Eighty three percent of the primary school aged learners with implants in a study by Mukari et al. (2007) were in mainstream school placement while the remaining 17% were in special school placement due to additional disabilities other than hearing impairment.

Positive outcomes have also been cited in this multi-handicapped population of implantees (Hamzavi et al., 2000; Uziel et al., 2007; Verhaert et al., 2008; Waltzman et al., 2000). Communication progress was also reported by all the families in the Wiley et al. (2005) study. It appears that hearing impairment is more remediable through cochlear implantation in the multi-handicapped population with the use of appropriate assessment and intensive training (Lesinki et al., 1995).

Similarly to learners with normal hearing, additional disabilities are factors that need to be considered when decisions are made regarding educational placement of learners with cochlear implants (Sullivan & Perigoe, 2004). Research has indicated that it is one of the main factors that accounts for educational placement of learners with cochlear implants (Mukari et al., 2007; Selmi, 1985; Uziel et al., 2007).

2.7.8 Parental preference

Parents fulfil an important role in the rehabilitation and education of learners with cochlear implants (Incesulu, Vural & Erkam, 2003; Mellon, 2000 as cited in Niparko, 2000). Parental involvement is required in both educational and social aspects of the child's development to ensure optimal use of the cochlear implant (Christiansen & Leigh, 2004). Appropriate educational placement is identified as one of the critical decisions that the parents of children with cochlear implants have to make (Christiansen & Leigh, 2004; Daya et al., 2000).

The importance of parental preference as a determinant of educational placement for learners with cochlear implants is well documented (Archbold & Robinson, 1997; Archbold, 2000; Francis et al., 1999; Mukari et al., 2007; Tobey, Rekart, Buckley & Geers, 2004; Yuelin, Bain & Steinberg, 2003). Internationally, legislation prescribes that parents be the decisions makers regarding school placement for learners with disabilities (Archbold et al., 2002; De Mitchell, 1997 as cited in Easterbrooks & Mordica, 2000; Garrick Duhaney & Salend, 2000). As stated by Selmi (1985, p. 57), “The ultimate decision on the child’s educational placement always must remain with the parents.”

2.7.9 Educational recommendations by professionals

Recommendations made by the professionals (i.e. both the educators and the cochlear implant team) involved in the management of the learner with a cochlear implant, are recognized as important determinants of school placement (Archbold & Robinson, 1997; Archbold, 2000; Damen et al., 2006; McConkey Robbins, 2000; Mukari et al., 2007; Nevins & Chute, 1995; Tobey et al., 2004). Their recommendations are based on the specialist advice and their expertise in the management of learners with cochlear implants (Thoutenhoofd, 2006).

2.7.10 Additional factors

Logistical issues such as the geographic location of the school (Niparko et al., 2000) and the educational placement options that are available (Archbold & Robinson, 1997; Francis et al., 1999) can influence placement for learners with cochlear implants. Special school placement for learners with hearing impairments is often residential and involves the learner travelling away from home (Archbold, 2000; Nevins & Chute, 1995) which could motivate the selection of a local mainstream school. Cost implications (e.g. travelling costs) was noted by Goldberg et al. (1989) as one of the items parents should consider when evaluation an educational setting for their child with a hearing impairment. A learner with a disability also has to be socially and academically ready for a specific school setting to facilitate successful placement (Etschiedt, 2006). Another important determinant of school placement for learners with hearing impairment is the

support services that are available to the learner at the school (Niparko & Blankenhorn, 2003). Support services which could motivate placement include: a reduced class size (Cawthon, 2001; Garrick Duhaney & Salend, 2000; McLeskey & Waldron, 2007), a positive attitude of educators towards having a learners with special educational needs (LSEN) in the classroom (Nevins & Chute, 1995) and educators who have knowledge of and experience with teaching LSEN (Garrick Duhaney & Salend, 2000; Moog, 2002; Wamae & Kang'ethe-Kamau, 2004). The reduced class size is viewed as supportive as it could afford the educator more time to provide learners with individual attention (McLeskey & Waldron, 2007). A positive attitude towards having a LSEN in the classroom could be indicative of a willingness to accommodate the learner. Acceptance of the learner and more confidence in having a LSEN in the classroom could be the result of the educator having more knowledge about and experience with a disability (Wamae & Kang'ethe'Kamau, 2004).

2.8 CONCLUSION

The advent of cochlear implantation as hearing technology has introduced a diverse range of educational options for children with hearing impairment. Research shows a trend towards mainstream placement for learners with cochlear implants (Archbold et al., 1998; Archbold et al., 2002; Boothroyd & Boothroyd-Turner, 2002; Daya et al., 2000; Mukari et al., 2007; Nevins & Chute, 1995; Summerfield et al., 1997; Thoutenhoofd, 2006; Waltzman et al., 1994). Reports further indicate that these learners experience success in mainstream settings, both internationally (Bennett & Lynas, 2001; Damen et al., 2006; Nevins & Chute, 1995; Spencer, Gantz & Knutson, 2004; Uziel et al., 2007) and nationally (Reeves, 2003). Even with these encouraging reports and the positive perceptions of parents of LSEN in inclusive education (Garrick Duhaney & Salend, 2000), it should be remembered that no one educational placement is optimal for all children with hearing impairment (Goldberg et al., 1989). No school placement should be regarded as final (Goldberg et al., 1989) and there should be flexibility in the placement of a learner with a cochlear implant (Schopmeyer, 2000).

Literature also indicates that a myriad of factors influences school placement for the learner with a cochlear implant. The cochlear implant unit at the Tygerberg Hospital-University of Stellenbosch has implanted children since 1988. The majority of the paediatric implantees of this unit receive their preschool instruction at the Carel du Toit Centre, a preschool for children with hearing impairment, where oral language development is advocated. At grade 1 level the educational options for the learner with a cochlear implant, are either the special school setting or mainstream placement.

In view of the changes in policy regarding school placement of learners with disabilities and the growing interest in the school placement of learners with cochlear implants, the focus of this study was to investigate the factors influencing the parents'/caregivers' choice of grade 1 school placement for the children implanted at this implant unit. The aim was to probe the background factors of cochlear implantation that might influence grade 1 school placement. As school placement for learners with cochlear implants is not static (Francis et al., 1999), changes in school placement subsequent to grade 1 were also to be noted in the present study.

Further motivation for conducting the present study is the need for outcome studies in the realm of cochlear implantation in the South African context. Since cochlear implantation is largely still an elective procedure due to high cost implications, and therefore still almost primarily occurring in the private health sector setting (Jessop et al., 2007), the findings of outcome studies are needed to advocate for state funding (Jessop et al., 2007).

3. METHODOLOGY

3.1 INTRODUCTION

The process of conducting research consists of a variety of aspects which includes the selection of an appropriate theoretical paradigm, research design, research strategy and method for collecting and analysing the data (Denzin & Lincoln, 2000). Interpretation of the results and formulating a discussion thereof, forms the latter part of the research process (Denzin & Lincoln, 2000). The research process of the present study is discussed below.

3.2 AIMS OF THE STUDY

3.2.1 Main aims of the study

The main aim of this study was to describe the factors that influence the primary school (grade 1) placement of learners with profound hearing impairment who were implanted at the TBH-USCIU. Data collection included a retrospective record review and a questionnaire.

3.2.1.1 *Factors investigated through the record review:*

The record review provided data about the following eight factors that could influence school placement:

1. Age at implantation.
2. Duration of hearing impairment before implantation.
3. Duration of cochlear implant use at the start of grade1.
4. Speech perception performance.
5. Mode of communication.
6. Bilateral cochlear implants.
7. Additional disabilities.
8. Preschool attended.

3.2.1.2 Factors investigated through the questionnaire:

The factors that could influence school placement probed through the questionnaire included:

9. Parental preference.
10. Educational recommendation by professionals.
11. Geographic site or proximity of the school.
12. Availability of the school.
13. Mode of communication employed at the school.
14. School accommodated learners with special needs.
15. Cost implications.
16. Other factors

3.2.2 Sub-aims of the study

The following sub-aims were probed through the questionnaire:

1. Change in school placement subsequent to grade 1.
2. Reasons for the change in school placement.
3. Additional commentary regarding grade 1 school placement.

3.3 RESEARCH DESIGN

The present study was a descriptive survey using a retrospective record review and questionnaire. This design was deemed suitable as it allowed the description of an existing set of variables (Last, 2001).

The study utilized mixed-method techniques (i.e. using both qualitative and quantitative methods of data analysis). This is increasingly being done by researchers to “expand the scope of, and deepen their insight from, their studies” (Sandelowski, 2000, p. 246). The data collected from the record review as well as parts of the questionnaire was quantitatively analysed, while the open-ended questions in the questionnaire lent itself to qualitative analysis (i.e. inductive or thematic analysis). Both the aspects were suitable for the present study as quantitative information is important for trend analysis (Grimes

& Schulz, 2002), while qualitative research seeks "...illumination, understanding and extrapolation to similar situations" (Hoepfl, 1997, p. 48).

3.4 PARTICIPANTS

3.4.1. Sampling method for the selection of participants

Purposive sampling was deemed an appropriate sampling method for the present study as it provided individuals who had specific characteristics necessary for the purpose of the study (Hegde, 2003). It allowed the researcher to set up the preliminary list of participants from the list of all the implantees at the TBH-USCIU who met the selection criteria of the present study. Although this sampling method yields individuals with the necessary characteristics for the purpose of a given study it typically sacrifices empirical generalizability of the findings (Patton, 2002).

3.4.2. Selection criteria for participants

The participants in the present study consisted of two separate groups, namely the children implanted at the TBH-USCIU and their parents/caregivers. Hereafter the children will be referred to as learners (L), while their parent/caregiver will be referred to as respondents (R).

3.4.2.1 *Selection criteria for the learners:*

The learners had to comply with the following criteria to qualify for participation in the study:

1. The learner had to currently be at or beyond the grade 1 level to ensure that the selection of school placement had been made.
2. The learner had to have had a minimum of 2 years experience with the cochlear implant prior to starting grade 1. Two or more years of cochlear implant experience has been found to be a significant predictor of school placement (Archbold et al., 1998) and has been associated with a higher percentage of mainstream school placements (Francis et al., 1999). Educational placement in the first 2 years of implant experience has usually been found to stay the same as

before implantation (Francis et al., 1999). Archbold et al. (1998) also found that age of implantation and duration of hearing impairment was significant predictors of school placement two years after implantation.

3. The onset of the learner's hearing impairment could be congenital or prelingual (\leq 3 years of age). In the present study, prelingual onset of hearing impairment was defined as after birth but before 3 years of age (Damen et al., 2006; Miyamoto, Osberger, Robbins, Myres & Kessler, 1993). Literature reveals varying opinions regarding the effect of age of onset of deafness on cochlear implant performance. Staller, Dowell, Beiter and Brimacombe (1991) reported that an acquired onset of hearing loss relates to better speech perception abilities than congenital onset of deafness. However, other studies have shown no statistical difference in speech perception performance (Dowell et al., 1995; Miyamoto et al., 1993; Osberger, Todd, Berry, Robbins, Miyamoto, 1991) and mainstream performance (Damen et al., 2006) between congenitally and prelingually deafened cochlear implant users. Learners with congenital and prelingual onset of hearing impairment were included.

It was decided to exclude learners with postlingual onset (i.e. onset after 3 years or later) of hearing impairment as their performance was expected to differ from those of the two aforementioned groups. They typically display dramatic and rapid benefits from hearing with cochlear implants (McConkey Robbins, 2000; Osberger et al., 1991) and are viewed as better implant candidates (Fryauf-Bertschy, Tyler, Kelsay & Gantz, 1992).

4. Any etiology of hearing impairment was allowed and the learner could have additional disabilities.

It is recognized that the etiology of a hearing impairment may confound performance with a cochlear implant (Osberger et al., 1991) and cause benefits to vary after implantation (Niparko & Blankenhorn, 2003). It is, however, accepted

that cochlear implantation is not contraindicated for individuals with additional disabilities (Daneshi & Hassanzadeh, 2007; Dettman et al., 2004). Even though additional disabilities have been reported to interfere with performance with a cochlear implant (Pyman et al., 2000; Uziel et al., 2007; Waltzman et al., 2000), studies have shown demonstrable benefits of cochlear implantation in the multiply handicapped population (Jorgensen, Chmiel, Clark & Jenkins, 1995; Isaacson et al., 1996; Lesinki, et al., 1995; Uziel et al., 2007; Waltzman et al., 2000). This reported benefit supported the inclusion of this criterion in the present study.

5. The learner could be implanted unilaterally or bilaterally. Both unilateral and bilateral implant wearers were included in the present study as the potential benefit of bilateral implantation is as yet not fully understood (Litovsky et al., 2006b).
6. The learner's mother tongue could be English or Afrikaans. The implant unit has equivalent test material in both these languages which afforded the researcher access to speech perception scores for all the learners who met criteria 1-5.

3.4.2.2 Selection criteria for the respondents:

Using parents as a source of data in the present study was deemed appropriate as they not only fulfil an important role in the rehabilitation and education of learners with cochlear implants (Incesulu et al., 2003; Mellon, 2000 as cited in Niparko, 2000), but are also an accurate source of information (Rossetti, 2001).

The parents/caregivers had to comply with the following criteria to qualify for participation in the present study:

1. They had to have a child with a cochlear implant, who complied with the above criteria.
2. They had to be literate, as the questionnaire had to be completed in written format.

3. Their mother tongue could be English or Afrikaans, as the questionnaire was available in both languages.

3.4.3 Description of the learners

The learners were included in the study upon receipt of the completed questionnaire from their respective parents/caregivers. The researcher compiled an original list of 73 learners who met the selection criteria. The parents/caregivers of these learners were contacted either telephonically or by post. Twenty-six of the learners and their respective parents/caregivers in the original list of participants were not included in the final sample as one of their parents declined to participate while the remaining 25 parents/caregivers did not return the questionnaire.

The final sample consisted of 47 learners with cochlear implants and their respective parents/caregivers, who returned the questionnaire. Twenty-seven of the learners were female and 20 male. English was the first language of 22 of the learners and Afrikaans for the remaining 25. Current scholastic placement varied from grade 1 to tertiary education. They all had pre-operatively been diagnosed with bilateral, profound hearing impairments tested under sound field or unaided earphone testing or by auditory brainstem response. Forty-two of the learners presented with congenital hearing impairment and the remaining five were prelingually deafened. The learners were all implanted with Nucleus multi-channel cochlear implants (see Appendix A-Table I for a summary table of the participant characteristics).

3.5 INSTRUMENTATION

The retrospective record review utilized the records of learners implanted at the TBH-USCIU. It included the records of children from the year 1988, when the first child was implanted in the unit all the way to the most recently implanted children, who were already in grade 1. It documented the factors from their records that could influence grade 1 school placement decisions (see main aims 1-8).

The questionnaire was sent to the parents/caregivers of each of the learners who complied with the selection criteria of the study. The questionnaires were used to assess parental perceptions of the factors that were thought to influence the selection of grade 1 school placement (i.e. main aims 9-15). The questionnaire also probed the sub-aims of the study.

3.5.1 Retrospective record review

Section A of the review included demographic and background information. Section B included the eight factors that were expected to influence school placement decisions as outlined in the main aim of the study (see Appendix B). The discussion below outlines the rationales for the eight factors included in the record review.

3.5.1.1 *Age at cochlear implantation.*

3.5.1.2 *Duration of hearing impairment before implantation.*

Both age at implantation and duration of hearing impairment are amongst the factors which influence the development of a child with a cochlear implant (Bertram & Päd, 1995). Age at implantation has also been identified as a significant predictor of school placement for children with cochlear implant (Archbold et al., 2002). Early implantation and thus a shorter duration of hearing impairment allows for participation of children with hearing impairment in a mainstream school setting (Geers & Brenner, 2003a).

Meningitis was the etiology for the hearing impairment for the five prelingually deafened learners in the sample. The duration of hearing impairment before implantation for these learners was calculated using the date at which the diagnosis of meningitis was made and the date of the implantation. For the learners with a congenital hearing impairment, this calculation involved their date of birth and the date of implantation.

3.5.1.3 *Duration of cochlear implant use at start of grade 1.*

Increased experience with a cochlear implant has been associated with more frequent mainstream school placement for learners with cochlear implants (Francis et al., 1999; Geers & Brenner, 2003a; Niparko et al., 2000).

Factors 1-3 were calculated in months.

3.5.1.4 *Speech perception skills.*

Pyman et al. (2000) stated that the level of speech perception achieved by a child with a cochlear implant may influence the choice of educational placement.

The most recent speech perception scores prior to starting grade 1 were collected for each learner. The speech perception test battery utilized by the TBH-USCIU consists of test material in South African English and equivalent material in Afrikaans. As a means of providing a common measure of speech perception across languages, each test percentage is translated into a Speech Perception Performance Category, according to tasks of increasing difficulty. These categories were numbered from 1 to 7 and indicated an overall speech perception performance. The definition used to categorize each learner's speech perception performance is outlined in Appendix C (Clark, Cowan & Dowell, 1997; Moog & Geers, 1990). The use of the categories allowed the researcher to deal with a variety of test results and a wide variation in speech perception skills of the children in the present study (Dowell & Cowan, 1997).

The absolute goal of cochlear implantation is the enhancement of language development (McConkey Robbins, 2000). A crucial measure of the effectiveness of implantation in young children is the resultant receptive and expressive language development (Niparko & Blankenhorn, 2003). It was initially intended to include language levels in the record review. The data collection process, however, revealed that equivalent measures were not available for each of the learners.

3.5.1.5 Mode of communication.

The mode of communication employed is one of the factors that aids in predicting gains in speech and language development following implantation (Isaacson et al., 1996 and an important determinant of school placement for a learner with a cochlear implant (Selmi, 1985).

The mode of communication employed by each learner upon starting grade 1 level was categorized as follows:

Sign language: A gestural system with a unique syntactic structure and no spoken correlate (Barker, Dettman & Dowell, 1997).

Total Communication: Some form of manually coded language accompanying speech (Geers & Brenner, 2003a).

Oral Communication: Dependence on speech and audition for communication (Geers & Brenner, 2003a) with optimum use of residual hearing in conjunction with lip-reading (Barker et al., 1997).

3.5.1.6 Bilateral cochlear implants.

The growing evidence of the impact of bilateral implantation on the educational outcomes in this population (Verhaert et al., 2008) motivated the inclusion of this factor in the present study.

3.5.1.7 Additional disabilities.

Additional disabilities are relatively common amongst children with profound impairment (Dowel & Cowan, 1997) and are one of the main factors that account for educational placement of learners with cochlear implants (Uziel et al., 2007).

3.5.1.8 Preschool attended.

Learners with cochlear implants are educated in a variety of settings (Christiansen & Leigh, 2004). Traditionally they were educated in special school settings (Archbold,

2000). A move towards mainstream placement after cochlear implantation has, however, been observed (Archbold et al., 2002; Daya et al., 2000). The researcher therefore noted preschool placement to evaluate the possibility of this trend prior to grade 1 school placement.

Preschool placement or care prior to grade 1 was categorized as follows:

- Mainstream preschool.
- Carel du Toit Pre-Primary School for Hearing Impaired Children.
- Homecare or no preschool attended prior to grade 1.

3.5.2 Questionnaire

3.5.2.1 *Development of the questionnaire:*

The questionnaire utilized in the present study was developed based on the five steps of survey design as outlined on (Creative Research Systems. n.d.)

Step 1 or the basis for the content of the questionnaire was primarily the factors influencing school placement for learners with cochlear implants identified during the literature review for the present study.

Step 2 involved determining the sample for the study. This was predetermined by the selection criteria set for the present study.

During step 3 the decision was made to have the questionnaire completed in written format. Telephonic contact was made with as many of the parents/caregivers as possible to briefly outline the aim and confidentiality aspects of the study. An improved response rate is usually gained when a response to a questionnaire is solicited (Creative Research Systems. n.d.).

Step 4 involved formulating the questionnaire. The questionnaire format included the basic types of questions: close-format, limited-choice, numeric open and open-format questions.

The questionnaire was peer evaluated in Step 5 by two staff members in the Department of Speech-Language and Hearing Therapy, Stellenbosch University. They provided feedback about the sequencing of the questions and format of the questionnaire. Editing changes were subsequently made to reach the final six page questionnaire consisting of 15 items (see Appendix D).

3.5.2.2 Structure of the questionnaire:

The questionnaire consisted of 15 questions.

Questions 1, 2, 3 and 13 were numeric open questions.

Questions 4, 5, 9, 10, 11, 12 and 6, 7, 8 (first part) were close-format questions.

Questions 6, 7, 8 (second part) were limited choice questions.

Questions 14 and 15 were open-format questions.

Section A

This section consisted of 3 questions (1-3) which provided information about the age and the current grade of the learner.

Section B

This section consisted of 7 questions. Questions 4-8 provided information relating to the main aim of the study, i.e., factors 9-15 that could influence grade 1 school placement and the type of school the learner attended. It also collected information about 'other' factors (i.e. any additional factors not listed on the questionnaire) that influenced the school placement decision.

The latter part of section B, questions 9 and 10 collected information relating to sub-aim 1, parental satisfaction of grade 1 school placement. This was deemed a relevant inclusion in the questionnaire due to the important role fulfilled by the parents/caregivers in selecting a mode of communication, education placement and habilitation options for their child with a cochlear implant (Yuelin et al., 2003).

Section C

Section C collected information about any change and reasons for the change in school placement subsequent to grade 1. This was included since change in placement towards mainstream placement (Tobey et al., 2004) is reported as more experience with the cochlear implant is gained (Geers & Brenner, 2003a). Constant change in the educational needs of a learner with a hearing impairment is also reported (Goldberg et al., 1989) which necessitates flexibility in the school placement (Schopmeyer, 2000).

The section consisted of 5 questions. Questions 11-14 provided information on sub-aims 2 and 3, i.e., changes in school placement subsequent to grade 1 and the reason for the changes. Question 15 allowed the respondent an opportunity to provide any additional information relating to the topic of grade 1 school placement. Providing the respondents an opportunity to include other information can yield data that is critical but not thought of by the researcher (Creative Research Systems. n.d.).

3.5.2.3 *The content of the questionnaire:*

The discussion below outlines the rationale for including factors 9 to 15 as possible determinants of school placement for learners with cochlear implants (see Section B of the questionnaire).

3.5.2.3.1 *Parental preference of school placement.*

Parents have the right to assert reasonable preference in the educational placement of their child (Tobey et al., 2004) since school placement is a major decision for the parent/caregiver with a child with a cochlear implant (Archbold, 2000). Literature has identified the importance of parental preference or choice regarding school placement for learners with cochlear implants (Archbold & Robinson, 1997; Archbold et al., 2002; Francis et al., 1999; Tobey et al., 2004; Yuelin et al., 2003).

3.5.2.3.2 *Educational recommendations by professionals.*

The professionals (i.e. both the educators and the cochlear implant team) fulfil an important role in the management of a learner with a cochlear implant (Archbold, 2000; Archbold & Robinson, 1997; Damen et al., 2006; McConkey Robbins, 2000;

Nevins & Chute, 1995). They are often called upon to make recommendations to parents regarding the educational placement for the child with a hearing impairment (Geers & Moog, 1987).

Tobey et al. (2004) noted that decisions regarding classroom placement are usually made based on a combination of factors such as parental preference and the recommendations of teachers.

3.5.2.3.3 *Geographic site or proximity of school.*

Schools for learners with hearing impairment were often residential and involved travelling away from home (Archbold, 2000). Geographic availability often also determined communication mode in the early years for learners with cochlear implants in a study by Tobey et al. (2004). This highlights that proximity of a school could play a role in the selection of an educational setting.

3.5.2.3.4 *Availability of the school.*

Selection of school placement can be influenced by the educational placement options that are available to the learner (Archbold & Robinson, 1997; Archbold, 2000; Francis et al., 1999; Tobey et al., 2004).

3.5.2.3.5 *Mode of communication employed at the school.*

The mode of communication a learner with a cochlear implant uses help in determining school placement (Selmi, 1985). Educators in special education are aware of the importance of oral communication in the process of teaching and learning (Okeke, 2003 as cited in Ademokoya, 2008). Placement in a mainstream school setting dictates the use of oral communication which could preclude learners utilising total communication or sign language.

3.5.2.3.6 *School accommodated learners with special needs.*

The availability of support services at school is a concern for parents of learners with disabilities (Garrick Duhaney & Salend, 2000). This was included as a factor since

appropriate support services are essential feature of appropriate school placement for a learner with a cochlear implant (Nevins & Chute, 1995; Niparko & Blankenhorn, 2003).

3.5.2.3.7 *Cost implications.*

This was included as the cost of cochlear implantation is high for the parents of learners with hearing impairment (Easterbrooks & Mordica, 2000).

3.6 ETHICAL CONSIDERATIONS

Ethical practice in research is important as it assures the rights and privacy of all participants (Denzin & Lincoln, 2000). Prior to the commencement of the study, the researcher obtained ethical approval from the Stellenbosch University Committee for Human Research (see Appendix E). Permission was sought and verbally obtained from the Medical Superintendent of Tygerberg Hospital (Dr. A. Muller) and the co-ordinator of the implant unit (Mrs. A.M. Müller) to conduct the record review component of the study at the TBH-USCIU (see permission letters Appendix F & G).

Informed consent is very important as every individual has the right to be informed about the nature and purpose of research (Denzin & Lincoln, 2000). Written consent was obtained from the parents/caregivers, who completed and returned the questionnaire. Telephonic contact was made with 95% of the parents/caregivers of the learners who complied with the criteria of the study. During the telephone conversation, the researcher explained the nature and purpose of the study. The questionnaire and accompanying participation information leaflet and consent form was sent to each parent/caregiver who gave verbal consent to participate in the study. The leaflet outlined the aim of the study and the voluntary nature of participation (see Appendix H).

3.7 DATA COLLECTION PROCEDURE

The data collection was conducted in two phases. Figure 3.1 is a graphic representation of the two phase data collection process employed in the present study.

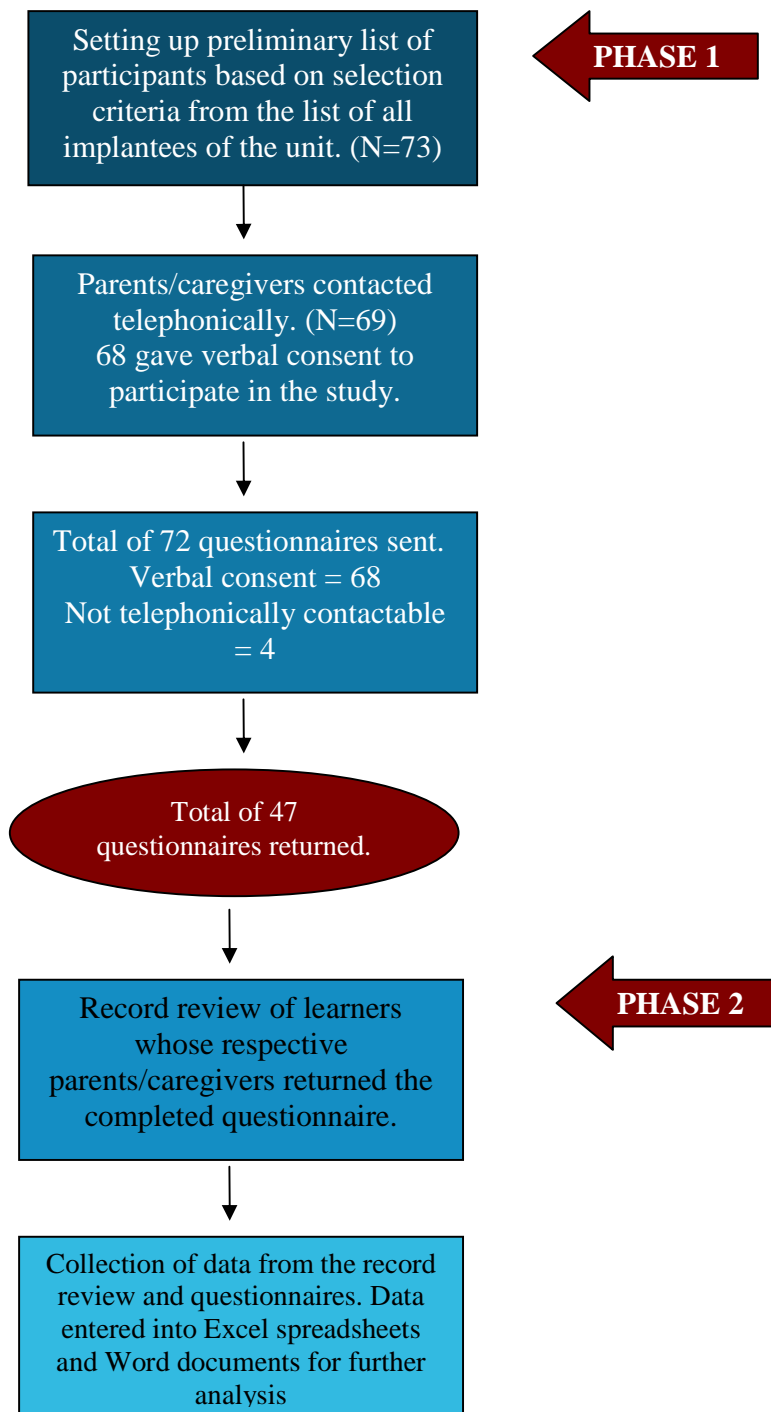


Figure 3.1: Flow diagram of the phases of data collection.

During phase 1 the preliminary list of 73 learners who met the criteria was sourced from the list of all the unit’s implantees. The researcher made telephonic contact with 69

parents/caregivers of these learners. Sixty-eight parents/caregivers verbally agreed to partake in the study. Depending on their preference, questionnaires were sent via post, electronic mail or facsimile to these 68 parents/caregivers. A total of 72 questionnaires were sent as questionnaires were also posted to the 4 parents/caregivers who could not be reached telephonically.

Phase 2 involved reviewing the records of the respective learners upon receipt of the completed questionnaire from their parents/caregivers. The record review involved collecting information regarding the identified 8 factors and other relevant background information as outlined in table I in appendix A. The data collected from the record review and questionnaires was entered into Excel spreadsheets and Word documents for further analysis

3.8 DATA ANALYSIS

3.8.1 Quantitative data

Descriptive statistics were used for the results of factors 1-15 and sub-aims 1 and 2 in the present study. The descriptive statistics included: frequency counts, percentages and the mean. Mean ages in months, were calculated for age at implantation, duration of hearing impairment before implantation and duration of implant use at the start of grade 1 (see Appendix I-Table II for the data used for quantitative analysis).

Comparisons of data from learners from mainstream schools and special schools were made for each factor.

3.8.2. Qualitative data

3.8.2.1 *Transcription of the collected data:*

The written responses to the open-ended questions (i.e. Section B: 'Other' option of question 8 and Section C: Questions 14 & 15) in the questionnaire were transcribed before the data could be analysed. The responses were transcribed verbatim from each of the questionnaires for later thematic analysis. No data was excluded in the transcription

process as it can negatively influence the accuracy and validity of the research (Denzin & Lincoln, 2000).

3.8.2.2 Inductive or thematic analysis:

The process of inductive or thematic analysis of the data is graphically represented in Figure 3.2

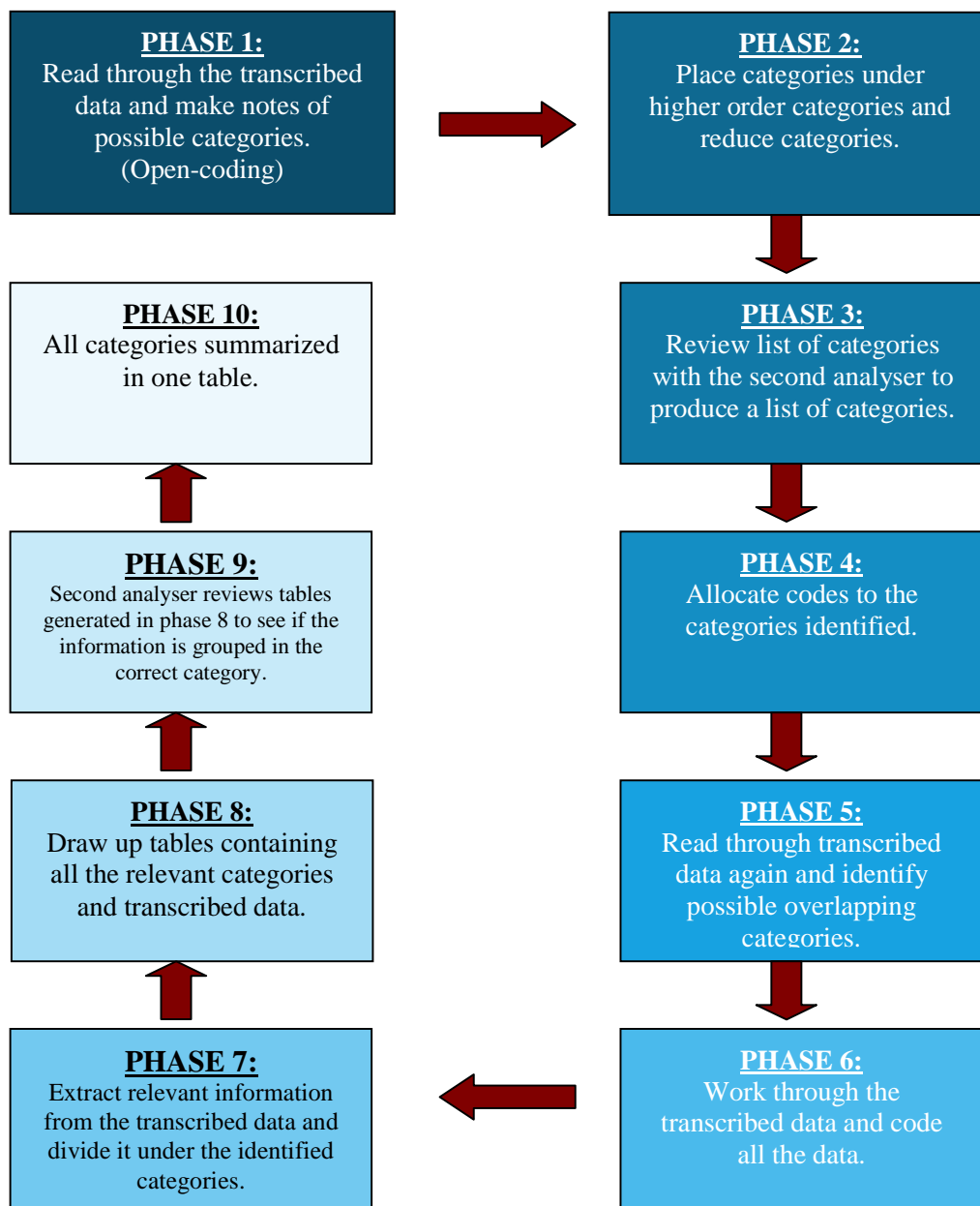


Figure 3.2: Flow diagram of the phases of inductive or thematic analysis.

The qualitative analysis process involved reducing the volume of the raw data to identify meaningful information and patterns and to set up a framework to reveal the core issues the data holds (Patton, 2002). The phases of analysis were based on the stages of analysis of Burnard (1991). A discussion of the phases of analysis follows.

Phase 1 involved reading through the raw data (i.e. the transcribed responses), while making notes of possible categories also known as open-coding. Open-coding is an early part of qualitative analysis and starts with examining each line of the data in order to name actions or events in the data (Strauss & Corbin, 1998). The categories at this phase of analysis were tentative and could still change in the subsequent phases (Boychuk Duchscher & Morgan, 2004).

Phase 2 of the analysis involved grouping the categories generated in Phase 1 to form related categories (Burnard, 1991). This re-organisation of the categories was to form a more representative view of the data (Boychuk Duchscher & Morgan, 2004) and transform it “into more precise descriptive terms” (Doehring, 2002, p. 177).

In phase 3, a second analyser reviewed the list of categories. The use of the second analyser was to ensure the reliability and validity of the results and to eliminate possible preconceptions of the researcher (Burnard, 1991; Patton, 2002).

Codes were allocated to the identified categories in phase 4. Coding of qualitative information provided a framework to organize and described the collected data (Patton, 2002).

Phase 5 involved re-reading the transcribed responses and coding each response using the codes generated in phase 4. The coded responses were then grouped under the relevant categories in phase 6.

Phase 7 and 8 consisted of drawing up tables containing excerpts from the transcribed responses relevant to each category and placing it under the appropriate category. Sub-categories were then created within each category where required.

In phase 9 the second analyser reviewed the tables generated in phase 8 to verify the categories and sub-categories set up by the researcher. This verification process by the second analyser was utilized to allow other important insight to emerge and is known as analytical triangulation (Patton, 2002). Analytical triangulation between the researcher and the second analyser contributes to possible different perspectives in the interpretation of the transcribed data.

Phase 10 saw the categories and sub-categories being placed into summative tables to allow direct referencing to the transcribed responses during the formulation of the results and discussion of the present study.

The analysis also revealed responses that related to factors 1 to 15 included in the study. Relevant excerpts from the responses were included in the discussion of the fifteen factors included in the main aim of the study.

3.9 RELIABILITY AND VALIDITY CONSIDERATIONS

The mixed-method techniques used in the present study afforded “complementarity” to the analysis of the data (Green, Caracelli & Graham, 1989 as cited in Sandelowski, 2000). Use of both qualitative and quantitative analysis of the same aspects allowed the researcher to clarify and elaborate the results, which contribute to the reliability and validity of the findings.

Another means of establishing validity in the present study was the peer evaluation of the questionnaire by two staff members from the Division of Speech-Language and Hearing Therapy, Stellenbosch University. Their feedback was used to verify that the questionnaire measured what it aimed to measure providing content validity for the questionnaire.

The verification or analytical triangulation (Patton, 2002) of information by the second analyser during the thematic analysis also aimed to establish reliability and validity in the present study.

Observing parental satisfaction of grade 1 school placement was initially included as a sub-aim of the present study. Face validity of the measure of this aspect was compromised as close format questions were used in the questionnaire (i.e. questions 9 and 10 in section B). The construct of perceived satisfaction lends itself to a self-report activity, which can be included in a questionnaire (Hegde, 2003) but would require an open ended question format. The use of open-ended questions would have enabled the researcher to “understand and capture the points of view” of the respondents with regard to the aspect of their satisfaction of grade 1 school placement (Patton, 2002, p. 21). It would have allowed the respondents an opportunity to provide details and reasons for the information they provided and not merely generated agreement or disagreement with statements (Brink, 2000). Due to the compromised face validity of the measure, the data pertaining to this sub-aim was subsequently excluded from the results and discussion chapter of the present study.

4. RESULTS AND DISCUSSION

The results will be presented and discussed according to the aims and sub-aims of the study. Factors 1 to 8, collected via the retrospective record review will be presented first. This is followed by factors 9-16 collected via the questionnaire. Next the change in school placement subsequent to grade 1 and the reasons for the change are outlined. Lastly, the findings of the inductive or thematic analysis of the respondents' additional comments regarding the grade 1 school placement decision process are presented.

The results of the study are based on 47 participants, who complied with the selection criteria and whose parents returned the questionnaire. The 47 returned questionnaires reflect a response rate of 65%, which is well above the acceptable level of 30% (Bailey, 1997). Results for each factor are presented in terms of learners' school placement, i.e., mainstream vs. special school. The mainstream group consisted of 26 learners and the special group of 20 learners. One subject, L4, was the only learner who was home schooled for grade 1 and is discussed individually as item III on page 74 (in the discussion of table 4.7). The results and discussion of factors 1 to 15 are therefore based on the data of 46 learners.

4.1 FACTORS INFLUENCING GRADE 1 SCHOOL PLACEMENT

4.1.1 Age at implantation

The first factor observed was the age at which the learners obtained their cochlear implants. The results of the present study seemed to agree with past research, which has emphasized the benefits of early implantation (Boothroyd & Boothroyd-Turner, 2002; Kirk, 2000; Manrique et al., 2004a; Stark, 1991; Uziel et al., 2007) and its role in mainstream school placement (Archbold et al., 1998; Archbold et al., 2002; Govaerts et al., 2002; Summerfield, 1997).

Table 4.1 illustrates the average ages at which cochlear implantation occurred for the mainstream and special school learners.

Table 4.1: Average age at implantation.

Overall average age at implantation = 38 months (3 years 2 months)	
Mainstream learners (26)	Special school learners (20)
32 months (2 years 8 months)	47 months (3 years 11 months)

The overall average age at implantation was 38 months. The average age at implantation of the mainstream learners was 32 months and 47 months for learners, who were placed in special schools. On average, the mainstream learners were implanted 15 months (1 year 3 months) earlier than the learners educated in special school placement. Similarly findings of local research conducted at another implant unit in South Africa, indicated that learners in the primary school group in mainstream school placement were implanted 14 months earlier than the learners in special school placement (Jessop et al., 2007).

These findings are similar to those of Archbold et al. (1998), who found that the age of implantation of the learners in the mainstream setting was significantly lower than those in the special school setting. The average age of implantation was higher in the Archbold et al. (1998) study than in the present study for learners in both the mainstream (49 months) and special school setting (72 months).

The age effect of implantation suggests that a better performance outcome and more benefit may be obtained with earlier implantation (Boothroyd & Boothroyd-Turner, 2002; Manrique et al, 2004a; Stark, 1991). In the present study earlier cochlear implantation appeared to be associated with the placing of learners in a mainstream school setting. These findings reflect the goal of early implantation, which is “to allow the child to be placed in an inclusive education setting” (Jessop et al., 2007, p. 53).

Table 4.2: Age range of implantation.

Mainstream learners (26)	Special school learners (20)
Earliest: 7 months	Earliest: 32 months (2 years 8 months)
Latest: 60 months (5 years)	Latest: 65 months (5 years 5 months)

As seen in table 4.2 above and table II in Appendix I, the earliest implantation in the mainstream group (L31) was at 7 months, while the special school group's earliest implantation (L6 & L41) occurred at 32 months. Thus the earliest implantation in the special school group occurred 25 months later than the first implant in the mainstream group. This difference also reflects the effect of age of implantation on mainstream school placement (Archbold et al., 1998). In contrast a mere 5 month difference existed between the latest implantation in the mainstream group (L43) and special school group (L1). Although, research recognizes the age effect of cochlear implantation on school placement, this small difference in age of implantation between L1 and L43 could be reflective of the heterogeneous nature of the performance of children with cochlear implants (Fryauf-Bertschy et al., 1997; Goldberg et al., 1989; Isaacson et al., 1996; Young & Killen, 2002) and of the fact that "the benefits of cochlear implantation vary tremendously across individuals" (Kirk, 2000, p. 225). It is clear that factors other than the age of implantation may be important in the educational placement of these two specific learners. Although the age of implantation is a significant factor in the determination of educational placement (Archbold et al., 1998), it is not the only factor that should be considered.

Figure 4.1 is a graphic representation of the percentage of learners within each school setting relative to the age at implantation.

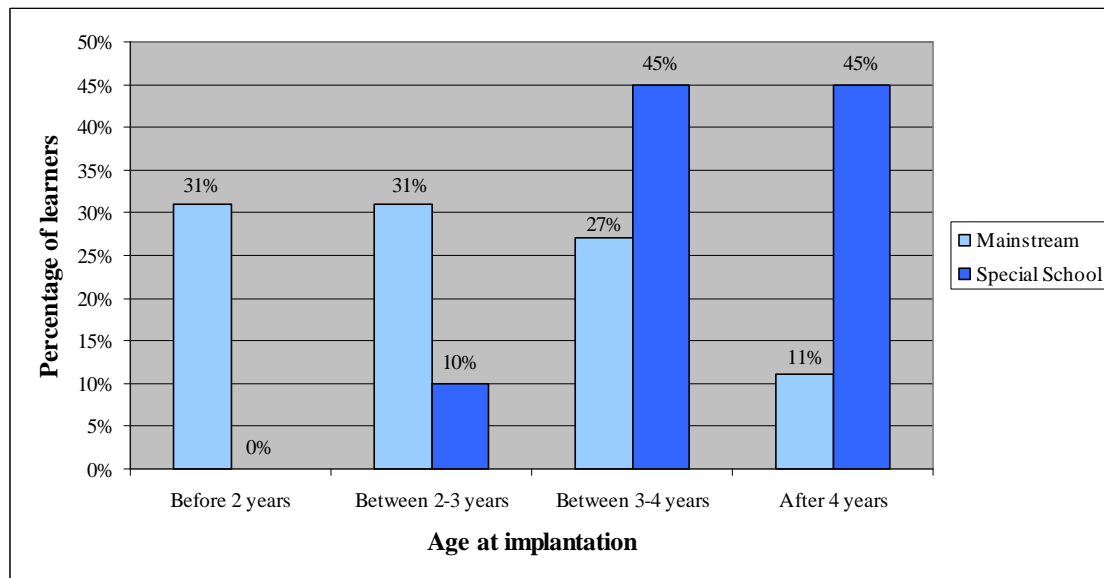


Figure 4.1: Percentage of learners within each school setting relative to the age at implantation.

Figure 4.1 shows that the mainstream learners overwhelmingly were implanted at an earlier age, 89% (31% *before 2 years* + 31% *between 2-3 years* + 27% *between 3-4 years*) before the age of 4 years. Among the special school learners almost half (45%) were implanted after 4 years of age. Similarly, Govaerts et al. (2002) found that the probability for integration into the mainstream was greater when the implantation occurred between the ages of 2 and 4 years. Implantation beyond the age of 4 years seldom resulted in the learner being integrated into the mainstream school environment (Govaerts et al., 2002). As seen in figure 4.1, only 11% of the mainstream group as opposed to 45% of the special school group was implanted after 4 years of age, which supports the core finding by Govaerts et al. (2002) that integration into the mainstream school setting decreased as the age of implantation increased.

Reference has also been made to a critical period for implantation consistent with the sensitive period for language development (Geers, 2004; Svirsky, Teoh & Neuburger, 2004). Researchers have attempted to define the age limits at which the implant should be provided to allow for the greatest benefit (Geers, 2004; Manrique et al., 2004a). This period appears to span a wide age range covering the first 6 years of life (Geers, 2004;

Govaerts et al., 2002; Manrique et al., 2004a). As can be seen from the results in figure 4.1, the implantations of all the participants in the present study fell within this “critical period” irrespective of their school placement.

Figure 4.1 also shows that 31% of the mainstream learners were implanted within the ‘optimal period’ (i.e. before 2 years of age) for cochlear implantation as identified by Govaerts et al. (2002). Other researchers have placed similar emphasis on the benefit gained from cochlear implantation before the age of 2 years (Manrique et al., 2004b; Osberger et al., 2002; Svirsky et al., 2004). Early implantation is preferable in the paediatric population, as processing of speech in a linguistically meaningful way already occurs during the first year of life (Owens, 2008). Early implantation allows beneficial use of “the window of opportunity for language learning that begins to narrow after 2 years of age” (Gates & Miyamoto, 2003, p. 421). The importance of this ‘optimal period’ is further endorsed by the finding in the present study that none of the learners in the special school group were implanted before the age of 2 years.

Implantation at an early age minimizes the effect of auditory deprivation on the development of the auditory system. It is a strong predictor of long term speech perception and language development (Hassanzadeh et al, 2002). Earlier implantation in the present study could have afforded the mainstream learners greater benefit in aspects, such as auditory abilities, speech perception (Hassanzadeh et al., 2002; Waltzman et al., 1994; Zwolan et al., 2004) speech performance and language (Boothroyd & Boothroyd-Turner, 2002; Francis et al., 1999; Geers et al., 2003c; Geers 2004), which could have facilitated their grade 1 mainstream school placement.

An equal percentage of mainstream learners (31%) were implanted before the age of 2 and between 2 and 3 years, respectively. If mainstream school placement is viewed as the outcome measure, then this result does not seem to indicate that greater benefit are gained from implantation before the age of two years in comparison to implantation between the age of 2 and 3 years (Osberger et al., 2002).

Studies have outlined a wide age range for beneficial cochlear implantation, from before the age of 2 years (Manrique, Cervera-Paz, Huarte & Molina, 2004b; Osberger, 2001 as cited in Niparko & Blankenhorn, 2003; Svirsky et al., 2004; Govaerts et al., 2002;) to before the age of 6 years (Govaerts et al., 2002). Most research, however, advocates implantation as early as possible, preferably before the age of 4 years (Govaerts et al., 2002). The findings of the present study reflect similar trends as 89% of the mainstream learners were implanted before the age of 4 years.

The results of the present study thus strongly suggest that the relative proportion of mainstream school placement appear to decrease as the age of implantation increases (Govaerts et al., 2002), thus reflecting the significance of the age effect of cochlear implantation as a major determinant of educational placement for learners with cochlear implants (Archbold et al., 1998).

4.1.2 Duration of hearing impairment before implantation

The duration of the hearing impairment was directly related to the age of implantation, as earlier implantation yielded a shorter duration of hearing impairment. Since the mainstream learners received their cochlear implants at a younger age they would logically be expected to have a shorter duration of hearing impairment relative to the learners in special school placement.

Table 4.3: Average duration of hearing impairment before implantation.

Overall average duration of hearing impairment = 37 months (3 years 1 month)	
Mainstream learners (26)	Special school learners (20)
31 months (2 years 7 months)	45 months (3 years 9 months)

Table 4.3 shows that the average duration of hearing impairment for the sample was 37 months. The average duration of hearing impairment of the mainstream learners, was 31 months, while it was 45 months for the special school learners. On average, the mainstream learners experienced a shorter period (i.e. 14 months) of hearing impairment relative to the special school learners. Similarly, a study at another implant programme in

South Africa, revealed that the learners in mainstream school placement were diagnosed earlier, which relates to a shorter duration of hearing impairment (Jessop et al., 2007)

The findings of the present study appear to lend support to the idea that a shorter duration of hearing impairment is advantageous in cochlear implantation (Dowell et al., 2002) if mainstream school placement is viewed as a preferred outcome. These results also highlight the principle that in cochlear implantation “the chief predictor of success is a short duration of hearing loss” (Gates & Miyamoto, 2003, p. 421).

Figure 4.2 is a graphic representation of the percentage of learners within each school setting relative to the duration of hearing impairment.

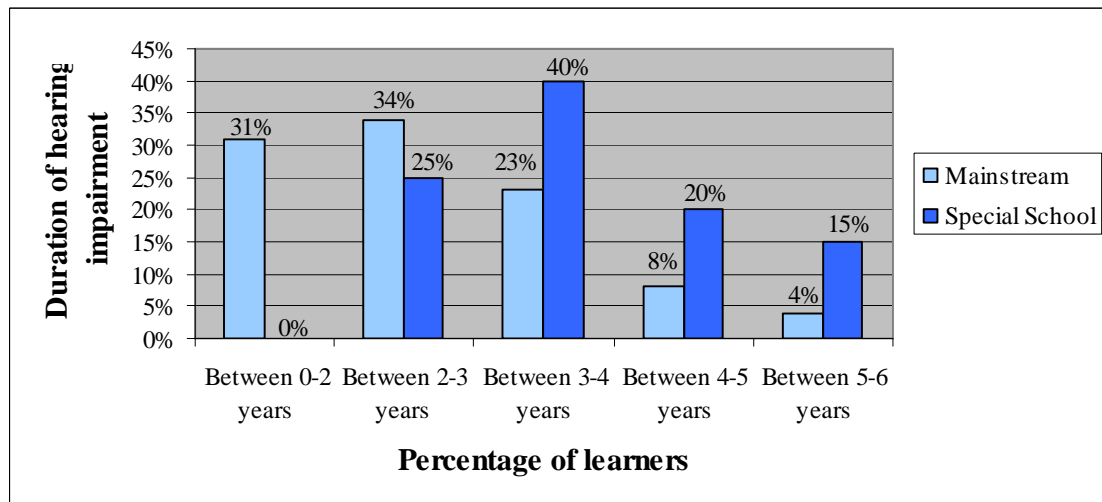


Figure 4.2: Percentage of learners within each school setting relative to the duration of hearing impairment.

Figure 4.2 illustrates the fact that a greater percentage of the mainstream learners had a shorter duration of hearing impairment, 88% (31% *between 0-2 years* + 34% *between 2-3 years* + 23% *between 3-4 years*) between 0-4 years, relative to 65% (0% *between 0-2 years* + 25% *between 2-3 years* + 40% *between 3-4 years*) of the special school learners. Duration of hearing impairment has been recognized as a significant variable contributing to the outcomes of children using cochlear implants (Isaacson et al., 1996). A shorter duration of hearing impairment has been related to improved outcomes in aspects such as,

speech perception (Dowell et al., 2002; Gordon et al., 2000; Mitchell, Psarros, Pegg, Rennie & Gibson, 2000; Miyamoto et al., 1994; Staller et al., 1991) and classroom performance in the mainstream setting (Damen et al., 2006). The shorter duration of hearing impairment, which offers earlier access to the auditory input provided by the cochlear implant (Damen et al., 2006; Dettman et al., 2004) and allows linguistic skills to develop sooner (Dettman et al., 2004) could have benefited the mainstream learners. They had an earlier start to interpreting auditory signals, speech sound discrimination and the development of linguistic skills, which could have facilitated grade 1 mainstream school placement. The advantage of a shorter duration of hearing impairment is emphasized by Geers (2004, p. 638), “Normal speech and language is possible for many children who experience only a short period of auditory deprivation during the critical language learning years.”

4.1.3 Duration of cochlear implant use at the start of grade 1

The next factor observed, which was also directly related to the age of implantation, was the duration of implant use at the start of grade 1. Since on average the mainstream learners were implanted at a younger age they would also be expected to show longer implant use at the start of grade 1.

Table 4.4 shows the average duration of implant use at the start of grade 1 for the mainstream and special school learners.

Table 4.4: Average duration of implant use at the start of grade 1.

Average duration of implant use = 46 months (3 years 10 months)	
Mainstream learners (26)	Special school learners (20)
51 months (4 years 3 months)	41 months (3 years 5 months)

Table 4.4 shows that the overall average duration of implant use at the start of grade 1 was 46 months. The average duration of implant use for the mainstream learners was 51 months (4 years 3 months), while the average for the special school learners was 41 months (3 years 5 months). On average the mainstream learners had 10 months more

implant experience than the special school learners at the start of grade 1. Similarly other studies have shown that longer duration of implant use is associated with more frequent mainstream school placement for learners with cochlear implants (Francis et al., 1999; Geers & Brenner, 2003a; Niparko et al., 2000). In other words, the duration of implant use is related to the age effect of cochlear implantation which is considered to be a significant factor in determining educational placement (Archbold et al., 1998).

As mentioned previously, earlier implantation relates to a longer duration of implant use within the ‘optimal period’ to gain benefit from the cochlear implant. This allows an earlier opportunity for the development of skills such as speech perception (Dowell et al., 2002; Miyamoto et al., 1994) and language growth. The mainstream learners were afforded this opportunity for an average of 10 more months longer than the special school learners.

Table 4.5: Age range of duration of implant use.

Mainstream learners (26)	Special school learners (20)
Shortest: 26 months (2 years 2 months)	Shortest: 24 months (2 years)
Longest: 73 months (6 years 1 month)	Longest: 62 months (5 years 2 months)

As seen in table 4.5 above and in table II in Appendix I, the shortest duration of implant use in each of the groups differed by only 2 months, i.e., mainstream learner L3 had only 26 months’ experience and the special school learner L1 had 24 months’ experience. Mainstream learner 45 had 11 months more implant experience than L41 who had the longest duration of implant use in the special school group. Research recognizes the benefit of a shorter duration of hearing impairment with cochlear implantation. The mere 2 month difference between mainstream learner 3 and the special school learner L1, however, highlights the variability commonly found in research with children with cochlear implants (Young & Killen, 2002).

Figure 4.3 is a graphic representation of the percentage of learners within each school setting relative to the duration of implant use at the start of grade 1.

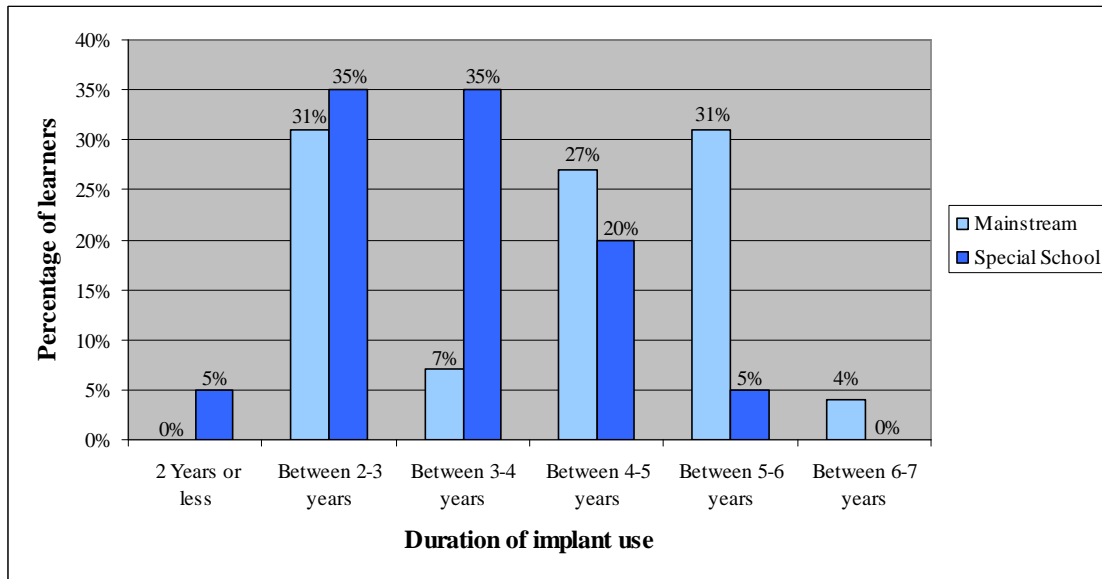


Figure 4.3: Comparison of the percentage of learners within each school setting relative to the duration of implant use at the start of the grade 1.

Visual inspection of Figure 4.3 suggests that the majority of the special school learners (70% = 35% *between 2-3 years* + 35% *between 3-4 years*), had only between 25 and 48 months of implant experience at the start of the grade 1 year. In contrast, the majority of mainstream learners (58% = 27% *between 4-5 years* + 31% *between 5-6 years*), had 49-72 months of implant experience upon entering grade 1. Figure 4.3 also shows that none of the mainstream learners had less than 2 years of implant experience. This is in contrast to the 30% in this category noted in a study conducted by Niparko (2000).

Stacey et al. (2006) found significant associations in auditory performance, communication skills, educational achievement and quality of life of learners with cochlear implants who had more than 4 years of implant use. Research has also suggested that learners with more than 4 years of experience with the cochlear implant are more likely to be mainstreamed (Francis et al., 1999). In the present study 62% of the mainstream learners had more than 4 years of implant experience, as opposed to only 25% of the special school learners.

4.1.4 Speech perception performance

The speech perception test battery utilized by the TBH-USCIU consists of test material in South African English as well as equivalent material in Afrikaans. As a means of providing a common measure of speech perception across languages, each test percentage was translated into 7 Speech Perception Categories. (See Appendix C for the speech perception categories). Based on their results, the learners were placed into one of the seven categories, which provided an overall perspective of their speech perception performance. The most recent speech perception scores prior to commencing grade 1 were used from the record review. Results were available for all but one of the special school learners (L6). Thus 45 speech perception scores were obtained from the record review.

As seen below in Figure 4.4, only 1 learner in the sample (2%) had speech perception scores in category five, which translates to minimal open-set speech perception. This learner (L1) in the special school group was implanted the latest and presented with the shortest duration of implant use in the sample. The remaining 44 learners' (98%) speech perception performance was placed in category seven (i.e. 51%-100% open-set speech recognition of words and sentences). All the mainstream and the remaining 18 special school learners' speech perception performance was at the category 7 level.

Figure 4.4 is a graphic representation of the percentage of learners within each school setting and their speech perception performance.

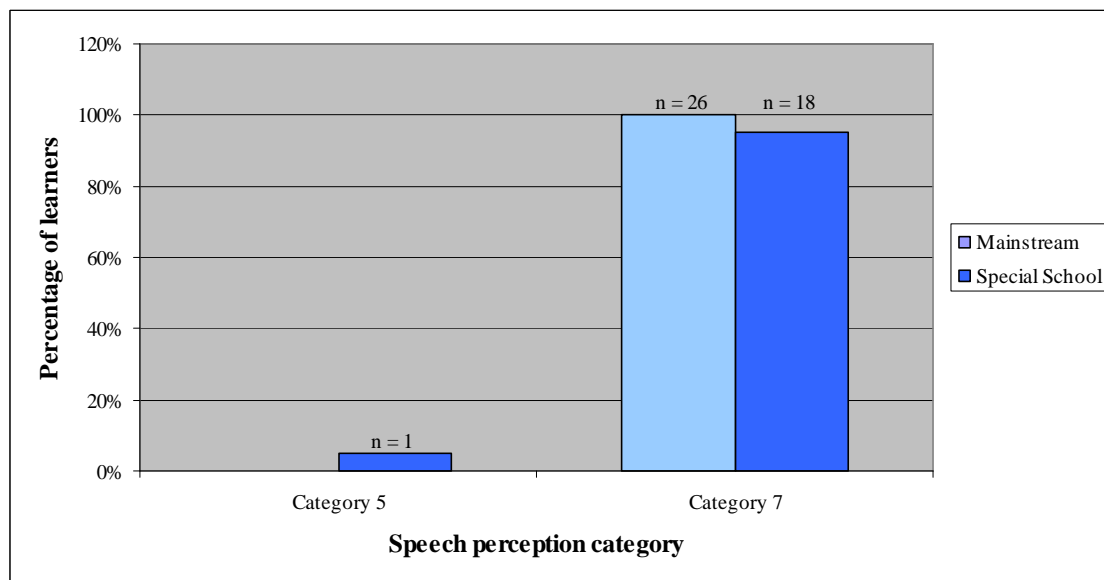


Figure 4.4: Comparison of the percentage of learners within each school setting and speech perception performance.

Speech perception has been reported to influence (Pyman et al., 2000) or predict (Archbold et al., 2002) the educational placement for learners with cochlear implants. Higher levels of speech perception has been observed among learners who remained in or moved to mainstream educational settings (Daya et al., 2000) or to an integrated or oral educational setting (Dowell, et al., 1995). In the present study almost all the learners (98%) presented with speech perception performance in the highest category (i.e. category seven).

Age at implantation is one of the most important factors in speech perception of children with cochlear implants (Hassanzadeh et al., 2002) with earlier implantation facilitating better speech perception skills (Hassanzadeh et al., 2002; Müller & Wagenfeld, 2002; Zwolan et al., 2004; Spencer et al., 2004). A positive association is reported between the duration of implant use and speech perception (Kirk, 2000). As indicated above, 98% of the learners in the present study, both mainstream and special school, showed similar high speech perception performance even though the mainstream learners on average were implanted earlier and thereby experienced a longer duration of implant use. Speech performance did not seem to be a significant indicator for school placement in the present

study. This could be related to the nature of the speech perception categories utilized during the assessment process. Although the majority of the learners' performance was at the highest category (i.e. category 7), this category covers a wide range of performance (i.e. 51%-100%, open-set speech recognition of words and sentences). The relative 'crudeness' of the measure may have masked possible differences in the performances of the groups. Although speech perception is the most direct method of documenting benefit from a cochlear implant (Kirk, 2000; Tyler, 1993) it is noted as inadequate when used alone (Tyler, 1993). Testing was also conducted in a clinical setting which does not "necessarily reflect conversational competency in a natural setting" (Mukari et al., 2007, p. 238). Kirk (2000) pointed out that open-set speech perception assessment may simulate natural listening conditions, but it does not estimate performance in daily living.

For the learner with a hearing impairment, poor speech perception is predictive of educational placement in which oral communication is less likely to develop such as special school placement (Geers & Moog, 1987). The speech performance of L1, with minimal open-set speech perception, in the special school group may be reflective of this principle.

4.1.5 Mode of communication

Forty-three learners (94%) in the sample utilized an oral mode of communication. Similarly, the majority of the children in the study by Jessop et al. (2007) also employed an oral mode of communication. This group was composed of all 26 mainstream learners and 17 (85%) of the special school learners. Two (4%) of the remaining 3 special school learners employed total communication and 1 (2%) used sign language.

Figure 4.5 is a graphic representation of the primary mode of communication of learners within each school setting.

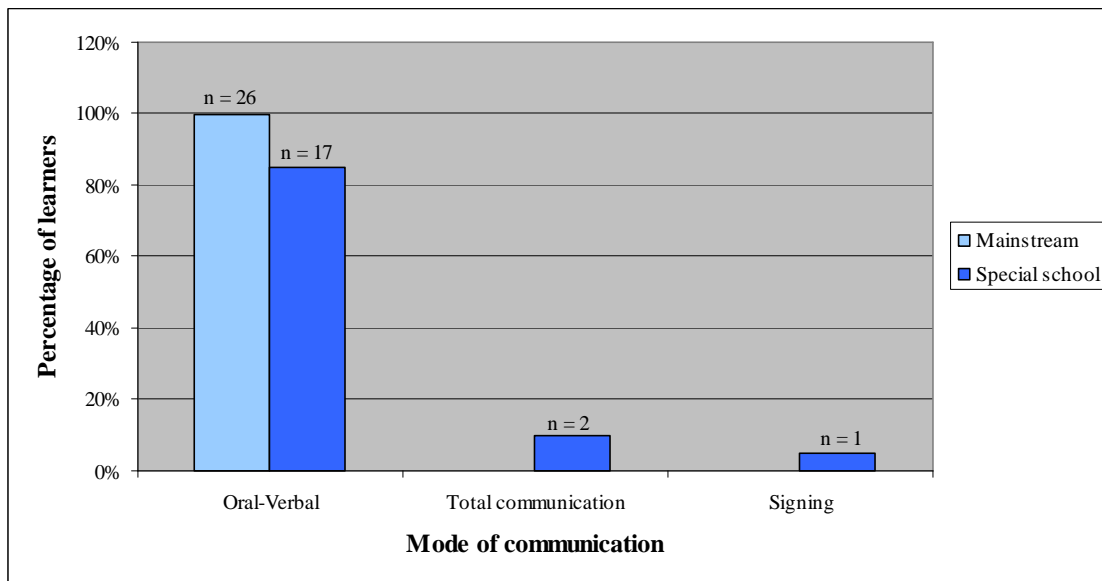


Figure 4.5: Comparison of the percentage of learners within each school setting and their primary mode of communication.

Mode of communication aids in predicting post implant gains (Isaacson et al., 1996) and is also an important determinant of school placement for a learner with a cochlear implant (Selmi, 1985). Even though the majority of the sample employed oral communication, 26 (57%) of the learners were placed in a mainstream school setting and 20 (43%) of the learners were educated in a special school setting for grade 1. Although an oral approach relates to a focus on auditory skills and speech production abilities (Moog & Geers, 1991), merely knowing the approach employed by the child does not provide detail regarding his/her level of proficiency within that approach. The earlier implantation, and hence the longer duration of implant use by the mainstream learners, could have resulted in an improved level of oral communication skills, which facilitated mainstream school placement.

4.1.6 Bilateral cochlear implants

Figure 4.6 is a graphic representation of the percentage of learners within each school setting with bilateral cochlear implants.

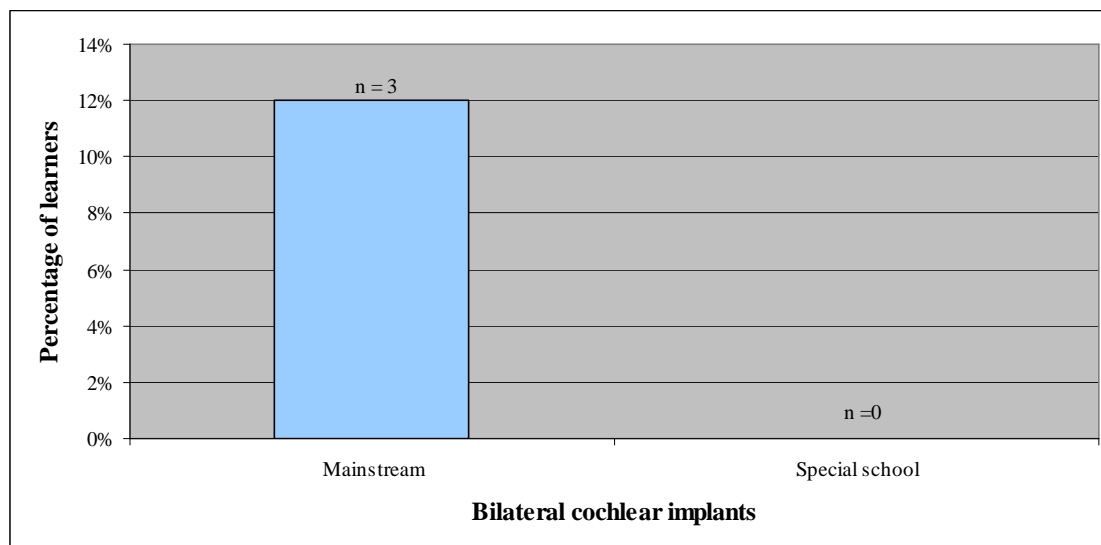


Figure 4.6: Percentage of learners within each school setting with bilateral cochlear implants.

Overall 3 of the 46 (7%) learners in the sample were bilaterally implanted. These 3 learners made up (12%) of the mainstream group.

In a study by Verhaert et al. (2008) all the subjects with bilateral cochlear implants (with or without additional disabilities) attended mainstream schools. Similarly, in the present study, the 3 bilaterally implanted learners were mainstreamed with L27 in this group being the only one with an additional disability.

4.1.7 Learners with additional disabilities

Overall 23 of the 46 (50%) learners in the sample had additional disabilities. Additional disabilities are relatively common amongst children with profound hearing impairment (Dowel et al., 1997). Researchers have documented varied accounts of the frequency of additional disabilities with profound hearing impairment; 15% (Daneshi & Hassanzadeh, 2007), between 15% and 20% (Dowell et al., 1997), 40% (Sullivan & Perigoe, 2004) and 41% (McCracken & Bamford, 1995 as cited in Dettman et al., 2004). Findings of the present study correspond closely to the latter two studies.

Table 4.6: Number of learners with additional disabilities.

Total number of learners with additional disabilities = 23 (50%)	
Mainstream learners (26)	Special school learners (20)
N = 13 (50%)	N = 10 (50%)

Table 4.6 shows that the mainstream group had 13 learners and the special school group had 10 learners with additional disabilities. The incidence of additional disabilities was similar in the two groups.

Figure 4.7 is a graphic representation of the types and percentage of learners with disabilities within each school setting.

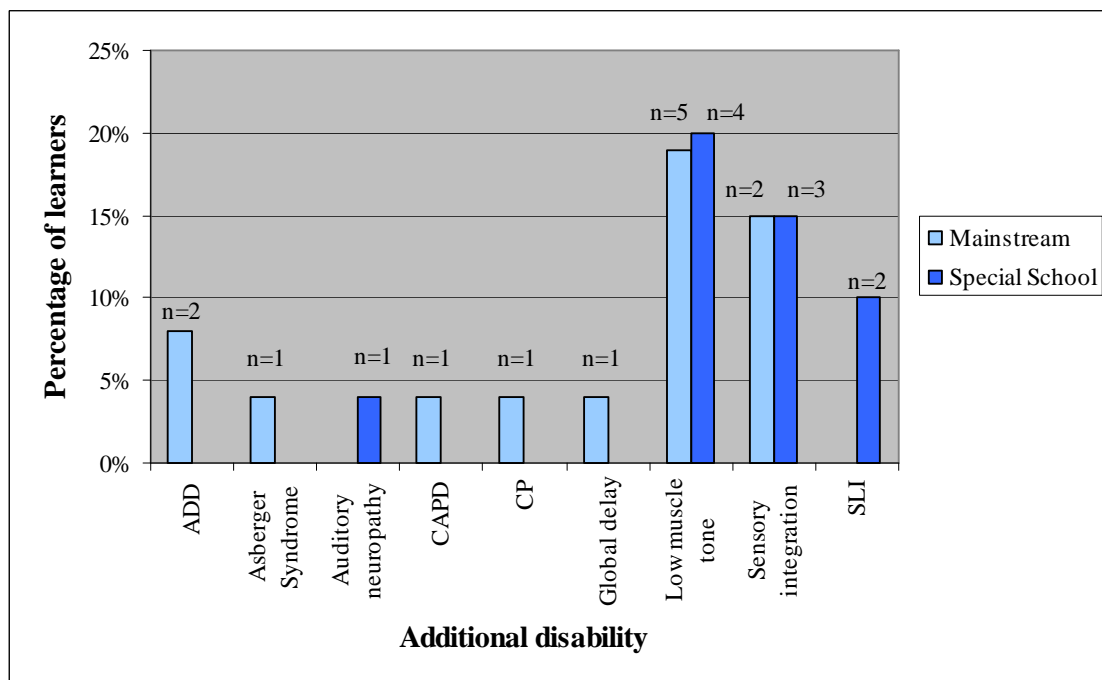


Figure 4.7: Comparison of the percentage of learners within each school setting according to additional disabilities.

Figure 4.7 indicates that the mainstream learners exhibited a wide range of disorders: 2 (8%) had Attention Deficit Disorder (ADD) and one learner each with Asberger Syndrome (Pervasive Developmental Disorder Spectrum), Central Auditory Processing

Disorder (CAPD), Cerebral palsy (CP) and Global Developmental Delay. The special school group had no learners with the aforementioned five additional disabilities. Autism and cerebral palsy are considered definite contra-indications to cochlear implantation (Lesinki et al., 1995).

One learner in the special school group had a diagnosis of auditory neuropathy. Five learners in the mainstream group and 4 learners in the special school group had low muscle tone. These learners constituted 19% of the mainstream group and 20% of the special school group. The mainstream group also had 2 learners with sensory integration problems, while the special school group had 3. None of the learners in the mainstream group showed specific language impairment (SLI), while the special school group had 2 learners with this diagnosis.

Additional disabilities often place severe limitations on the learning potential for a learner with a hearing impairment (Lesinki et al., 1995). Children with cochlear implants with additional disabilities reported to have poorer outcomes (Stacey et al., 2006). They show different progress in terms of their auditory and speech skills (Lesinki et al., 1995), poorer speech perception skills (Dettman et al., 2004; Isaacson et al., 1996) and an overall slower rate of benefit (Pyman et al., 2000; Stacey et al., 2006; Waltzman et al., 2000). The 10 learners in the special school group provide support to the possible limitations related to additional disabilities (i.e. special school placement required due to the possible negative effect of the additional disability on learning potential).

A recent longitudinal study by Uziel et al. (2007) reported that demonstrable benefit can be obtained from implanted children with additional disabilities. Lesinki et al. (1995) proposed that hearing impairment is more remediable through cochlear implantation in the multi-handicapped population with the use of appropriate evaluation and intensive training. The results of the present study also highlight the possible benefit of implantation in this population as 13 learners in this group were placed in mainstream school settings.

4.1.8 Preschool attended

Figure 4.8 is a graphic representation of the preschool attended by the learners.

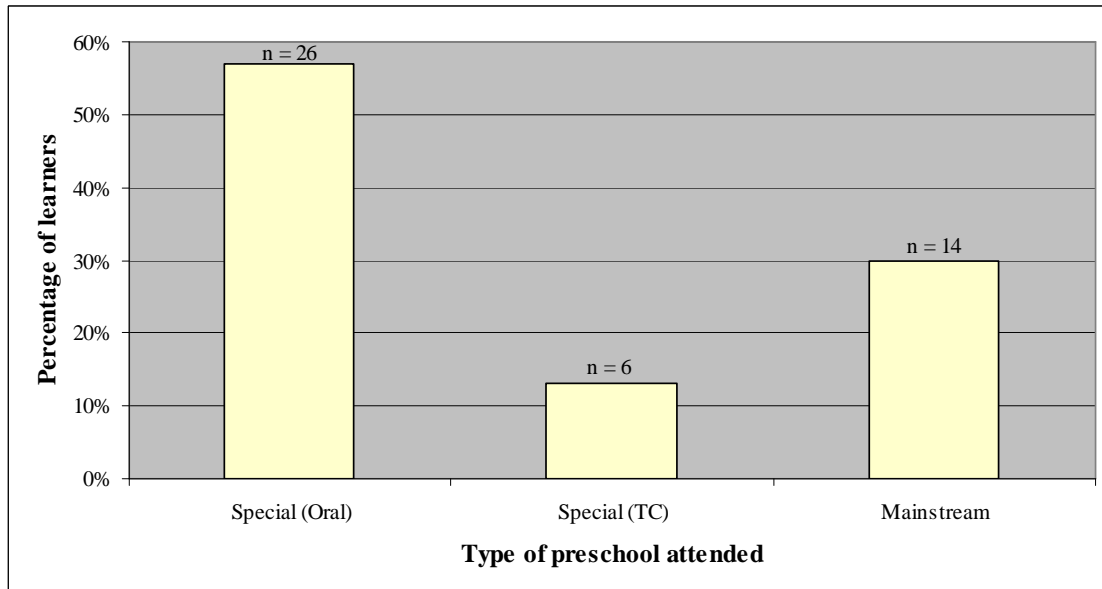


Figure 4.8: Type of preschool attended.

Overall this finding reflects the varied settings in which children with cochlear implants can be educated (Christiansen & Leigh, 2004). The majority of the learners (26 or 57%) in the sample had attended a special oral preschool. Six learners (13%) had attended a special total-communication preschool. While 14 (30%) attended a mainstream preschool. This result is consistent with the findings that learners with cochlear implants are traditionally educated in the special school settings (Archbold, 2000).

All the learners who attended a special oral preschool attended the Carel du Toit pre-primary school for hearing impaired children. The fact that a high percentage (57%) of the sample attended this preschool could be related to the close proximity and relationship in the rehabilitation process of the children implanted at the TBH-USCIU with the Carel du Toit pre-primary school.

Figure 4.9 is a graphic representation of the preschool attended by the learners within each school setting.

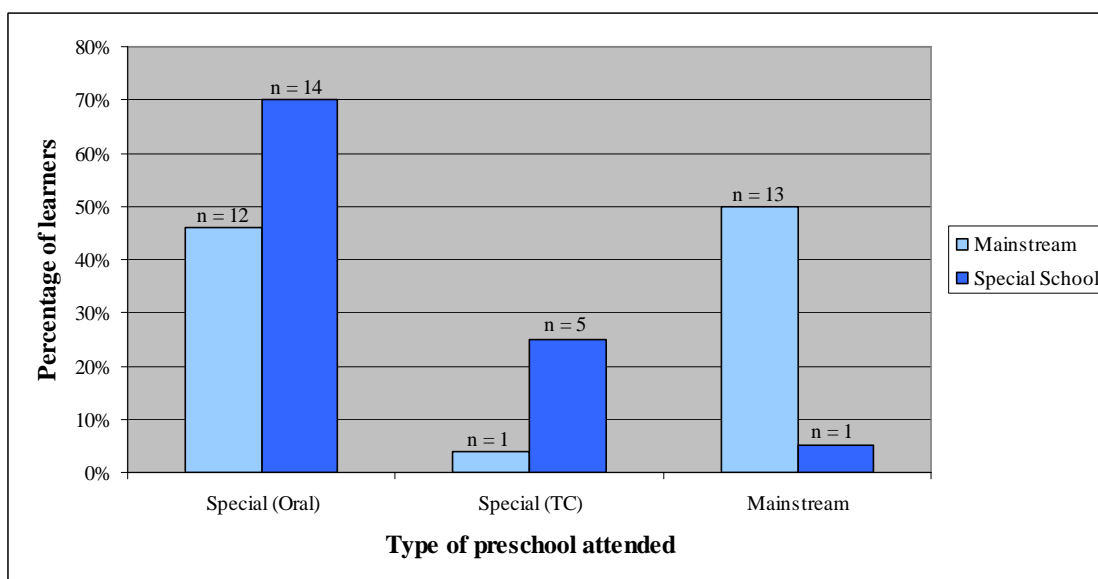


Figure 4.9: The percentage of learners within each school setting and the preschool attended.

It can be seen from figure 4.9 that twelve (46%) of the mainstream learners and fourteen (70%) of the special school group had attended a special oral preschool. One mainstream learner (L45) and five learners (25%) of the special school group had attended a special total-communication preschool. One (5%) of the special school learners (L17) had attended a mainstream preschool as apposed to thirteen (50%) of the mainstream learners. Aspects such as improved speech and language skills related to the earlier implantation of the mainstream learners could have allowed this early integration into mainstream education.

As shown in figure 4.8, 26 learners attended a special oral preschool. Twelve of the learners were placed in a mainstream setting for grade 1, while the remaining 14 learners were placed in special schools. Although the preschool followed an oral approach, which focuses on listening and spoken language (Moog & Geers, 2003), the experience did not translate into mainstream grade 1 placement for all the learners. Once again the influence of the earlier implantation and the relative effect on the speech and language skills of the mainstream learners might have had more influence on their grade 1 placement than their

preschool placement. Even though there are recognized benefits of mainstream placement for learners with cochlear implants it may not be suited for every child (Reeves, 2003). The 12 learners who were mainstreamed for grade 1 reflect the move towards mainstream placement after cochlear implantation (Archbold et al., 2002; Daya et al., 2000).

The underlying idea of the total-communication approach is that the child is afforded visual and auditory cues via signing, lip reading and audition (Daya et al., 2000; Moog & Geers, 2003a). There are different forms of total communication varying from an emphasis primarily on signing, to equal emphasis on speech and signing and to emphasis on speech with signing for a portion of the time (Tobey et al., 2004). It appears that the total-communication approach used with L45 may have facilitated the development of adequate speech and language skills which allowed mainstream grade 1 school placement.

The 12 learners who attended a mainstream preschool remained in mainstream placement for grade 1. Their continued mainstream placement could reflect the successful performance researchers have reported of learners with cochlear implants in mainstream education (Damen et al., 2006; Reeves, 2003; Spencer et al., 2004).

Summary

On average the mainstream learners in the present study were implanted earlier, which related to a shorter duration of hearing impairment and more implant experience at the start of grade 1 than the learners in the special school group. Speech perception performance and the primary mode of communication was predominantly the same in both groups. The incidence of additional disabilities was similar in the two groups. It was found that the majority of the learners had attended a special oral preschool. The 3 bilaterally implanted learners were in the mainstream group.

The results and discussion of factors 9 to 15 included in the questionnaire now follows. Factor 16 covers the discussion of the 'other' factors highlighted by the respondents which were identified upon completion of the inductive or thematic analysis of their

responses. These results are outlined in table 4.7. Reference will also be made to excerpts from the questionnaires in relation to the factors 9-15 where applicable.

Figure 4.10 is a graphic representation of the percentage of respondents for each factor.

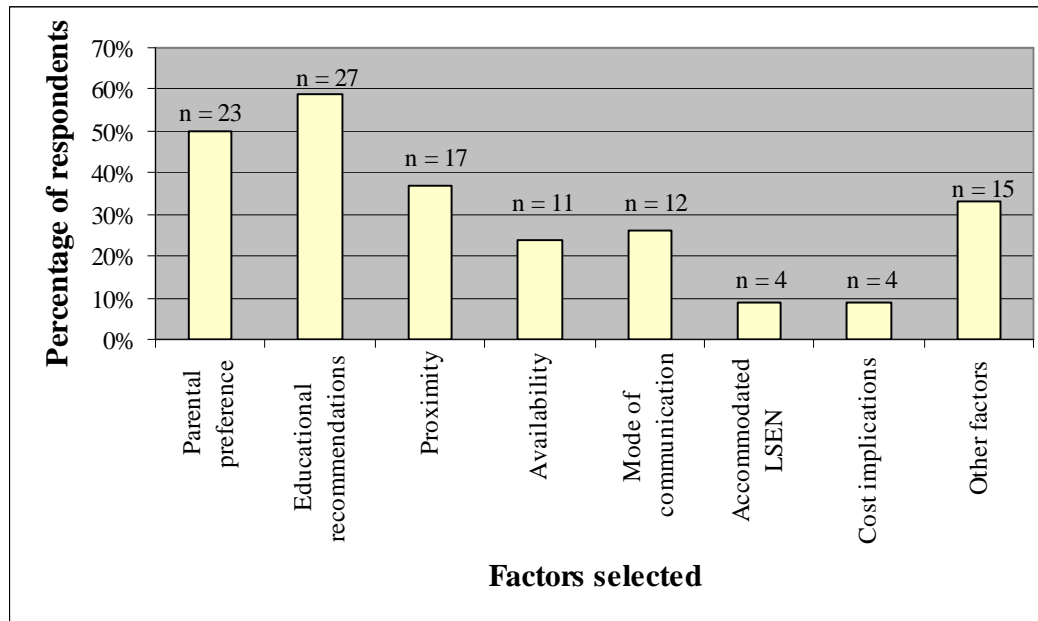


Figure 4.10: Percentage of respondents for the factors in the questionnaire that influenced grade 1 school placement.

Visual inspection of Figure 4.10 shows that the majority of the respondents, 27 (59%), indicated that the most common factor, which influenced the selection of the grade 1 educational placement, was recommendation made by professionals, usually the cochlear implant team or educators. Parental preference was the second most frequent factor selected by 23 (50%) of the respondents. Seventeen (37%) of the respondents selected the proximity of the school, 11 (24%) chose availability of the school and 12 (26%) chose the mode of communication employed at the school. Eight of the respondents, 4 (9%) of the respondents indicated that the accommodations made for LSEN and another 4 (9%) indicated that cost implications influenced their selection of school placement.

Decisions regarding the educational placement for learners with cochlear implants are usually based on a combination of aspects most importantly parental preference and teacher recommendations (Tobey et al., 2004). Similarly, these two factors were the two highest ranking factors selected by the respondents in the present study. Fifteen (33%) of the respondents cited ‘other factors’ which were identified via the inductive or thematic analysis.

4.1.9 Parental preference

Figure 4.11 is a graphic representation of the percentage of respondents within each school setting selecting the factor of parental preference.

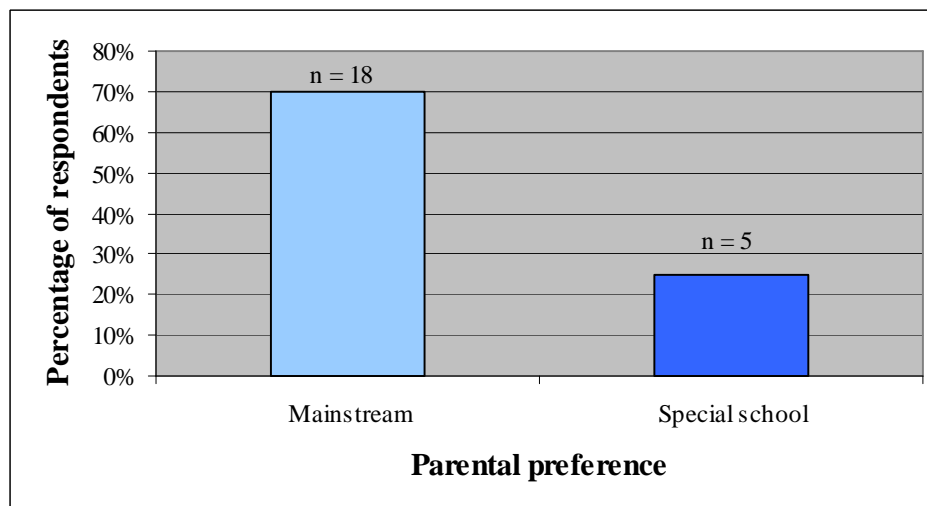


Figure 4.11: Importance of parental preference in school selection.

Overall, twenty-three (50%) of the respondents indicated that their own preference/parental choice was an important determinant of educational placement of learners. Similarly, research documents the importance of parental preference in the school placement process (Archbold & Robinson, 1997; Archbold, 2000; Francis et al., 1999; Tobey et al., 2004; Yuelin et al., 2003). This also mirrors legislation, which prescribes that, parents be the decisions makers regarding school placement for learners with disabilities (De Mitchell, 1997 as cited in Easterbrooks & Mordica, 2000; Garrick Duhaney & Salend, 2000).

As seen in figure 4.11, 18 (70%) of the respondents in the mainstream group indicated that their own preference influenced their selection of school placement. The findings of the present study correlate well with the 82% of the parents, who indicated a preference for mainstream placement in a study by Daya et al. (2000).

Respondent 19, in the special school group, highlighted the importance of the parental role in the school placement decision-making process when stating: “Doctors and the rest can advise, but parents should decide. For at the end a child is a parent’s responsibility.”

4.1.10 Educational recommendation by professionals

Figure 4.12 is a graphic representation of the percentage of respondents within each school setting regarding the importance of educational recommendations by professionals.

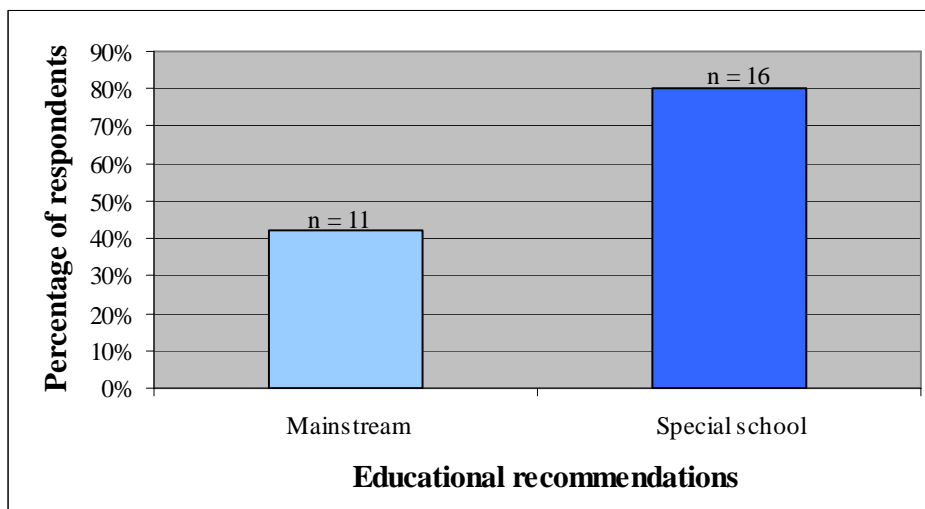


Figure 4.12: Importance of educational recommendations in school selection.

Recommendations by professionals was considered important for school selection by 11 (42%) of the respondents in the mainstream group and by 16 (80%) in the special school group. In other words the professionals’ recommendation appeared relatively more important for the parents of special school learners. This could indicate how highly the respondents value the opinion and input provided by the professionals (both the educators

and the cochlear implant team) involved in the management of the learner. Literature also highlights the important role served by professionals (i.e. both the educator and the implant team) in this regard (Archbold & Robinson, 1997; Archbold, 2000; Damen et al., 2006; McConkey Robbins, 2000; Nevins & Chute, 1995).

Even though the recommendation by professionals influenced R41's (i.e. a respondent in the special school group) school placement decision, a need for more advice and knowledge was noted. "*Ander opsies moes aan my verduidelik gewees het en nie net aanbevelings nie.*" ("*Other options should have been explained to me and not only recommendations made.*") This reflects the need for specialist advice regarding the education for learners with cochlear implants (Thoutenhoofd, 2006). Although the recommendations by professionals are based on their expertise in the management of their clients, the comment made by R41 reflects that these professionals should ensure that parents / caregivers are adequately informed about the basis of the choice. As aptly stated by Easterbrooks and Mordica (2000, p. 56), "Parents need all the information they can get."

4.1.11 Geographic site or proximity of school:

Figure 4.13 is a graphic representation of the percentage of respondents within each school setting selecting geographic site or proximity of the school.

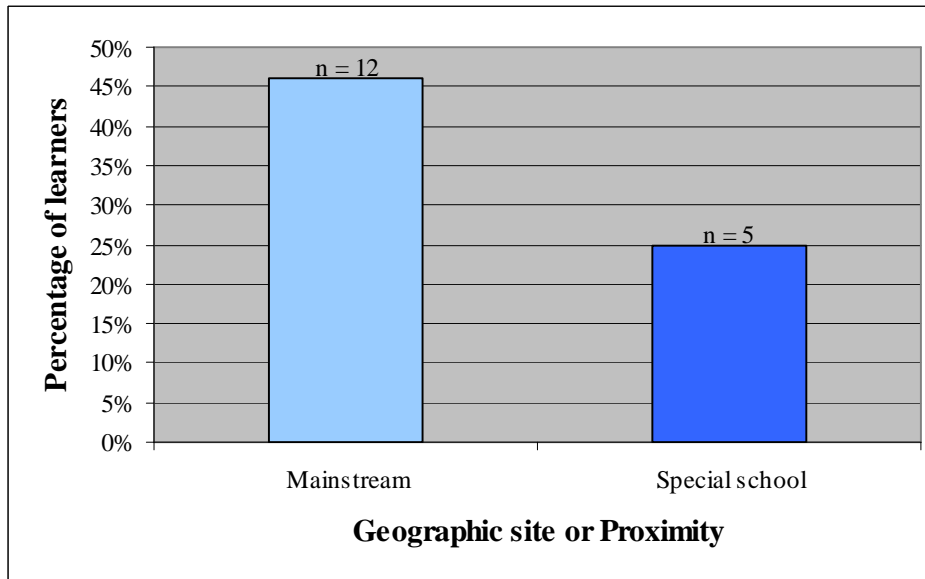


Figure 4.13: Importance of geographic site or proximity in school selection.

The geographic site or the proximity of the school influenced the selection of grade 1 school placement for 12 (46%) of the respondents in the mainstream group and only 5 (25%) in the special school group. The lower response rate to this factor in the special school group could be that they were more focussed on appropriate special school placement for the learner than the issue of the proximity of the school.

Education was traditionally provided in special schools for learners with hearing impairment which was often residential and involved travelling away from home (Archbold, 2000; Nevins & Chute, 1995). Separation from their child would therefore be a logical concern for a parent of a learner with a hearing impairment and may motivate local school placement. This concern could have motivated R30's selection of a nearby mainstream school as she remarked "...as jou kind oor 'n ver afstand van jou af is." ("...when your child is a great distance away from you."). Respondent 42, in the mainstream group, placed particular emphasis on the proximity of the school when she stated "...en het op die ou end besluit dat die naaste skool maar die beste was vir ons". ("...and in the end we decided that the closest school was the best for us."). All 12 of the respondents in the mainstream group selected a nearby local mainstream school, while five respondents in the special school group selected placement in local special schools.

Although respondent 6 and 29, in the special school group, did not select this factor they also noted concern regarding residential special school placement. Respondent 6 mentioned, “...om te dink my kind moet so klein van my af weg gaan.” (“...to think that my child had to go away from me at such a young age.”). Respondent 2 stated, “Bring skool nader aan Kaapstad!” (“Bring the school closer to Cape Town!”).

4.1.12 Availability of school:

Figure 4.14 is a graphic representation of the percentage of respondents within each school setting selecting on the basis of availability of the school.

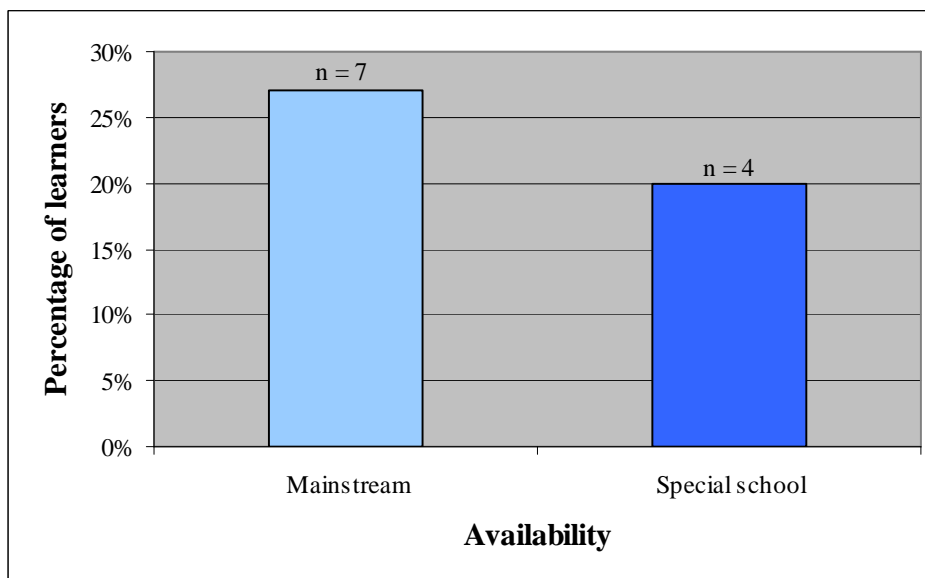


Figure 4.14: Importance of availability in school selection.

Overall, 24% of the respondents in the sample indicated that this factor influenced their placement decision. It was selected as an important factor by 7 (27%) of the respondents in the mainstream group and by 4 (20%) in the special school group. Availability may influence the educational placement decisions for a learner with a cochlear implant (Archbold & Robinson, 1997; Archbold, 2000; Francis et al., 1999).

Research by Archbold and Robinson (1997), in the United Kingdom, found the availability of the school to be the most important determinant of educational placement.

Although seemingly not as important in the present study, availability was still influential for many as expressed by R17 who noted that the special school was the, “*Only oral deaf school with boarding facilities.*”

Literature indicates that an increasing number of learners, with cochlear implants are placed in mainstream educational settings both internationally (Archbold et al., 2002; Thoutenhoofd, 2006) and nationally (Müller & Wagenfield, 2003, Reeves, 2003). Although this information is positive in terms of reflecting the educational policy of inclusive education for learners with disabilities, children with cochlear implants are still educated in a variety of school settings (Christiansen & Leigh, 2004). Even with the current emphasis on inclusive education (i.e. mainstream placement), there is a paucity of options available within the realm of special school placement, which was highlighted by R9, who stated: “*...there is not a great choice of schooling for the hearing impaired.*” Limited school placement options have also been identified in the United States (Francis et al., 1999).

4.1.13 Mode of communication employed at the school:

Figure 4.15 is a graphic representation of the percentage of respondents within each school setting selecting on the basis of the mode of communication employed at the school.

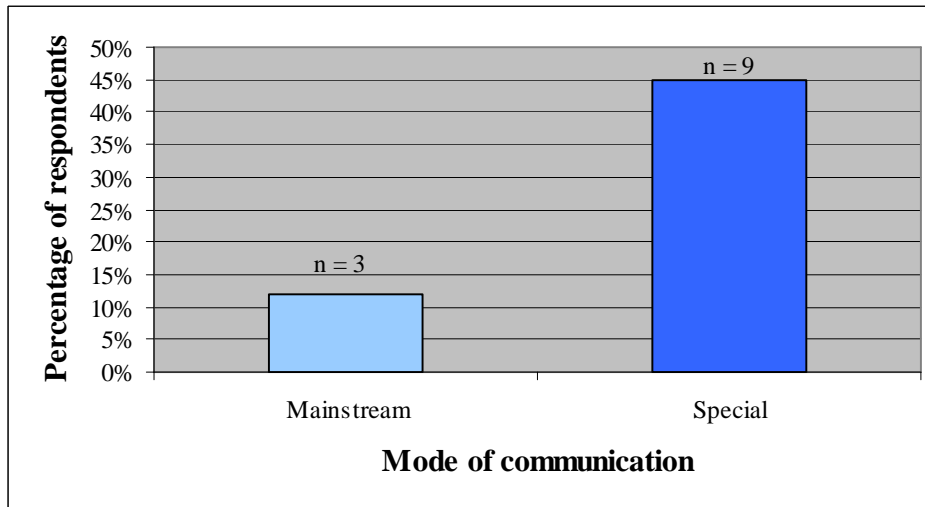


Figure 4.15: Importance of the mode of communication in school selection.

The mode of communication employed at the school influenced the selection of school placement for 12 respondents (26%) in the sample. It was selected by 3 (12%) of the respondents in the mainstream group and 9 (45%) of the respondents in special school group. This result is consistent with Selmi (1985) who reported that mode of communication is a determinant of school placement for a learner with a cochlear implant.

It has been recognized that cochlear implantation allows for access to acoustic information of spoken language (Francis et al., 1999) thus making spoken language a possibility for children who would previously have primarily employed sign language as their mode of communication (Geers, 2004). Oral schools place major focus on the development of auditory skills and speech production (Moog & Geers, 1991). This could have motivated the 3 respondents in the mainstream group as well as the majority of the respondents in the special school group (6 of the 9) to select schools following an oral mode of communication.

The remaining 3 respondents in the special school group selected schools that employed a total-communication approach. This could have been motivated by the ideal that the

total-communication approach allows access to a complete system of communication (Davis, 1995).

4.1.14 School accommodated learners with special needs

Figure 4.16 is a graphic representation of the percentage of respondents within each school setting selecting on the basis of the accommodations the school made for LSEN.

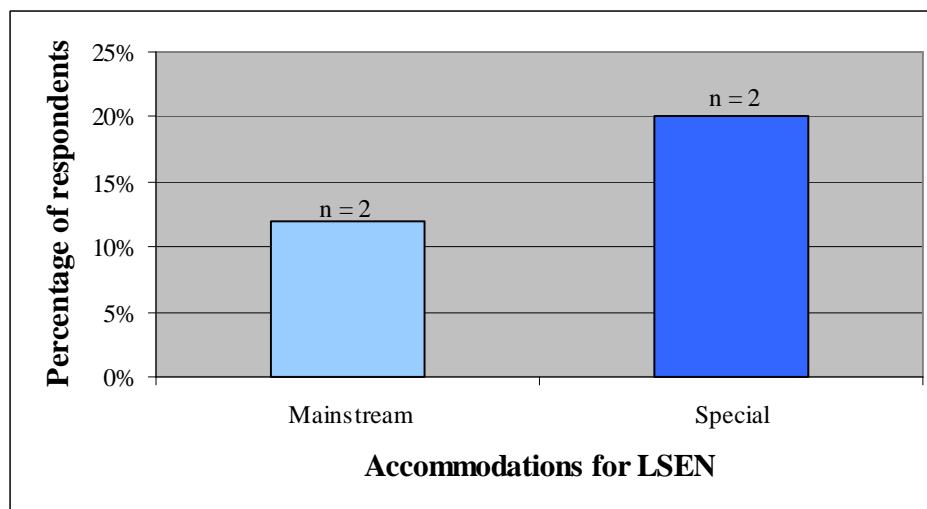


Figure 4.16: Importance of accommodations made for LSEN.

Overall, accommodations (i.e. educational support provided for the learner at the school) made by the school for LSEN was selected by 4 (9%) of the respondents as an influential factor in determining school placement. Two (8%) of the 4 respondents were from the mainstream group and 2 (10%) from the special school group. This result is consistent with the importance numerous published studies have placed on the educational support for the learner with a cochlear implant (Archbold, 2000; Nevins, Kretschmer, Chute, Hellman, & Parisier, 1991; Nevins & Chute, 1995; Niparko & Blankenhorn, 2003; O'Donoghue, 1996; Tyler, 1993).

Learners with cochlear implants in mainstream school settings often continue to require classroom support (Christiansen & Leigh, 2004; Uziel et al., 2007) to ensure full access to the curriculum (Archbold et al., 2002) and to succeed in mainstream placement

(Damen et al., 2006). The underlying ideal is that adequate educational support be provided in the mainstream (Archbold & Robinson, 1997), but the support may vary (Barton, Stacey, Fortnum & Summerfield, 2006). The two respondents in the mainstream group identified varying sources of support, ranging from a special unit with remedial classes for LSEN linked to the mainstream school (R18), “([Naam van kind] is in ‘n eenheid in ‘n hoofstroom skool” (“[Child’s name] is in a unit in a mainstream school”) to a class assistant (R45), “Skoolhoof het klas-hulp tot [naam van kind] se beskikking aangestel om [naam van kind]) te help” (“Principal appointed a class assistant who was available for the [name of learner].”).

4.1.15 Cost implications

Figure 4.17 is a graphic representation of the percentage of respondents within each school setting who indicated that cost implications were important.

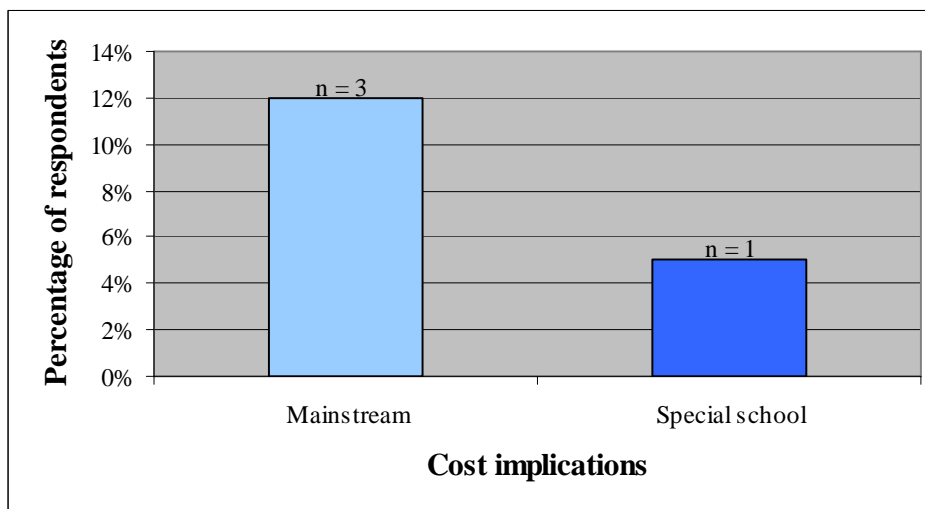


Figure 4.17: Importance of cost implications in school selection.

As can be seen in figure 4.17, cost did not appear to be important in the school selection and was the least influential factor in the present study as it was selected by only 4 (9%) of the respondents in the sample. It was selected by 3 respondents in the mainstream group (12%) and one respondent (5%) in the special school group.

For the parents of learners with hearing impairment the cost of cochlear implantation is high both financially and emotionally (Easterbrooks & Mordica, 2000). Although research indicates that cost is an important area of focus in the educational management of learner with a cochlear implant, only four parents/caregivers in the present study indicated that cost implications influenced their school placement decision.

Respondent 29, in the special school group, did not select this factor but mentioned the high cost of school and hostel fees, “*Koste verbonde aan skool, b.v. skoolfonds, hostelfees, baie hoog.*” (“*Cost related to school e.g. school fees, hostel fees, is very high.*”).

Figure 4.18 is a graphic representation of the percentage of respondents within each school setting according to the number of factors selected in the questionnaire.

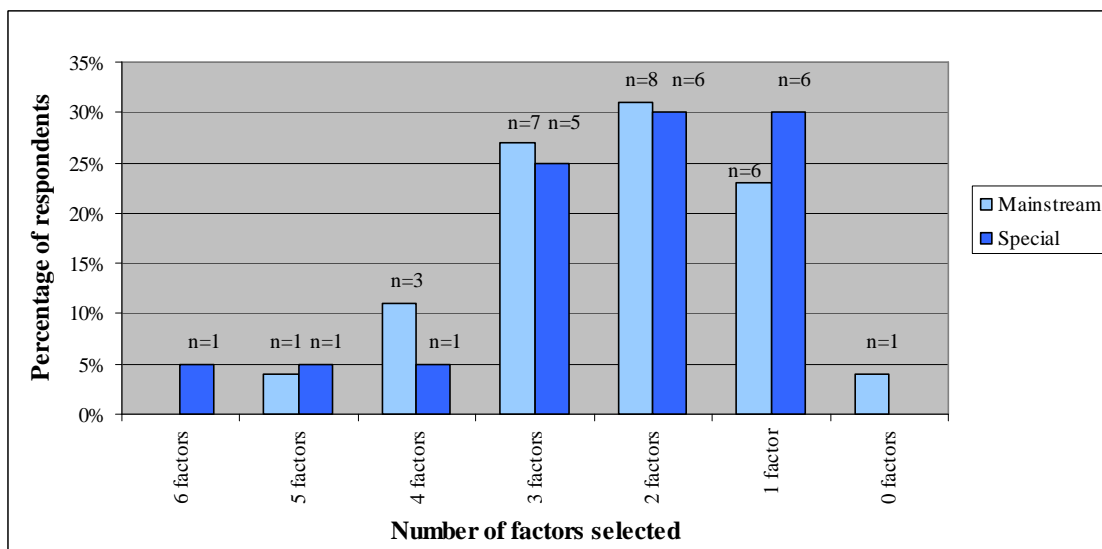


Figure 4.18: Comparison of the percentage of respondents within each school setting according to the number of factors selected in the questionnaire.

Figure 4.18 shows that multiple factors (i.e. more than one factor) were selected by 19 (73%) of the respondents in the mainstream group and by 14 (70%) of the respondents in the special school group. One factor was selected by 6 (23%) respondents in the

mainstream group and by 6 (30%) in the special school group. This reflects that the school placement for learners with hearing impairments is both highly individualised and related to a variety of factors and circumstances (Francis et al., 1999).

4.1.16 'Other' factors

Open-ended questions in the questionnaire allowed the respondents an opportunity to provide further commentary regarding any other factors that influenced grade 1 school placement. Thirteen (28%) of the respondents mentioned other factors. The results of the thematic analysis of these responses are outlined in table 4.7 and discussed below.

Table 4.7: A summary of other factors that influenced the selection of grade 1 school placement.

Other factors influencing grade 1 school placement
<p>I. Integration</p> <p>II. School setting:</p> <ul style="list-style-type: none"> a) Reduced class size b) Attitude of educators c) Knowledge and experience of educators <p>III. School readiness *</p>

* Only applies to L4 who was homeschooled for grade 1.

An interpretive discussion of each of the themes noted in table 4.7 follows. Each theme will be linked to existing literature and excerpts from the responses are included to aid the reader's understanding of the respondents' perspectives. Where relevant, individual responses are elaborated on to provide further insight. The final theme in the table (i.e. school readiness) only refers to L4 who was homeschooled for the grade 1 academic year.

Figure 4.19 is a graphic representation of the number of respondents within each school setting according to other factors that influenced grade 1 school placement.

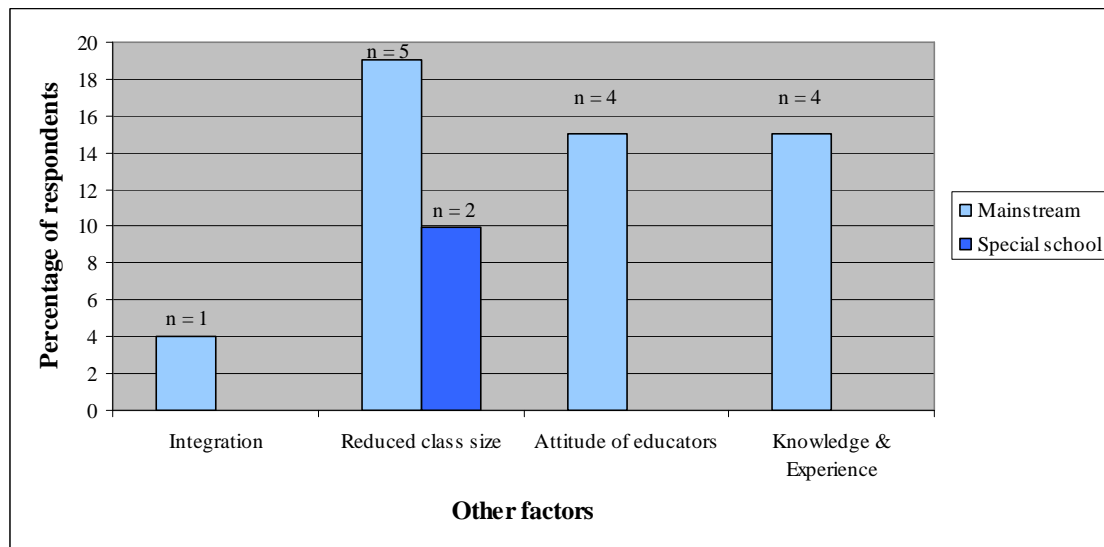


Figure 4.19: Comparison of the number of respondents within each school setting according to other factors that influenced grade 1 school placement.

Overall, twelve respondents in the mainstream and special school group mentioned ‘other’ factors that influenced their school placement decision. This group included 10 respondents in the mainstream group and 2 in the special school group.

Figure 4.19 shows that the most common additional factor that influenced the decision for school placement was reduced class size (7 respondents). Five (15%) of the respondents from the mainstream group and 2 (10%) noted the aforementioned factor. The remaining factors were only identified by respondents in the mainstream group. One respondent cited the need to integrate the learner into a normal environment. The attitude of the educators towards a learner with a hearing impairment (4 or 15% of the respondents) and the knowledge of and the experience of the educators with learners with hearing impairment (4 or 15% of the respondents) also influenced school placement. Respondent 26 and 46 mentioned both the attitude and the knowledge and experience of the educators. Respondent 26 also mentioned the influence of a reduced class size. Respondent 10 mentioned both reduced class size and experience of the educators with learners with hearing impairment.

The class size and attitude of the school is items on the parental checklist utilized by Nevins and Chute (1995) in a study evaluating the success of learners with cochlear implants in mainstream educational settings. These aspects were the two main themes found amongst the respondents in the mainstream group in the present study.

I. Integration

Mainstream:

R37: *“I wanted (name of learner) to be integrated into a very normal environment within her own community or neighbourhood.”*

Respondent 37’s motivation for mainstream school placement stemmed from wanting the learner integrated into the local school with normal hearing peers. She stated: *“I wanted (name of learner) to be integrated into a very normal environment within her own community or neighbourhood.”* This reflects the current focus in educational policy towards inclusive education, which advocates high quality, age appropriate education for learners with disabilities in classrooms in their local schools with peers without disabilities (Garrick Duhaney & Salend, 2000). This ideal of integration is echoed not only in educational policy (White Paper, 2001), but reflects the ideal of assimilating the child with a cochlear implant into the hearing world (Bertram & Päd, 1995).

II. School setting

a) Reduced class size

Mainstream:

R27: *“...and has smaller classes...”*

R32: *“size of class at 25 or less influenced placement.”*

Special school:

R2: *“Minimal amount of children per class. (6 children in Grade 1 class).”*

R13: *“...small classes...”*

a) Reduced class size

Seven of the respondents (15%) reported that reduced class size influenced their school placement decision. A reduced class size is not the norm in mainstream classrooms it is, however, an expectation of inclusive education (Garrick & Salend, 2000). Five (19%) of the respondents in the mainstream group indicated that a small class size influenced their school placement decision. They could have recognized the supportive function provided by a reduced class size for the learner with a hearing impairment in an inclusive school setting (Cawthon, 2001; McLeskey & Waldron, 2007).

The present finding indicates that respondents in both groups identified the possible benefit of a smaller class size, which would possibly afford the educator more time to provide the learners with individual attention (McLeskey & Waldron, 2007). Respondent 2, in the special group stated that the “*Minimal amount of children per class*” influenced her school placement decision. Respondent 32, in the mainstream group, noted that the “*size of class at 25 or less influenced placement.*”

II. School setting

b) Attitude of the educators

Mainstream:

R3: “... asook vanweë aanpasbare persoonlikheid kans gesien het vir die uitdaging wat plasing sou bied. Hy het die ook gesien as ‘n goeie leerervaring vir die skool.”
 (“...also due to an adaptable personality he saw that placement would offer a challenge to the school. He also saw this as a good learning experience for the school.”)

R26: “...en baie positief oor haar was.” (“...and was very positive about her.”)

R35: “Attitude of principal towards including child with special needs.”

R46: “Most important consideration was the willingness of the school to accommodate a child with special needs.”

b) Attitude of the educators

Four (15%) of the respondents in the mainstream group stated that the positive and encouraging attitude the school had towards enrolling a learner with a cochlear implant,

influenced their school placement decision. This finding reflects the importance of the attitude of the school, when an educational setting is evaluated for a learner with a hearing impairment (Goldberg et al., 1989). It also reflects the shift towards a more positive attitude amongst educators with regards to having a learner with a disability in the mainstream classroom setting (Wamae & Kang'ethe-Kamau, 2004).

Respondent 46 even noted that the school's positive attitude was the most influential factor, *“Most important consideration was the willingness of the school to accommodate a child with special needs.”*

II. School setting
c) Knowledge and experience of the educators
<p><u>Mainstream:</u> <i>Knowledge:</i> R26: <i>“Die skoolhoof en onderwysers (almal) by die skool was goed ingelig (naam van die leerder) se koglêere implanting en was bereid om ingelig te word.”</i> <i>(“The principal and teachers at the school were well informed about (name of learner) cochlear implant and were prepared to be informed.”)</i></p> <p><i>Experience:</i> R10: <i>“Reeds heelwat dowe kinders.”</i> (<i>“Already have some deaf children.”</i>)</p> <p>R40: <i>“Daar was al ‘n paar gehoorgestremde kinders in (naam van laerskool).”</i> <i>(“There already were a few children with hearing impairment at (name of primary school).”)</i></p> <p>R46: <i>“She had had remedial training and is experienced...”</i></p>

c) Knowledge & experience of the educators

Four (15%) of the respondents in the mainstream group indicated that the knowledge and experience of the educators with regards to learners with hearing impairment influenced their school placement decision. This finding indicates that the expertise and training of educators is a concern of parents of learners with disabilities (Garrick Duhaney & Salend, 2000). More knowledge about a disability allows the educator to be more accepting of and feel more competent teaching the learner (Wamae & Kang'ethe-Kamau, 2004). More experience with learners with disabilities also makes the educator more confident in

having the learner in the class (Wamae & Kang'ethe-Kamau, 2004). These respondents in the present study seem to have identified the supportive function of educators with appropriate knowledge of and skills for teaching learners with hearing impairment in the mainstream school setting (Wamae & Kang'ethe-Kamau, 2004).

III. School readiness

Homeschool:

R4: “(Naam van leerder) was op 5 jarige ouderdom, vanweë al die vroeë stimulasie intellektueel, emosioneel en sosiaal skoolgereed...Toe ons haar in haar Gr1 huiskool”.

([(Name of learner] was school ready at the age of 5 years due to all the early intellectual, emotional and social stimulation...We then home schooled her for her gr1”.)

Learner 4 is discussed separately as she was homeschooled for grade 1. Respondent 4 cited that the school readiness of the learner had motivated the parents' preference for mainstream grade 1 school placement. She remarked that L4 was, “...vanweë al die vroeë stimulasie intellektueel, emosioneel en sosiaal skoolgereed.” (“....school ready due to all the early intellectual, emotional and social stimulation.”). However, mainstream school placement could not be secured for grade 1, as the learner was only 5 years of age and she was homeschooled. A school readiness evaluation, at the end of the grade 1 academic year, confirmed their belief as grade 2 mainstream school placement was recommended. The parents recognized that L4 had the necessary skills to manage in the mainstream school setting. For learners with hearing impairment, adequate preparedness for school placement is essential to the success of inclusive education (Bess & McConnell, 1981 as cited in McConkey Robbins, 2000).

Summary

Overall, the most common factor identified by the respondents as influential in the school placement decision was recommendations made by professionals, followed closely by parental preference. The proximity of the school was selected by 46% of the mainstream group. The mode of communication employed was at the school was identified as

influential by 45% of the respondents in the special school group. Less frequently selected factors included the availability of the school; accommodations made by schools for LSEN and cost implications. Thirteen respondents identified ‘other’ factors which were not included in the questionnaire.

4.2 CHANGES IN SCHOOL PLACEMENT SUBSEQUENT TO GRADE 1

Table 4.8: Changes in school placement subsequent to grade 1.

Changes in school placement	Number and percentage of learners
1. To mainstream school	7 (15%)
Special school to mainstream school	6 (13%)
Home school to mainstream school*	1 (2%)
Away from mainstream school [#]	1
2. Mainstream school to mainstream school	6 (13%)
3. Special school to special school	3 (6%)

* L4 was moved from being homeschooled in grade 1 to mainstream school placement in grade 2.

[#] L15 moved away from a mainstream setting and attended a special school setting for only one school quarter and subsequently returned to the original mainstream school.

Table 4.8 depicts the number of learners in the sample who changed school placement subsequent to grade 1. Six learners (13%) moved from special school settings to mainstream placement to grade 1. One learner (2%) moved from being homeschooled to mainstream placement school. Six learners (13%) moved from one mainstream school to another and 3 learners (6%), moved from one special school setting to another. These changes in school placement show that “no placement decision is final” (Goldberg et al., 1989, p. 328) and reflects the flexibility in placement of learners with cochlear implants (Schopmeyer, 2000).

Figure 4.20 is a graphic representation of the percentage of learners in mainstream placement in grade 1 and subsequent to grade 1 placement.

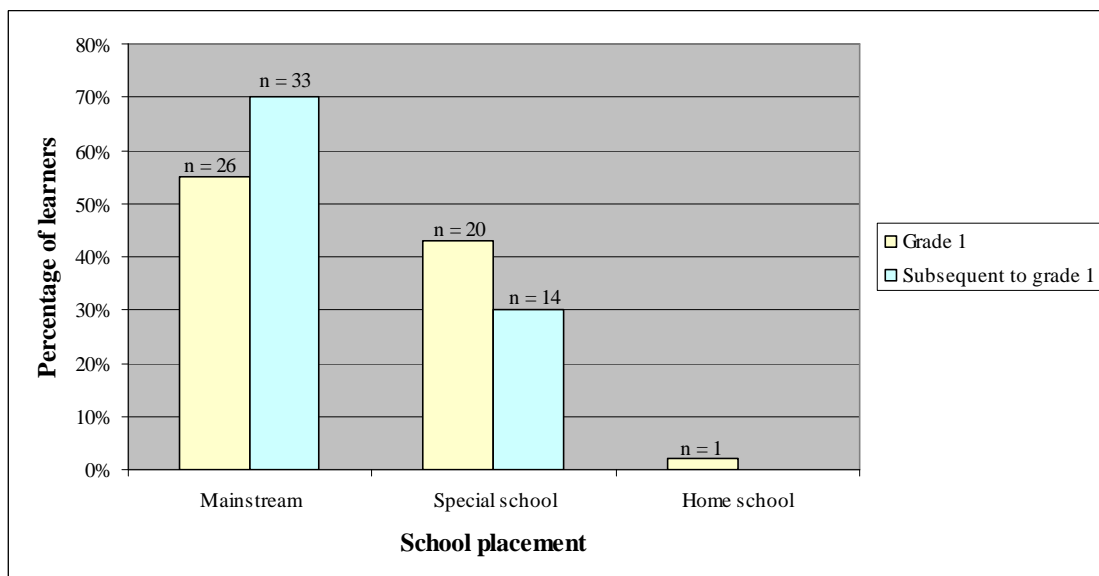


Figure 4.20: Graphic comparison of the percentage of mainstream learners in grade 1 and subsequent to grade 1 school placement.

As can be seen in figure 4.20, subsequent to grade 1, the number of mainstream learners in the sample increased from 26 to 33 (55% to 70%). The number of learners within the special school setting decreased from 20 to 14 (43% to 30%). None of the learners were homeschooled subsequent to grade 1. Similarly, Thoutenhoofd (2006) found that 76% of the learners with cochlear implants were educated in mainstream educational settings. The percentage of learners in mainstream placement in the present study (70%) and in that of Thoutenhoofd (2006) is higher than the 38% reported by Archbold et al. (2002). Learner 15 moved away from and returned to the same mainstream school. This change to a special school setting occurred in grade 1 and was temporary as the family moved house.

Summary

The number of learners in mainstream placement in the sample increased from 26 to 33 (55% to 70%) subsequent to grade 1 placement. This phenomenon of a shift of learners with cochlear implants towards mainstream is similarly reported in literature (Archbold et al., 1998; Archbold et al., 2002; Boothroyd & Boothroyd-Turner, 2002; Daya et al., 2000; Nevins & Chute, 1995; Summerfield et al., 1997).

4.3 REASONS FOR THE CHANGE IN SCHOOL PLACEMENT

The respondents were afforded the opportunity to provide reasons for the change in placement. The results will be discussed below using excerpts from the transcribed responses. The range of reasons discussed below shows that change in school placement for a learner with a cochlear implant is likely influenced by a complex array of factors (Francis et al., 1999).

4.3.1 Change to mainstream school subsequent to grade 1

Table 4.9: Factors that influenced a change to mainstream school placement subsequent to grade 1.

Change to mainstream placement subsequent to grade 1
<p>I. Assimilating or integrating.</p> <p>II. School readiness.</p> <p>III. Educational recommendation by professionals.</p>

Three respondents (R1, R7 and R19) wanted their children educated alongside learners with normal hearing. Research documents the concept of assimilating children with cochlear implants into the hearing world (Bertram & Päd, 1995; Moores 2005). The reason for changing to mainstream school placement also echoes the idea for inclusive education and integration of learners with disabilities (Garrick Duhaney & Salend, 2000). Respondent 19 aptly stated, “*She is capable of being with other ‘able’ children.*”

Respondents 36 and 47 indicated that they believed that the learners were ready for mainstream placement. Respondent 36 remarked, “*Child was ready for mainstream school...*” The results of a school readiness evaluation recommended grade 2 mainstream placement for L4, who was homeschooled for grade 1. Adequate preparedness of learners with hearing impairment is essential for the success of inclusive education (Bess & McConnell, 1981 as cited in McConkey Robbins, 2000).

Respondent 22 noted that the teachers at the special school recommended mainstream placement. “*Recommended by teachers at (name of the school) that (name of the learner) was ready for mainstream schooling.*” This confirms the important role of recommendations made by professionals regarding educational placement for learners with cochlear implants (Archbold & Robinson, 1997; Archbold, 2000; Damen et al., 2006; McConkey Robbins, 2000; Nevins & Chute, 1995; Tobey et al., 2004).

4.3.2 Mainstream school to another mainstream school

Table 4.10: Factors that influenced a change from one mainstream school to another mainstream school.

Change from mainstream school to another mainstream school.
<p>I. Secondary school placement.</p> <p>II. Logistical constraints.</p> <p>III. Reduced class size</p>

The later natural progression to secondary school placement was the reason for the shift from one mainstream school setting to another for 4 of the 6 learners.

Learner 26 moved to an alternative mainstream setting for grade 4, due to logistical constraints as the previous school only offered schooling up to a grade 3 level.

Learner 39 moved to an alternative mainstream school with smaller class sizes. Once again the supportive function of a reduced class size for a learner with a disability within inclusive education (McLeskey & Waldron, 2007) influenced school placement.

4.3.3 Special school to special school

Table 4.11: Factors that influenced a change from a special school to another special school.

Change from special school to another special school
I. Availability and proximity of school.
II. Recommendations made by professionals and reduced class size.
III. Support services

Three learners moved from one special school setting to another. Respondent 17 cited that the availability of the school (Archbold & Robinson, 1997; Archbold, 2000) influenced the shift to an alternative special school. "*Special needs school available and willing to receive (name of learner)*" as well as the proximity of the school "...only 2 hrs from home."

Recommendations by educators (Tobey et al., 2004), and the supportive role of a reduced class size (McLeskey & Waldron, 2007), influenced L23's move to an alternative special school. Respondent 23 stated, "*(Naam van skool) is aanbeveel*" ("*(Name of school) was recommended*") and "*Klasse is ook klein. (Classes are also small)*".

Learner 41 moved to an alternative special school, where support in the form of regular speech therapy would be provided. Respondent 41 reported that "*Hy het individuele spraak en taalopleiding nodig gehad, maar het net 2 keer 'n maand spraakterapie ontvang.*" ("*He only needed individual speech and language training but only received speech therapy twice a month.*"). Jamieson (1994) pointed out that learners with hearing impairment should receive speech therapy as frequently as possible.

Summary

Respondents cited a variety of reasons for changing school placement subsequent to grade 1. The reasons echoed factors, such as educational recommendations made by

professionals and the proximity of the school, which were identified in literature as determinants of school placement for learners with hearing impairment.

4.4 ADDITIONAL COMMENTARY REGARDING GRADE 1 SCHOOL PLACEMENT

An open-ended question concluded the questionnaire and afforded the respondents a final opportunity to provide further commentary regarding the process of selecting an educational setting for grade 1 school placement. A total of 12 respondents provided additional commentary. The majority of these comments (10/12) were from respondents in the mainstream group. The results of the thematic analysis of the responses are discussed below and accompanied by relevant examples from the questionnaires.

Table 4.12: Summary of themes relating to additional information provided by respondents.

Additional information
<p>I. Aspects of concern:</p> <ul style="list-style-type: none">a) Knowledge & experience of educatorsb) Secondary school placement <p>II. Sources of support:</p> <ul style="list-style-type: none">a) Educator supportb) Cochlear implant rehabilitation teamc) Reduce class sized) FM system <p>III. Academic performance</p>

I. Aspects of concern
a) Knowledge and experience of educators
<p><u>Mainstream:</u> R3: <i>“Personeel is aanvanklik uit onkunde skikkerig vir ‘n buitengewone leerder en die uitdagings wat dit mag meebring...”</i> <i>(“Staff is initially scared due to lack of knowledge of an unusual learner and the challenges it may bring...”)</i></p> <p>R4: <i>“’n Skoolhoof se kennis van doofheid...beïnvloed sy houding teenoor kind.”</i> <i>(“A principal’s knowledge of deafness...influences his attitude towards a child.”)</i></p> <p>R20: <i>“...onderwysers in hoofstroom skole meer ingelig behoort te word rakende gestremdhede, hulle is baie onkundig.”</i> <i>(“...teachers in mainstream schools should be more informed regarding disabilities, they are not very knowledgeable.”)</i></p>

a) Knowledge and experience of educators

Providing educators with knowledge and skills about learners with disabilities within the framework of inclusive education is viewed as relevant, appropriate and as a crucial measure of support (Wamae & Kang’the-Kamau, 2004). The training and expertise of educators of learners with disabilities in inclusive education is often a concern for parents (Garrick Duhaney & Salend, 2000). Respondents 3, 4 and 20 similarly commented on the importance of providing educators with appropriate knowledge regarding the learner with a cochlear implant.

I. Aspects of concern
b) Secondary school placement
<p><u>Special school:</u> R28: <i>“Ek is net baie bekommerd wanneer my kind gr 7 klaar maak waarheen dan.”</i> <i>(“I am just very concerned about when my child completes grade 7, where to then?”)</i></p>

b) Secondary school placement

Respondent 28, in the special school group, was concerned about secondary school placement. *“Ek is net baie bekommerd wanneer my kind gr 7 klaar maak waarheen dan.”*
(“I am just very concerned about when my child completes grade 7, where to then?”)

Archbold (2000) pointed out that secondary school education can pose a challenge for the learner with a cochlear implant.

II. Sources of support

Educational support for learners with a cochlear implant is recognized (Archbold, 2000; Tyler, 1993) and viewed as an essential feature of appropriate school placement (Nevins & Chute, 1995; Niparko & Blankenhorn, 2003). Parents of learners with cochlear implants consider additional support as not only being needed but as a necessity for the learner (Hasenstab, Van derArk & Kastetter, 1997 as cited in Archbold, 2000; Thoutenhoofd, 2006). There is, however, no clear agreement regarding the nature of the support that should be provided (Archbold & Robinson, 1997; Waltzman et al., 2000) with varying degrees to support being reported (Archbold, 2000, Barton et al., 2006). The discussion that follows outlines beneficial support services identified by the respondents in the present study.

II. Sources of support
a) Educator support
<u>Mainstream:</u> R26: “... <i>onderwysers bereid om persoonlike aandag te gee.</i> ” (“... <i>teachers prepared to give personal attention.</i> ”) <u>Special school:</u> R13: “ <i>Individual attention, teacher’s support.</i> ”

a) Educator support

The educator fulfils a vital support role (Barton et al., 2006; O’Donoghue, 1996) which is directly related to the performance of a learner with a cochlear implant (Reeves, 2003). One respondent in each group identified the supportive role of the teacher. Respondent 26 in the mainstream group, remarked that the “...*onderwyseres bereid om persoonlike aandag te gee.*” (“...*teacher was prepared to give personal attention*”), while R13, in the special school group, mentioned the aspect of the “*teacher’s support*”.

II. Sources of support

b) Cochlear implant rehabilitation team
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Mainstream:

R30: “*Ek sou meer persoonlike kontak met kogleêre span hou hê-soos bv. Skool besoek en met onderwysers gesels en inlig.*”

(“*I would have liked to have more personal contact with the cochlear team, e.g. A school visit to talk to and inform the teachers.*”)

R35: “*The input given by the cochlear implant team was essential.*”

b) Cochlear implant rehabilitation team

The success of the cochlear implant is influenced by the “partnership that exists between the cochlear implant centre and the child’s school” (McConkey Robbins, 2000, p. 349). Three fourths of the implant teams that participated in a survey conducted by Archbold and Robinson (1997), conducted visits to the local educators of learners with cochlear implants. The contact allowed for mutual education, a means of resolving problems and transmitting information about the cochlear implant. This highlights the importance of collaboration between the cochlear implant team and the school of the cochlear implant learner’s school (Archbold & Robinson, 1997; Archbold, 2000; Bertram & Päd, 1995; Incesulu et al., 2003; Schopmeyer, 2000; Selmi, 1985). By fulfilling the role of an educational consultant (Archbold, 2000), the implant centre is afforded the unique opportunity of contributing to the overall success of learners with cochlear implants in the mainstream school setting (Nevins & Chute, 1995). Respondent 30 indicated the need for this contact and highlighted the possibility of school visits by the implant team. Respondent 35 emphasized the benefit of the school visit carried out by the implant team when she remarked, “*The input given by the cochlear implant team was essential.*”

II. Sources of support

c) Reduced class size

Mainstream:

R37: “*However, smaller classes would perhaps be even more beneficial.*”

c) Reduced class size

Respondent 37 commented on the possible benefit of a reduced class size for a learner with a hearing impairment in an integrated school setting (Cawthon, 2001; McLeskey & Waldron, 2007).

II. Sources of support

d) FM system

Mainstream:

R16: *“Die gebruik van die FM sisteem deur (naam van leerder) in hoofstroom is van groot hulp.”*

(“The use of the FM system by [name of learner] in mainstream is of great help.”)

d) FM system

A FM system is an assistive listening device which can be utilized in the classroom setting to improve the signal-to-noise ratio in order to provide the learner with a hearing impairment with a clearer speech signal (Clark, 2003; Iglehart, 2004). The educator wears the microphone while the signal is directly relayed to the learner’s cochlear implant via FM signals without the amplification of additional background noise (Clark, 2003). For the learner with a hearing impairment, the FM system is one of the aids, which facilitates access to mainstream education (Archbold, 2000; Cawthon 2001). Respondent 16 highlighted the benefit of the use of the FM system in the mainstream classroom. Jessop et al. (2007) verify this benefit as 60% of the mainstream primary school learners in their study utilized an FM system.

III. Academic performance

Mainstream:

R27: *“...school progress is good”.*

R40: *“She has always been in the top 10 of her class.”*

Studies confirm that benefit from cochlear implantation varies across individuals (Isaacson et al., 1995; Kirk, 2000; Young & Killen, 2002). Successful performance of

learners with cochlear implants in mainstream placement have been reported both internationally (Damen et al., 2006) and nationally (Reeves, 2003). Similarly, R27 stated that L27's "...school progress is good."

Spencer et al. (2004) found that academic achievement of learners with cochlear implants in mainstream education compared favourably with their hearing peers. Learner 40 demonstrated this as R40 mentioned that, "*She has always been in the top 10 of her class.*"

Summary

Twelve respondents provided additional commentary which highlighted their concerns, outlined beneficial aspects of support and included positive reports of academic performance in mainstream school placement. Comments emphasized the importance of providing educators with adequate knowledge regarding learners with hearing impairments and included reports of the positive academic performance of two mainstream learners. Sources of educational support identified by the respondents included: teacher support, reduced class size, use of a FM system in the classroom and contact between the implant team and the school.

5. CONCLUSIONS, CRITIQUE AND PRACTICAL IMPLICATIONS

5.1 CONCLUSIONS

The present study aimed to describe the factors influencing grade 1 school placement of children implanted at the TBH-USCIU. Changes in school placement subsequent to grade 1 were also observed. The retrospective record review and the questionnaire employed yielded the following findings:

1. Fifty-five percent (26/47) of the sample was placed in a mainstream school setting for grade 1. Twenty learners were placed in a special school setting and 1 learner was homeschooled.
2. On average the mainstream learners had a shorter duration of hearing impairment (14 months less), were implanted at a younger age (15 months earlier) and had a longer duration of implant use (10 months more) at the start of grade 1 than the learners in the special school group. These factors could have given the mainstream learners earlier access to the auditory input provided by the cochlear implant (Damen et al., 2006; Dettman et al, 2004). This access in turn might have resulted in greater benefits in aspects, such as auditory abilities, speech perception (Hassanzadeh et al., 2002; Zwolan et al., 2004) speech performance and language development (Boothroyd & Boothroyd-Turner, 2002; Francis et al., 1999; Geers & Brenner, 2003a; Geers 2004), which could have facilitated their grade 1 mainstream placement. The majority of the learners were placed in the same high speech perception category and employed oral communication. A special oral preschool was attended by 26 learners in the sample. All 3 bilaterally implanted learners were in the mainstream group.
3. The respondents identified educational recommendations made by professionals as the most frequent determinant of school placement. This was closely followed by parental preference of school placement. Proximity of the school and the mode of communication were less influential. Other factors which influenced school placement

stemmed from wanting the learner integrated into the local school with normal hearing peers and the school readiness of the learner. Respondents also noted that the educators' knowledge of and experience with hearing impairment as well as a positive attitude towards having a LSEN in the classroom influenced their school placement decision.

4. The observed changes in school placement subsequent to grade 1 revealed an increase in mainstream placement from 55% to 70% in the sample. This finding was consistent with the trend towards mainstream placement for learners with cochlear implants (Archbold et al., 1998; Archbold et al., 2002; Boothroyd & Boothroyd-Turner, 2002; Daya et al., 2000; Müller & Wagenfeld, 2003; Nevins & Chute, 1995; Summerfield et al., 1997).

5. The analysis of the additional comments made by the respondents revealed: some concerns about school placement and support structures that respondents viewed as beneficial in the school setting. In addition, some positive reports of academic achievement of learners in mainstream placement were offered.

5.2 CRITIQUE AND SUGGESTIONS FOR FUTURE RESEARCH

5.2.1 School placement as the outcome measure

The specific outcome measure in the present study was the school placement of the learners with cochlear implants which was a narrowly defined outcome. Knowing the nature of the school placement of the learner with a cochlear implant although relevant, does not imply that it is the appropriate setting. As aptly stated by Archbold et al. (1998, p. 298), "Educational placement, however, cannot be considered an end in itself." In view of the limited information available on the educational outcomes of cochlear implantation (Easterbrooks & Mordica, 2000), measuring the academic achievement levels of learners in the sample might therefore be of interest for future research. This could be of particular interest for the mainstream learners since identifying mainstream placement is an indirect measure of cochlear implant success (Govaerts et al., 2002). Observing academic achievement could be a way of quantifying the benefit of mainstream placement for these learners (McConkey Robbins, 2000). The monitoring of the educational attainments of

these learners would allow investigation of the “effects of the trend of more profoundly deaf children being placed in mainstream settings” (Archbold, 2000, p. 160).

The outcome of school placement could also be assessed by probing educators’ perceptions of the functioning of learners with cochlear implants in the mainstream classroom using questionnaires or semi-structured interviews.

5.2.2 The outcome of language development

Literature recognizes the remarkable impact cochlear implantation has made on the linguistic competence of children with profound hearing impairment (Geers et al. 2003c), but it also notes that language deficits can pose as an educational challenge for learners with cochlear implants in mainstream placement (Mukari et al., 2007). Collecting data on the levels of language development at the start of grade 1 was initially an aim of the present study but was later excluded due to the lack of comparable information available in the records. The learners’ records did not contain comparable data for all the intended aspects of interests of the present study, which is a common disadvantage in the use of secondary data in research (Sørensen, Sabroe & Olsen, 1996). Future research could therefore focus on the assessment of the language skills of the learners while utilizing a standard assessment protocol. Data could also be collected by determining parents’ perceptions of language outcomes through the use of a questionnaire as was the case in the study by Jessop et al. (2007).

5.2.3 The outcome of mainstream placement

Subsequent to grade 1, mainstream placement in the sample increased from 55% to 70% which is consistent with existing research which shows a shift of learners with cochlear implants towards mainstream educational settings (Archbold et al., 1998; Archbold et al., 2002; Boothroyd & Boothroyd-Turner, 2002; Daya et al., 2000; Nevins & Chute, 1995; Summerfield et al., 1997). Longitudinal research would be useful in an attempt to determine whether the reported higher educational attainments are reached by the mainstream learners in comparison to those in special school settings (Archbold, 2000).

5.2.4 Level of satisfaction with grade 1 school placement

The data collected regarding parental satisfaction of grade 1 school placement suggested high levels of satisfaction, but it was excluded from the results and discussion chapter of the present study due to the compromised face validity of measuring this aspect using close format questions. Questionnaires allow for the self-report of attitudes towards a construct (Hegde, 2003) through the use of open-ended questions. The use of open-ended in the present study would have made the results more valid as it elicits information about opinions, attitudes and perceptions (Kumar, 1999). The open-ended questions would have allowed the respondents an opportunity to provide details and reasons for the information they provided and not merely generated agreement or disagreement with statements (Brink, 2000).

The researcher's involvement in an undergraduate research project (i.e. Nel, 2007) was an initial attempt to generate more in-depth information regarding parental perceptions of grade 1 mainstream school placement of learners with cochlear implants. The primary motivation for the research by Nel (2007) was due to the emphasis existing literature places on parental involvement in the rehabilitation process of children with cochlear implants (Christiansen & Leigh, 2004). Further motivation stemmed from the reports of positive perceptions of parents of learners with disabilities in inclusive educational placement (Garrick Duhaney & Salend, 2000). The qualitative research method in the Nel (2007) study employed semi-structured interviews. These offered more valid means of measuring the construct of parental satisfaction of grade 1 school placement initially intended to be a sub-aim of the present study. The outcomes of the aforementioned undergraduate study reported positive parental perceptions of the learner's functioning in the mainstream classroom (Nel, 2007).

5.2.5 Effect of additional disabilities on school placement

The findings in the present study showed a similar incidence of additional disabilities in the mainstream and special school groups. Mere categorization of the learners into the varied diagnosed additional disabilities, however, provides limited information. Further investigation is required to evaluate the "impact of the additional cognitive and/or

physical conditions” (Dettman et al., 2004, p. 365) on the functioning of the learner. This could provide insight into the influence of additional disabilities on the school placement of these learners.

5.3 PRACTICAL IMPLICATIONS

Numerous published studies have highlighted the importance of using the findings when counselling parents/caregivers to ensure that they have realistic post implant expectations (Dowell et al., 2002; Govaerts et al., 2002; Miyamoto et al., 1994; O’Donoghue, 1996; Osberger et al., 1991). Counselling could also emphasize the urgency for early implantation.

Due to the high cost involved, cochlear implantation in the South African context is still largely conducted exclusively in the private health sector (Jessop et al., 2007). Sound research which shows that cochlear implantation is effective is therefore essential in order to influence resource allocation in the health sector. Findings of outcome studies such as the present study could establish a strong basis for advocating for state funding for cochlear implantation.

The findings of the present study also direct the focus on the importance of early identification of hearing impairment and could also be used in advocating for universal newborn hearing screening.

The results of the qualitative analysis also outlined parental concerns about school placement and the support structures they identified as lacking or beneficial. These findings could be used to create awareness amongst the parents/caregivers and educators about the possible barriers these learners may experience. This could allow for adequate planning to circumvent the difficulties.

5.4 FINAL THOUGHT

Seventy percent of the learners in the present sample were in mainstream school placement subsequent to grade 1. This finding illustrates that for learners with cochlear

implants, mainstream placement is not only reachable but a reality (Archbold et al., 2002). Mainstream placement for learners with cochlear implants should, however, not be the goal at all costs. The school placement should be the “most appropriate environment that will help children achieve their potential” (Archbold, 2002, p. 160).

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7. APPENDICES

Appendix A: Table I: Participant description (Learners with cochlear implant/s)

Nr.	D.O.B	Gender	Language	Current grade	Degree of hearing loss ¹	Etiology ²	Onset of hearing loss	IMPLANT INFORMATION		
								Channels	Processor	Coding Strategy
1.	08/07/1989	Female	English	10	Bil. Prof.	3	Congenital	22	Spectra	Speak
2.	09/09/1996	Male	English	3	Bil. Prof.	3	Congenital	24	Sprint	ACE
3.	11/04/1987	Female	Afrikaans	Tertiary	Bil. Prof.	1	Congenital	22	Spectra	Speak
4.	06/06/1990	Female	Afrikaans	11	Bil. Prof.	1	Congenital	22	Spectra	Speak
5.	26/04/1993	Female	Afrikaans	7	Bil. Prof.	3	Congenital	Not available		
6.	02/06/1993	Female	Afrikaans	7	Bil. Prof.	13	Congenital	24	Sprint	ACE
7.	22/06/1994	Female	English	5	Bil. Prof.	3	Congenital	24	Sprint	ACE
8.	25/10/1997	Female	English	2	Bil. Prof.	3	Congenital	24	Sprint	ACE
9.	08/12/1998	Female	English	1	Bil. Prof.	2	Prelingual	24	Sprint	ACE
10.	17/01/1997	Female	Afrikaans	3	Bil. Prof.	1	Congenital	24	Esprit 3G	ACE
11.	06/05/1997	Female	English	3	Bil. Prof.	1	Congenital	24	Esprit 3G	ACE
12.	17/03/1995	Male	English	4	Bil. Prof.	1	Congenital	24	Esprit 3G	ACE
13.	26/07/1993	Female	English	6	Bil. Prof.	3	Congenital	22	Spectra	Speak
14.	12/04/1986	Male	Afrikaans	Post matric	Bil. Prof.	2	Prelingual	22	Spectra	Speak
15.	17/02/1995	Female	Afrikaans	5	Bil. Prof.	3	Congenital	24	Sprint	ACE
16.	27/10/1998	Male	Afrikaans	1	Bil. Prof.	2	Prelingual	24	Esprit 3G	ACE
17.	11/04/1993	Female	English	5	Bil. Prof.	3	Congenital	24	Sprint	Speak
18.	20/01/1998	Male	Afrikaans	Remedial L2	Bil. Prof.	1	Congenital	24	Sprint	ACE
19.	19/04/1997	Female	English	2	Bil. Prof.	2	Prelingual	24	Sprint	ACE
20.	17/06/1994	Male	Afrikaans	5	Bil. Prof.	1	Congenital	22	Spectra	Speak
21.	21/01/1997	Female	English	1	Bil. Prof.	5	Congenital	24	Sprint	ACE
22.	19/03/1997	Female	English	2	Bil. Prof.	3	Congenital	24	Sprint	ACE
23.	20/09/1994	Female	Afrikaans	5	Bil. Prof.	3	Congenital	24	Sprint	ACE
24.	15/02/1994	Female	Afrikaans	Remedial L2	Bil. Prof.	3	Congenital	24	Sprint	ACE
25.	30/06/1996	Female	Afrikaans	3	Bil. Prof.	3	Congenital	24	Sprint	ACE
26.	28/06/1995	Female	Afrikaans	5	Bil. Prof.	3	Congenital	24	Esprit	Speak
27.	13/04/1997	Male	English	1	Bil. Prof.	4	Congenital	24	Esprit 3G	ACE

Nr.	D.O.B	Gender	Language	Current grade	Degree of hearing loss ¹	Etiology ²	Onset of hearing loss	IMPLANT INFORMATION		
								Channels	Processor	Coding Strategy
28.	02/06/1996	Male	Afrikaans	3	Bil. Prof.	3	Congenital	24	Sprint	ACE
29.	15/07/1998	Male	Afrikaans	1	Bil. Prof.	20	Congenital	24	Sprint	ACE
30.	16/10/1992	Female	Afrikaans	7	Bil. Prof.	2	Prelingual	24	Sprint	ACE
31.	26/10/1998	Female	English	1	Bil. Prof.	1	Congenital	24	Sprint	ACE
32.	14/06/1997	Male	English	3	Bil. Prof.	1	Congenital	24	Sprint	ACE
33.	17/04/1999	Male	English	1	Bil. Prof.	3	Congenital	24	Sprint	ACE
34.	27/07/1992	Female	English	6	Bil. Prof.	3	Congenital	22	Spectra	Speak
35.	04/07/1997	Male	English	3	Bil. Prof.	3	Congenital	24	Esprit 3G	ACE
36.	25/07/1988	Female	English	11	Bil. Prof.	3	Congenital	22	Spectra	Speak
37.	03/08/1994	Female	English	5	Bil. Prof.	3	Congenital	24	Sprint	ACE
38.	20/05/1994	Male	Afrikaans	5	Bil. Prof.	3	Congenital	24	Sprint	ACE
39.	25/05/1996	Male	English	3	Bil. Prof.	1	Congenital	24	Sprint	ACE
40.	05/03/1997	Male	Afrikaans	2	Bil. Prof.	3	Congenital	24	Sprint	ACE
41.	06/02/1994	Male	Afrikaans	4	Bil. Prof.	3	Congenital	22	Esprit 22	Speak
42.	10/09/1999	Male	Afrikaans	1	Bil. Prof.	1	Congenital	24	Esprit 3G	ACE
43.	21/07/1990	Male	Afrikaans	9	Bil. Prof.	5	Congenital	22	Spectra	Speak
44.	03/04/1998	Female	Afrikaans	2	Bil. Prof.	3	Congenital	24	Sprint	ACE
45.	14/10/1996	Male	Afrikaans	2	Bil. Prof.	3	Congenital	24	Sprint	ACE
46.	17/06/1998	Male	English	2	Bil. Prof.	1	Congenital	24	Esprit 3G	ACE
47.	29/01/1985	Female	Afrikaans	Tertiary	Bil. Prof.	2	Prelingual	22	Spectra	Speak

¹ Bil. Prof. = Bilateral Profound

² Etiology (as coded by the TBH-USCIU)

1 - Congenital inherited	4 - Premature birth	20 - Waardenburg Syndrome
2 - Meningitis	5 - Rubella	
3 - Congenital unknown	13 - Auditory neuropathy	

RECORD REVIEW FORM

SECTION A

A.1 Biographical information

Learner number: _____

D.O.B: _____

Parent/Caregiver: _____

Address: _____

Contact no.: _____

Gender: Male Female

Language: English Afrikaans

A.2 Level of hearing loss:

Severity: Severe Profound

Laterality: Unilateral Bilateral

Etiology: _____

A.3 Cochlear implant information:

Channels: 22 24

Speech processor: Esprit Freedom Sprint

Esprit 3G Spectra

Coding strategy: Speak ACE CIS

SECTION B

B.1 Age at cochlear implantation

Date at implantation: YYYY / MM / DD - Date of birth: YYYY / MM / DD

= _____ Years _____ Months

B.2 Duration of hearing impairment

Date at switch on: YYYY / MM / DD - Age at onset of hearing impairment: YYYY / MM / DD

= _____ Years _____ Months

B.3 Duration of cochlear implant use at start of grade 1

Start of grade 1: YYYY / MM / DD - Date at switch on: YYYY / MM / DD

= _____ Years _____ Months

B.4 Speech perception skills

1 2 3 4 5 6 7

B.5 Mode of communication

- Sign language
- Total communication
- Oral / Aural communication

B.6 Laterality of cochlear implant

- Unilateral
- Bilateral

B.7 Additional disabilities

- Attention Deficit Disorder
- Auditory Neuropathy
- Autism Spectrum Disorder
- Central Auditory Processing Disorder
- Cerebral Palsy
- Global Delay
- Low Muscle Tone
- Cognitive Impairment
- Specific Language Impairment
- Sensory integration
- Other _____

B.8 Pre-primary care or school attended

- Mainstream preschool
- Carel du Toit Pre-Primary School for Hearing Impaired Children
- Homecare or no preschool attended

Appendix C: Speech Perception Categories

Category 1	Detection of speech sounds only.
Category 2	Pattern perception i.e. discrimination of supra-segmental aspects of speech.
Category 3	Closed-set word recognition through discrimination and recognition of words differing in vowels.
Category 4	Closed-set word recognition through discrimination and recognition of words differing in consonants.
Category 5	Minimal open-set perception: < 20% score.
Category 6	Open-set speech recognition of words and sentences: 20-50% score.
Category 7	Open-set speech recognition of words and sentences: 51-100% score.

(Clark, Cowan & Dowell, 1997; Moog & Geers, 1990)

QUESTIONNAIRE

**PARENTAL PERCEPTIONS OF THE SELECTION OF GRADE 1 PLACEMENT
FOR THEIR CHILDREN AND CHANGES IN SCHOOL PLACEMENT.**

Answer every question as indicated below.

SECTION A

BACKGROUND INFORMATION

1) Name of learner:

2) Date of birth:

3) In what grade is your child currently?

L

SECTION B

INFORMATION REGARDING GRADE 1 SCHOOL PLACEMENT

(Tick ✓ applicable)

4) What type of school did your child attend for Grade 1/is your child attending for Grade1?

- Mainstream school ⇒ **Move to Q.5**
- School for hearing impaired learners ⇒ **Move to Q.6**
- School for learners with special educational needs
(Needs other than hearing impairment) ⇒ **Move to Q.7**

5) Type of mainstream placement: *(Include the name of the school)*

- Mainstream fulltime
Name of school: _____
- Mainstream + Support (Any additional therapy **within** or **after** school hours)
Name of school: _____
- Mainstream + Special class (e.g. Remedial class, class for hearing impaired learners)
Name of school: _____
- Mainstream other
Name of school: _____

⇒ **Move to Q.8**

6) Type of school for hearing impaired learners: (Include the name of the school)

School for hearing impaired-Oral

Mary Kihn School for Partially Hearing Children

Dominican Grimley - Hout Bay

Other _____

School for hearing impaired - Total Communication

Dominican Grimley - Wittebome

Other _____

School for hearing impaired-Signing

De la Bat

Nuwe Hoop

Other _____

⇒ **Move to Q.8**

7) Type of school for learners with special needs:

Vera School for Autistic Children

Vista Nova Cerebral Palsy School

Other (*Specify the name of the school*):

⇒ **Move to Q.8**

8) What influenced the selection of your child's Grade 1 placement? (Tick ✓ ALL that apply)

Personal preference

Recommendation by teacher

Recommendation by cochlear implant team

Where the school was situated

Availability of the school

Method of communication at the school (e.g. Oral, sign language)

School accommodated learners with special needs (e.g. autistic, cerebral palsy, visually impaired)

Cost

Other (Specify): _____

⇒ Move to Q.9

9) Were you satisfied with the selection of school placement for Grade 1?

YES ⇒ Skip to Q.11

NO ⇒ Move to Q.10

10) What alternative placement would you have preferred?

- Mainstream placement
- School for hearing impaired learners
- School for learners with special educational needs

⇒ Move to Section C

SECTION C

INFORMATION REGARDING CHANGE IN SCHOOL PLACEMENT

(Tick ✓ applicable)

11) Has your child's school placement changed since Grade1?

- NO ⇒ Skip to Q.15 YES ⇒ Move to Q.12

12) To what type of school has your child changed?

- Mainstream placement
- School for hearing impaired learners
- School for learners with special educational needs

13) At what grade did the change in school placement occur?(e.g. Started Grade 4 at different school)

14) Why has placement changed?

15) Is there anything else you would like to add regarding your child's Grade 1 school placement?

Thank you for your participation and co-operation!

Appendix E: Ethical approval to conduct study from the Committee for Human
Research, Stellenbosch University



UNIVERSITEIT • STELLENBOSCH • UNIVERSITY
jou kennisvennoot • your knowledge partner

12 April 2006

Ms F Bardien
Discipline of Speech-Language and Hearing Therapy
Dept of Interdisciplinary Health Sciences

Dear Ms Bardien

**RESEARCH PROJECT : "FACTORS INFLUENCING GRADE 1 PLACEMENT AND
SUBSEQUENT CHANGES IN SCHOOL PLACEMENT OF
LEARNERS WITH COCHLEAR IMPLANTS"**
PROJECT NUMBER : N06/02/020

My letter dated 17 March 2006 refers.

At a meeting that was held on 5 April 2006 the Committee for Human Research ratified the approval of the
above-mentioned project.

Yours faithfully

CJ VAN TONDER
RESEARCH DEVELOPMENT AND SUPPORT (TYGERBERG)
Tel: +27 21 938 9207 / E-mail: cjvt@sun.ac.za

CJVT/ev



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Fakulteit Gesondheidswetenskappe • Faculty of Health Sciences



Verbind tot Optimale Gesondheid • Committed to Optimal Health
Afdeling Navorsingsontwikkeling en -steun • Research Development and Support Division
Posbus/PO Box 19063 • Tygerberg 7505 • Suid-Afrika/South Africa
Tel: +27 21 938 9677 • Faks/Fax: +27 21 931 3352
E-pos/E-mail: rdsinfo@sun.ac.za

Appendix F: Letter for permission to conduct study to the Medical Superintendent
of Tygerberg Academic Hospital



UNIVERSITEIT-STELLENBOSCH-UNIVERSITY
Jou kennisvenoot • your knowledge partner

Dr. A Muller
Medical Superintendent
Tygerberg Hospital
PO Box X1
Tygerberg
7505

19 April 2006

Dear Dr. Muller

Re: Permission to conduct research project

I am currently enrolled in the Master's Programme, Discipline of Speech-Language and Hearing Therapy, at Stellenbosch University. One of the course requirements is that I complete a research project. I, therefore would like to request permission to conduct my research in the Cochlear Implant Unit.

The aim of the research is to observe the factors influencing grade 1 school placement and subsequent changes in placement of learners with cochlear implants. In order to do this, I will require access to patient information.

Included please find the following documentation:

- Research Proposal
- Protocol Synopsis

If further information is required, please do not hesitate to contact me.

Yours sincerely

Faeza Bardien (Student no. 12534226)

Prof. SK Tuomi (Project Supervisor)



Fakulteit Gesondheidswetenskappe • Faculty of Health Sciences



Verbind tot Optimale Gesondheid • Committed to Optimal Health
Interdisiplinêre Gesondheidswetenskappe • Interdisciplinary Health Sciences
Disiplinê van Spraak-Taal- & Gehoorterapie • Discipline of Speech- Language and Hearing Therapy
Posbus/PO Box 19063 • Tygerberg 7505 • Suid-Afrika/South Africa
Tel: +27 21 938 9494

Appendix G: Letter for permission to conduct study to the Head of University of Stellenbosch-Tygerberg Hospital Cochlear Implant Unit



UNIVERSITEIT • STELLENBOSCH • UNIVERSITY
jou kennisvenoot • your knowledge partner

Mrs. AMU Muller (Cochlear Implant Programme)
Discipline of Speech-Language and Hearing Therapy
Stellenbosch University
PO Box 19063
Tygerberg
7505

19 April 2006

Dear Mrs. Muller

Re: Permission to conduct research project

I am currently enrolled in the Master's Programme, Discipline of Speech-Language and Hearing Therapy, at Stellenbosch University. One of the course requirements is that I complete a research project. I, therefore would like to request permission to conduct my research in the Cochlear Implant Unit.

The aim of the research is to observe the factors influencing grade 1 school placement and subsequent changes in placement of learners with cochlear implants. In order to do this, I will require access to patient information.

Included please find the following documentation:

- Research Proposal
- Protocol Synopsis

If further information is required, please do not hesitate to contact me.

Yours sincerely

Faeza Bardien (Student no. 12534226)

Prof. SK Tuomi (Project Supervisor)



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Dissipline van Spraak-Taal- & Gehoorterapie • Discipline of Speech- Language and Hearing Therapy

Posbus/PO Box 19063 • Tygerberg 7505 • Suid-Afrika/South Africa

Tel: +27 21 938 9494

**UNIVERSITY OF STELLENBOSCH
FACULTY OF HEALTH SCIENCES
DISCIPLINE OF SPEECH-LANGUAGE AND HEARING THERAPY**

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

TITLE OF RESEARCH PROJECT:

Factors influencing grade 1 placement and subsequent changes in school placement of learners with cochlear implants

REFERENCE NUMBER: N06/02/020

PRINCIPAL INVESTIGATOR: Faeza Bardien

SUPERVISORS: Prof. Seppo Tuomi, Mrs. Daleen Klop

ADDRESS: Department of Interdisciplinary Health Sciences
Discipline of Speech-Language and Hearing
Therapy
PO Box 19063
Tygerberg
7505

CONTACT NUMBER: (021) 938 9741 / 938 9494

Dear Parent/Guardian

You are invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do initially agree to take part.

This study has been approved by the Committee for Human Research at Stellenbosch University and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

Why have you been invited to participate?

As a parent/guardian of a learner with a cochlear implant, you play a vital role in the decision making process of educational aspects of your child's development. Enclosed is a short questionnaire intended to collect information regarding your perception of the factors that influenced your child's Grade 1 school placement and any subsequent changes in your child's school placement.

What is this research study all about?

This research project is part of my Master's degree in Speech-Language and Hearing Therapy at the University of Stellenbosch. Your responses can help us understand more about the factors that influence the educational placement and change in placement of the South African cochlear implant learner and can be used by the professionals at the Implant Unit to aid parents/caretakers in making educational placement decisions. It would be greatly appreciated if you would take a few minutes of your time to complete the enclosed questionnaire.

Procedure:

Your consent will also allow the investigator access to information from your child's records at the **University of Stellenbosch- Tygerberg Hospital Cochlear Implant Unit**.

The following information will be extracted from the records:

1) Biographical information

- date of birth, current grade, gender;

2) Intrinsic (subject) characteristics

- age of implantation, duration of implant use, speech perception skills, mode of communication, type of preschool, additional disabilities, type of school (grade 1), name of school, additional school information e.g. provision of support services, grade at which change in school placement occurred and type of school to which change occurred; and

3) Extrinsic characteristics

- parent /caregiver preference, recommendation by cochlear implant team or other professional, proximity of school, availability of school and cost implications.

Who has access to information collected during this study?

Your responses are completely confidential. All information will be coded by number only and your child's identity will only be known to the investigator and her supervisors. The identity of the participant will remain anonymous and participants' names will therefore not be used in a publication or the thesis.

DECLARATION BY PARTICIPANT

By signing below, I agree to take part in a research study entitled:- *Factors influencing grade 1 placement and subsequent changes in school placement of learners with cochlear implants.*

I declare that:

1. I have read this information and consent form and it is written in a language with which I am fluent and comfortable.
2. I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.
3. I may choose to leave the study at any time and will not be penalised or prejudiced in any way.

Signed at (place) on (date) 2006.

.....
Signature of participant

.....
Signature of witness

Thank you anticipation of your co-operation

Please return your completed consent form and questionnaire in the enclosed self-addressed envelope.

Yours sincerely

.....
Faeza Bardien

(Speech-Language Therapist & Audiologist)

.....
Prof. S.K. Tuomi

(Supervisor)

Appendix I: Table II: Data collected for quantitative analysis

Learner	Age at implantation (months)	Duration of hearing impairment (months)	Duration of implant use (months)	Speech perception Category	Mode of communication	Bilateral cochlear implants	Additional disabilities ¹	Preschool ²	Questionnaire factors (9-16)								Grade 1 school placement	Satisfaction with Grade 1 placement	Change in school placement
									9. Parental Preference	10. Recommend	11. Proximity	12. Availability	13. Mode of comm.	14. Accommodate	15. Cost	16. Other			
1.	65	66	24	5	Oral			Spec-OC		X							Special	YES	X
2.	56	56	32	7	Oral		8	Spec-OC			X		X			X	Special	YES	
3.	41	41	26	7	Oral			Spec-OC	X	X	X					X	Main	YES	X
4.	NOT REQUIRED FOR LEARNER 4															X	Home	YES	X
5.	49	49	31	7	Oral			Main	X		X	X	X				Main	YES	
6.	32	32	43	*NA	Total		3	Spec-TC		X							Special	YES	
7.	37	37	53	7	Oral		7	Spec-OC		X							Special	NO	X
8.	18	20	55	7	Oral			Main	X		X	X					Main	YES	
9.	43	33	41	7	Oral			Spec-OC		X							Special	YES	
10.	22	22	62	7	Oral		7	Spec-OC	X							X	Main	YES	
11.	16	17	63	7	Oral			Spec-OC	X	X							Main	YES	
12.	39	39	55	7	Oral		2	Spec-OC	X	X							Main	YES	
13.	37	38	53	7	Oral		7	Spec-OC		X			X			X	Special	YES	
14.	43	33	38	7	Oral		7	Main	X							X	Main	YES	X
15.	34	35	35	7	Oral		1	Main		X		X					Main	YES	X
16.	23	14	23	7	Oral	X		Spec-OC	X	X	X	X					Main	YES	
17.	59	61	33	7	Oral			Main		X		X	X				Special	YES	X
18.	39	38	34	7	Oral		6	Spec-OC		X				X			Main	YES	
19.	49	25	43	7	Oral			Spec-OC		X				X			Special	NO	X
20.	25	25	66	7	Oral			Spec-OC	X	X	X						Main	YES	
21.	39	40	56	7	Oral		7	Spec-OC	X	X	X	X	X	X			Special	YES	
22.	53	54	28	7	Oral			Spec-OC		X							Special	YES	X
23.	37	37	50	7	Oral		7	Spec-OC	X		X						Special	YES	X

Learner	Age at implantation (months)	Duration of hearing impairment (months)	Duration of implant use (months)	Speech perception Category	Mode of communication	Bilateral cochlear implants	Additional disabilities ¹	Preschool ²	Questionnaire factors (9-16)								Grade 1 school placement ³	Satisfaction with Grade 1 placement	Change in school placement
									9. Parental Preference	10. Recommend	11. Proximity	12. Availability	13. Mode of comm.	14. Accommodate	15. Cost	16. Other			
24.	48	49	36	7	Oral		7	Spec-OC	X	X					X		Main	YES	
25.	46	46	33	7	Oral		9	Spec-TC		X			X				Special	YES	
26.	27	28	50	7	Oral			Main	X	X						X	Main	YES	X
27.	32	33	72	7	Oral	X	8	Main	X		X	X				X	Main	YES	
28.	50	51	41	7	Oral		9	Spec-OC	X		X		X		X		Special	YES	
29.	40	42	48	7	Total		8	Spec-TC		X			X				Special	YES	
30.	55	45	30	7	Oral			Main		X	X				X		Main	YES	X
31.	7	7	67	7	Oral			Main	X								Main	YES	
32.	15	17	64	7	Oral		1	Main	X							X	Main	YES	
33.	39	40	42	7	Oral			Spec-OC	X	X							Special	YES	
34.	52	52	36	7	Oral			Spec-OC		X	X	X					Special	YES	
35.	22	23	56	7	Oral		5	Spec-OC	X		X	X				X	Main	YES	
36.	59	61	29	7	Oral			Spec-OC	X	X		X	X				Special	YES	X
37.	35	36	53	7	Oral		7	Spec-OC			X				X	X	Main	YES	
38.	47	48	43	7	Signing			Spec-TC					X				Special	YES	
39.	30	32	48	7	Oral		8	Main	X								Main	YES	X
40.	39	39	55	7	Oral		4	Spec-OC	X				X			X	Main	YES	
41.	32	33	62	7	Oral		8	Spec-OC		X							Special	NO	X
42.	46	44	29	7	Oral	X		Spec-OC			X						Main	YES	
43.	60	61	29	7	Oral			Main		X	X		X				Main	YES	
44.	14	15	66	7	Oral		7	Main			X	X					Main	YES	
45.	25	26	73	7	Oral			Spec-TC						X			Main	YES	
46.	25	25	53	7	Oral			Main	X		X					X	Main	YES	
47.	60	47	35	7	Oral			Spec-TC		X							Special	YES	X
	Avg=38	Avg=37	Avg=46			3	23		23	27	17	11	12	4	4	13			

Key:

* Not available

¹ Additional Disabilities:

1 – Attention Deficit Disorder	4 – Central Auditory Processing	7 – Low Muscle Tone
2 – Asberger Syndrome	5 – Cerebral Palsy	8 – Sensory Integration
3 – Auditory Neuropathy	6 – Global Developmental Delay	9 – Specific Language Impairment

² Preschool:

Main	Mainstream
Spec-OC	Special – Oral Communication
Spec-TC	Special – Total Communication

³ Grade 1 school placement:

Home	Homeschool
Main	Mainstream school
Special	Special school