

CHAPTER 4

DESCRIPTION AND DISCUSSION OF THE RESULTS

4.1 INTRODUCTION

In the first chapters of this study the literature relevant to the research question are described. The literature relevant to the research question is the source from where the researcher can collect and process information in order to identify a pattern in the data.

In this chapter the results of the study are presented, discussed and interpreted in relation to the relevant literature. The results of this study are discussed according to the formulated sub-aims (as stipulated in chapter 3) in order to address the main aim of this study namely: **The knowledge and attitude of pediatricians regarding the diagnosis and intervention process of infants and children with a sensorineural hearing loss.**

The results are presented through graphs, followed by a discussion and interpretation in order to draw conclusions, in accordance to the formulated sub-aims.

4.2 DESCRIPTION AND DISCUSSION OF THE BIOGRAPHICAL AND EDUCATIONAL BACKGROUND

The sub-aim formulated in 3.2.2.1 was to determine the respondents' years of experience as practicing pediatrician, their current instance of practice as well as previous education received regarding infants and children with a sensorineural hearing loss.

The results are presented respectively in Figure 4.1, Figure 4.2 and Figure 4.3.

Figure 4.1 is a visual display of respondents' years of experience as a practicing pediatrician

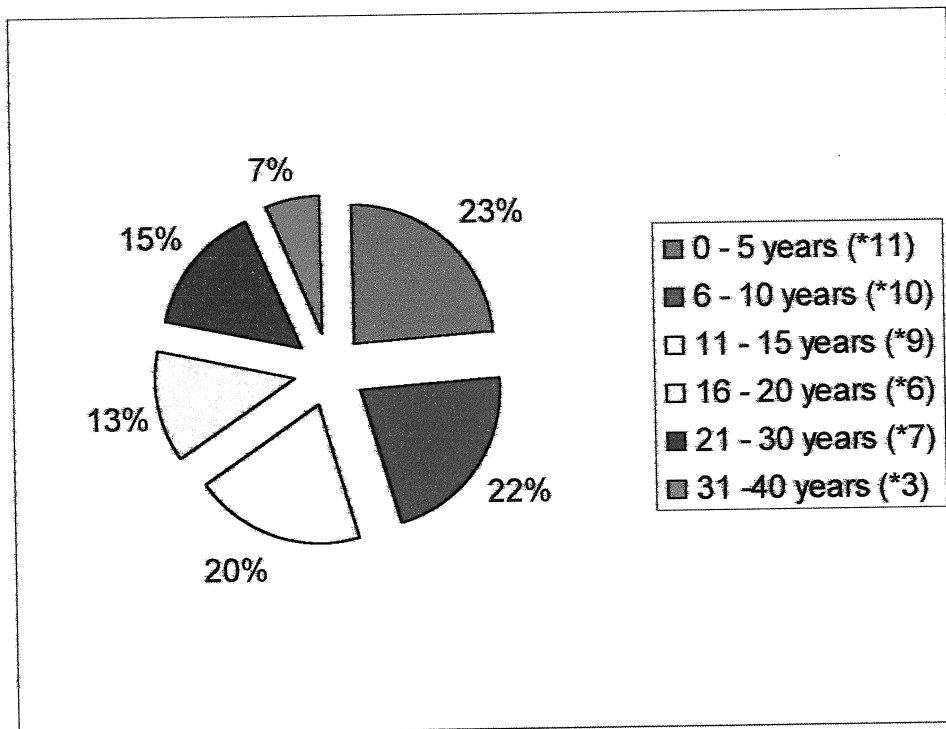


Figure 4.1: Years of experience as a practicing pediatrician

(* the amount of participating respondents in that specific year group)

From the above figure it is shown that there is a proportional spreading amongst the participants in terms of their years as practicing pediatricians. Respondents that have been practicing as pediatricians: 0 to 5 years (23%), 6 to 10 years (22%), 11 to 15 years (20%), 16 to 20 years (13%), 21 to 30 years (15%) and 31 to 40 years (7%) The random sample can therefore be seen as representative of the sample group (Leedy & Ormrod, 2001).

The majority of the respondents fall in the group of between nil to five years of experience field (23%). The researcher experiences their participation in the study positively, as they are eager to learn more about the topic of sensorineural hearing loss. The rest of the participating respondents are experienced pediatricians that have six or more years of experience in the clinical practice. Their participation in this study is just as important, since continuous education in the fast growing field of audiology is of utmost importance. In the researcher's opinion the study conducted is

of value to all pediatricians. The field of audiology has expanded at a rapid pace regarding the identification and intervention of pediatric hearing losses. Therefore the syllabus is changing continuously in order to keep up to date with the latest development in pediatric audiology. It is important for all pediatricians, those who have just started practicing as well as those who started a long time ago, to be on an equal level regarding their skills and knowledge.

Technology is evolving at a rapid pace and it is therefore important to gain knowledge in order to keep up to date with these developments. Infants/children with hearing loss as well as their families are dependent on pediatricians for expert consultation (Boswell & Cherow, 1999). Information is the key to developing a shared commitment for early hearing detection and intervention programmes (Finitzo & Crumley, 1999).

Research in early detection of hearing loss and intervention before the age of six months of age has proved the importance of knowledge by all professionals involved (Yoshinaga-Itano, 2001).

The goal of continuous education, regardless of experience, is to transfer and gain technical knowledge, related skills, values and attitudes in order to develop proficiency and abilities to improve capabilities as a medical member (Masterson et al., 1999).

Figure 4.2 illustrates the respondents' current position of practice

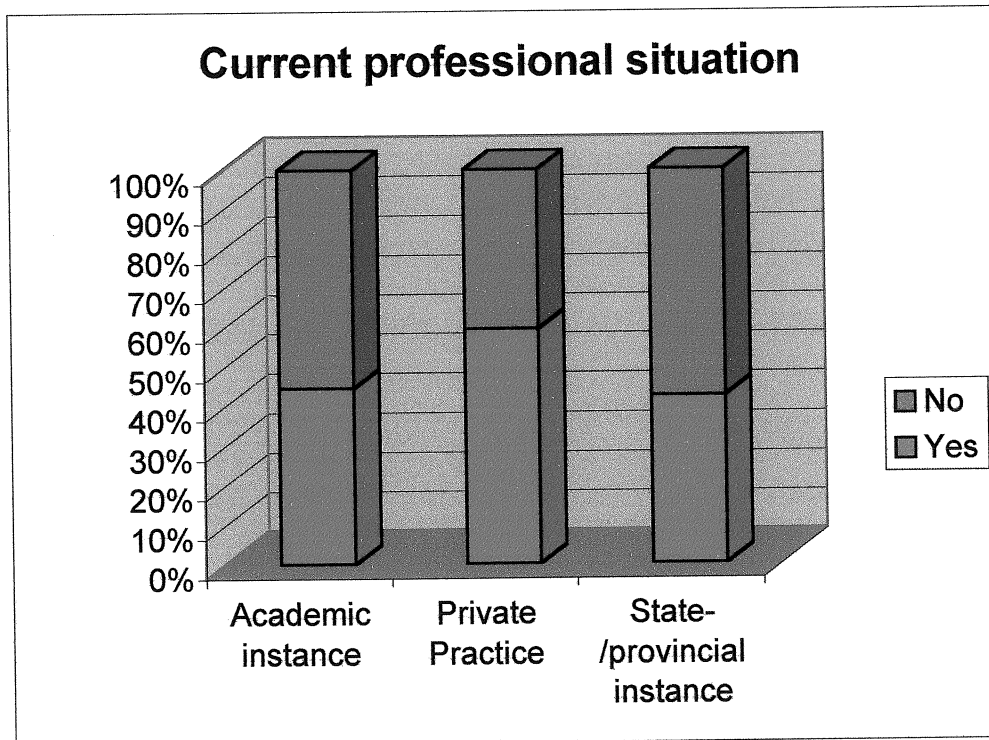


Figure 4.2: Current position of situation

As seen in Figure 4.2 the majority of the respondents are currently occupied in a private practice (53%), while 38% are in an academic situation and the minority (34%) of the respondents are practicing in a state- or provincial instance. This information is important to obtain, since all pediatricians, regardless of instance of practice, needs sufficient knowledge regarding infants and children with sensorineural hearing loss.

In order to treat the infant/child with hearing loss optimally, an interdisciplinary team approach must be followed (Rossetti, 1996). Since late diagnosis of infants/children with hearing loss is still preventing timely intervention the following conclusion can be made regarding pediatrician's situation of practice. When working in a private practice the pediatrician is usually working alone or in conjunction with other pediatricians. They have a busy schedule and this might lead to isolation from other medical practitioners or programmes. It can therefore easily happen that important current development and research surrounding hearing loss goes undetected. This statement is made accordingly to studies done that some pediatricians are unfamiliar with the rationale for hearing screening for newborns prior to hospital discharge

(Finitzo & Crumley, 1999). This reflects a poor state of awareness regarding hearing care.

In the academic instance it is easier to keep up-to-date with current trends and research done on the identification and intervention methods for a sensorineural hearing loss. The same goes for a state- or provincial instance where pediatricians' are surrounded by other members of the medical team.

Since professionals concerned with infants and children with sensorineural hearing loss might not always have had the necessary specialized training, it is important to keep abreast of the latest development and in-service training. It is not only the academic hospital with its interdisciplinary team approach that has a contribution to make to secondary prevention and therefore the optimum development of the hearing impaired infant/child, but also the pediatrician in the private practice, who is often the first link between the hearing-impaired infant/child and the appropriate medical service.

By secondary and tertiary prevention is meant the mitigating or eliminating of an incapability/disability as a result of a deficiency, and preventing incapability from becoming an impairment (Rossetti, 1996).

In Figure 4.3 the education received by the respondents during their studies regarding intervention of infants and children with sensorineural hearing loss is illustrated.

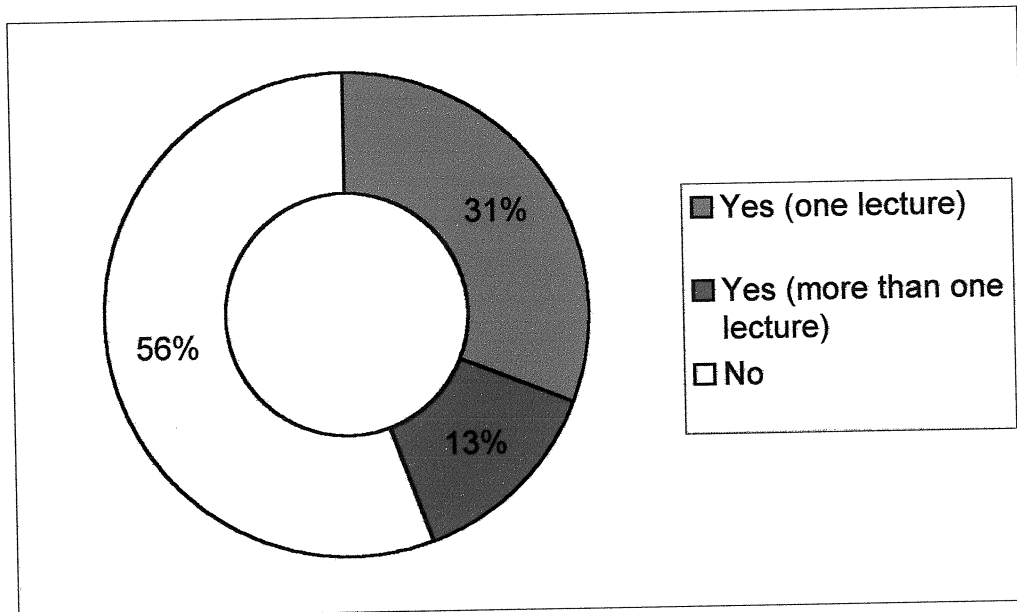


Figure 4.3: Received education

According to Figure 4.3 the majority of respondents (56%) received no formal lectures on the intervention of infants and children with sensorineural hearing loss during their time of studies. 31% of the respondents received only one lecture, while only 13% received more than one lecture on the topic surrounding intervention of sensorineural hearing loss.

The researcher came to the conclusion that the respondents' education surrounding the intervention of sensorineural hearing loss was insufficient, and that current training programmes are also lacking with regard to the early observation. Therefore detection and handling of hearing impairment as well as the referral thereof might also be lacking.

In order for the respondents to treat their patients holistically and to the best of their abilities it is of utmost importance that they obtained sufficient knowledge of the diagnosis and intervention of sensorineural hearing loss. Therefore continuous education cannot be overemphasized. Only when sufficient knowledge is obtained, and an interdisciplinary team approach is followed, can patients receive the best intervention possible (Rossetti, 1996).

It was important to determine the biographical and educational background of the respondents in order to evaluate the existing services and to formulate an overall policy for the care of hearing-impaired infants and children and to devise appropriate strategies.

4.3 DISCUSSION OF THE RESPONDENT’S KNOWLEDGE OF RISK FACTORS

Results regarding the respondents’ knowledge on the risk factors that can lead to sensorineural hearing loss are given in Figure 4.4. The respondents were to indicate if the following risk factors might lead to sensorineural hearing loss by marking “Yes”, “No” or “Never”.

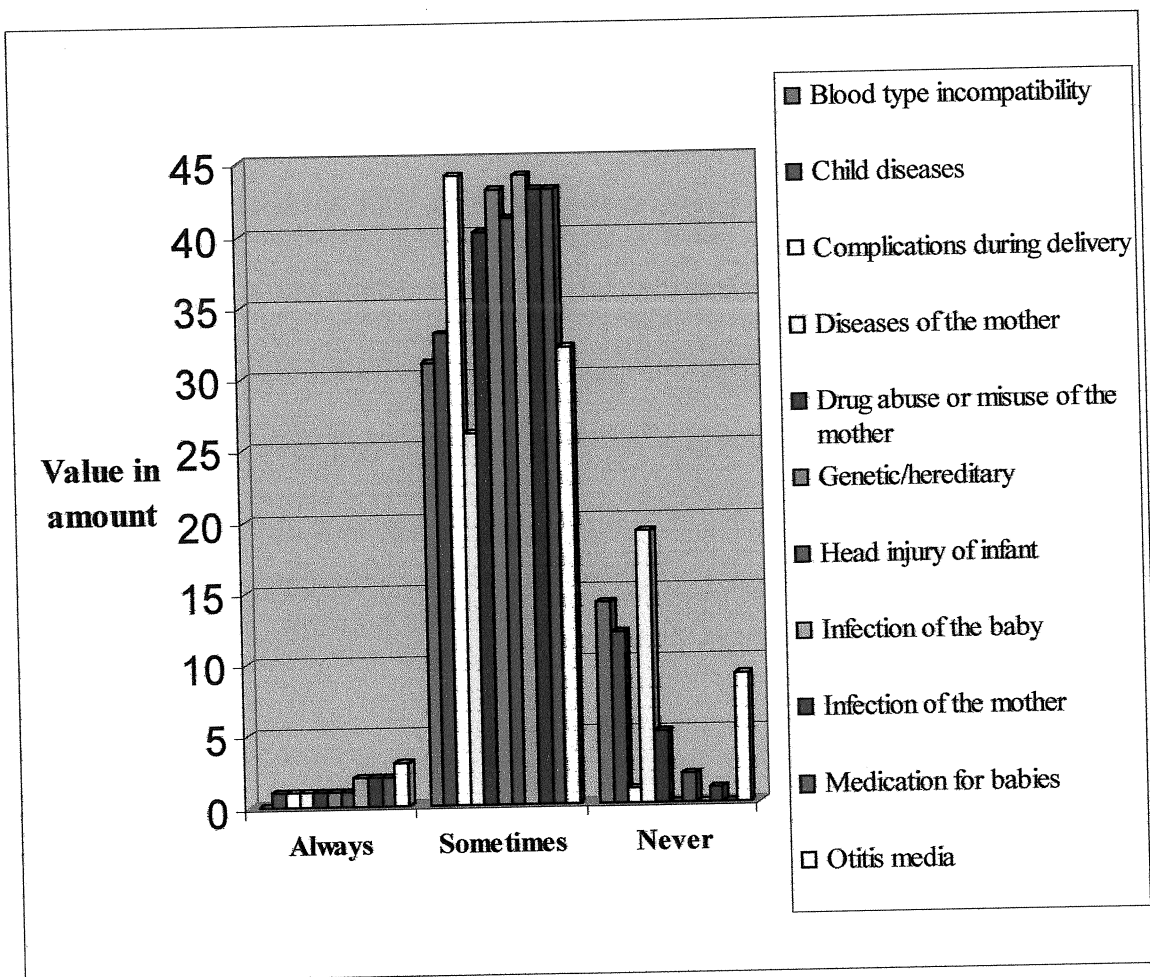


Figure 4.4: Knowledge of risk factors

About 1/600 neonates suffer from a congenital hearing loss, and many more acquire a hearing loss owing to conditions encountered during the neonatal period or during the course of the neonate's life (Hall & Mueller, 1998). There are a few known, as well as few less known causes of hearing loss. The cause of the hearing loss is thus an important guideline during the consideration of diagnosis and intervention criteria's.

In the visual presentation of Figure 4.4 it is clear that there is a strong tendency to the answer '*sometimes*'. The possible reason being that all above-mentioned factors might lead to a sensorineural hearing loss, depending on the severity, nature and possible combinations of risk factors present (Discussed in more detail in Chapter 2).

The other reason to be considered is uncertainty reflected by the respondent. It is the researchers opinion that the cause is that 56% of the respondents (in Figure 4.3) did not receive any formal education on aspects relevant to sensorineural hearing loss.

It is also seen from the results, where lesser-known risk factors are said not to cause a sensorineural hearing loss at all. This include the following:

In Figure 4.4 it can be seen that 14/47 respondents said that the blood type incompatibility between the mother and child could never lead to sensorineural hearing loss. In the case of childhood diseases 12/47 respondents said that diseases of the child, for example mumps, measles etc., cannot lead to a sensorineural hearing loss, while 28/47 respondents said that diseases of the mother cannot cause a hearing loss. 9/47 respondents did not see otitis media as a risk factor. The typical pediatrician viewed the presence of otitis media as a medical problem and not as resulting in a hearing loss (White, 2002).

It is important to note this fact, since these factors might well lead to a sensorineural hearing loss (Martin & Clark, 2000; Berkow et al, 1992; Enkin, et al, 2000; Papp et al, 2003; Mutlu et al, 1998). If pediatricians are unaware of factors that can lead to sensorineural hearing loss, the infant/child stand a chance to be diagnosed late. With late diagnosis it is meant that the impact of the hearing loss already affected the development of the child (Berkow et al. 1992). Hearing-impaired children do not develop language without normal hearing and special training. They require special

education, which needs to start as soon as the hearing loss has been identified. Thus the earlier in life the problem is identified and intervention begun the less serious the impact on the infant/child (Yoshinaga-Itano, 2001).

Pediatricians often face difficulty in accurately identifying the causes of sensorineural hearing loss in infants and children (Zakzouk & Al-Anazy, 2002). Working within a team allows each professional to contribute significantly to the well-being of the infant/child (Kim, Bothwell & Backous, 2002).

Knowledge surrounding risk factors that might cause sensorineural hearing loss is important for all professional members for early identification, the correct diagnosis and correct referrals (Kittrell & Arjmand, 1997). Therefore, it is the researcher's opinion once again on how important continuous education and an interdisciplinary team approach is.

4.4 DISCUSSION ON THE SYMPTOMS AND CHARACTERISTICS OF INFANTS AND CHILDREN WHO ARE DIAGNOSED WITH SENSORINEURAL HEARING LOSS

In order for pediatricians to detect a possible hearing loss it is necessary for them to be able to identify some crucial behaviours, responses and characteristics that might suggest a loss of hearing (Roodt, 1994). In Figure 4.5 the respondents' knowledge and insights regarding symptoms and characteristics that might accompany sensorineural hearing loss is presented visually.

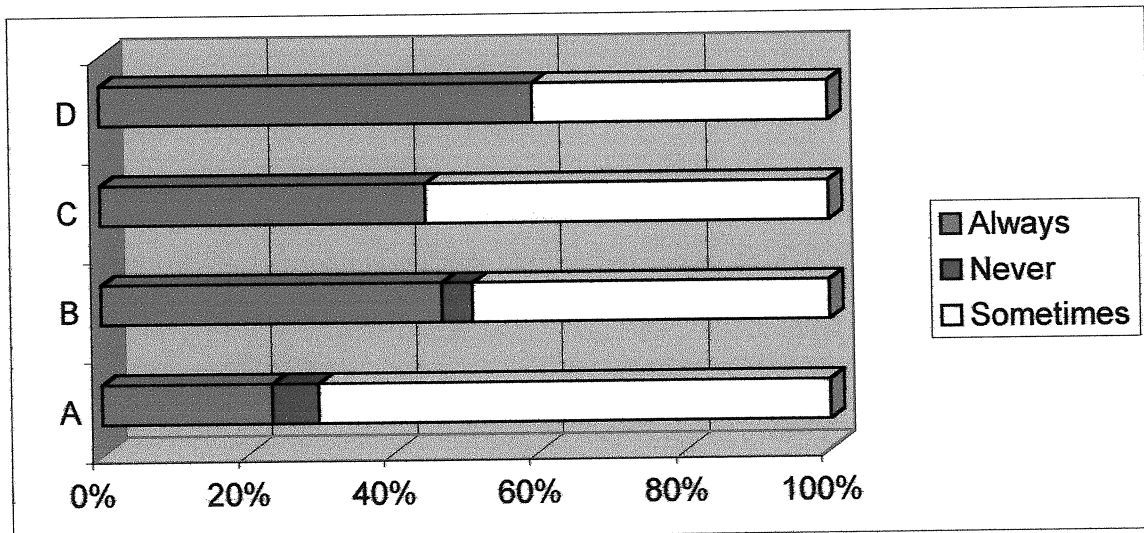


Figure 4.5: Symptoms and characteristics of sensorineural hearing loss

Keys:

- A. Atypical general development
- B. Decrease in babbling patterns
- C. Decrease in social interactions
- D. Inconsistent/ or no reaction to sound

In Figure 4.5 the respondents had to indicate their knowledge surrounding the symptoms and characteristics of an infant/child with a hearing loss. The majority of the respondents answered 'sometimes' and 'always'. In Figure 4.5, 23% of the respondents indicated that atypical development would always be a characteristic of sensorineural hearing loss, while 6 % answered 'never' and 71% answered 'sometimes'. Decrease in the infant's babbling patterns as a characteristic of hearing loss revealed the following answers: 47% answered 'always', 4% answered 'never' and 49% said that it might occur. Respondents indicated that a decrease in social interactions would have an effect 45% of the time, while 55% said that it 'might' have an effect. As for infants having inconsistent or no reaction to sound 60% of the respondents said it would always be present, while 40% said it 'might' be present.

This is a positive indication in the sense that the respondents are aware of the characteristics that might appear with a hearing loss.

It is well recognized that hearing is critical to speech and language development, communication and learning. The major areas in which an infant/child is affected by hearing loss are:

- A delay is caused in the development of receptive and expressive communication skills.
- It may cause a deficit in language development leading to learning problems; thus affecting development.
- Communication difficulties often lead to poor self-esteem and social isolation.
- It may have an impact on vocational choices (Rossetti, 1996 and Roodt, 1994).

Infants who do not pass the above-mentioned performance standards should be referred for a hearing test. With limited knowledge or uncertainty about the characteristics of infants and children with hearing loss, early diagnosis and intervention may not realize. The earlier a hearing loss occurs in an infant's life, the more serious the effects of the hearing loss will be (Yoshinaga-Itano, 2001). If a hearing loss is suspected, it is crucial to have a hearing assessment done as soon as possible in order for early intervention to realise (Yoshinaga-Itano, 2001).

4.5 DESCRIPTION AND DISCUSSION OF THE IDENTIFICATION METHODS USED FOR INFANTS AND CHILDREN WITH A SENSORINEURAL HEARING LOSS

In question 7 the knowledge of the respondents regarding the identification methods of infants/children with a sensorineural hearing loss was determined. The results are presented through visual presentation in Figure 4.6.

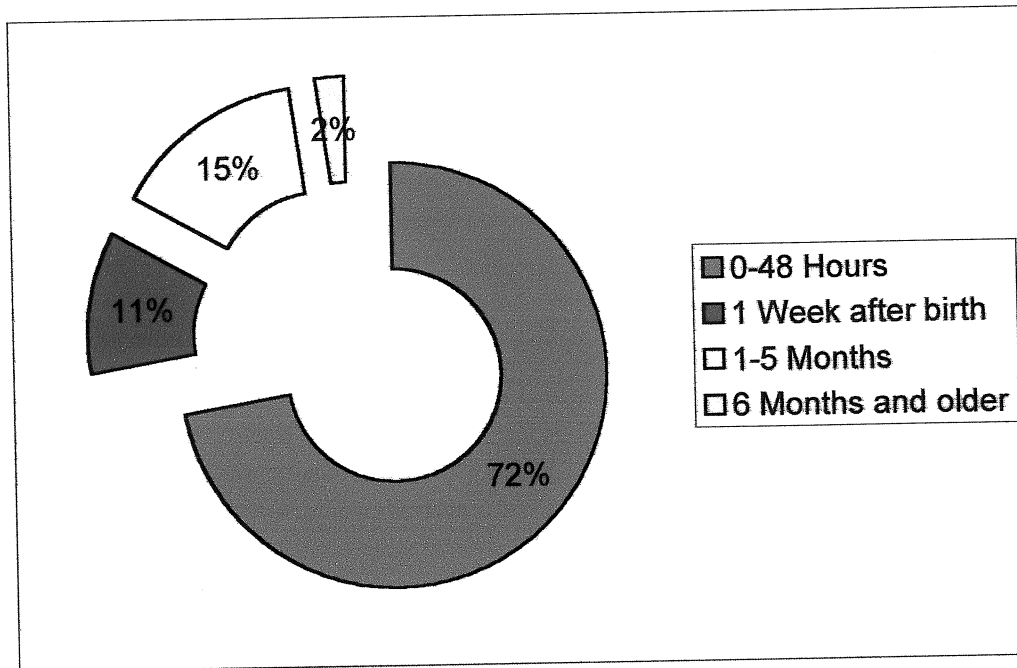


Figure 4.6: Age of identification of hearing loss

Early identification and intervention of hearing loss is, as already stated, essential for normal development of speech and language (Campbell, 1998). If risk factors are present and identified, a complete hearing evaluation should be conducted before 3 months of age (Yoshinaga-Itano, 2001). With the advanced technology of audiometric tests, the hearing of an infant can already be assessed at birth (Martin & Clarke, 2000).

Throughout the literature it is stressed that there is an optimum time for language acquisition and therefore early diagnosis of infants and children is essential (Boothroyd, 1998). Amplification with a hearing aid should be started as soon as possible after the diagnosis has been made, even as early as 6 months of age (Yoshinaga-Itano, 2001).

The results indicate a very positive approach from the respondents about when an infant/child can be tested for hearing loss. In Figure 4.6, 72% of the respondents indicated that an infant can be tested in the first 48 hours after birth. These results might have a positive outcome regarding early identification, appropriate referrals, amplification and intervention of infants. The minority of the respondents indicated

that identification could only occur: 1 week after birth (11%), 1 to 5 months after birth (15%), and at the age of 6 months or older (2%).

Proper care in terms of early identification and intervention of hearing-impaired infants/children remains a world-wide problem. If a lack of early detection is followed by improper action, referral, assessment and planning it will mean that preventative steps are inadequate. The early detection/identification of disabilities is often of critical importance to successful secondary prevention and the intervention of the hearing-impaired infant/child. The older a baby or a child with a hearing impairment is when identification and intervention occur, the greater the chance that it will not develop normally and be successful (Martin, 2000). Therefore there is an urgent need for better training and continuous education of professional members.

4.6 DESCRIPTION OF THE MANAGEMENT PROCEDURES USED BY PEDIATRICIANS

The fourth sub-aim formulated in 3.2.2.5 is determining the management procedures used by pediatricians. This included the referral procedures followed by pediatricians for infants and children with sensorineural hearing loss.

Determining when the respondents deem it important to refer infants/children for a hearing test, is visually represented in Figure 4.7.

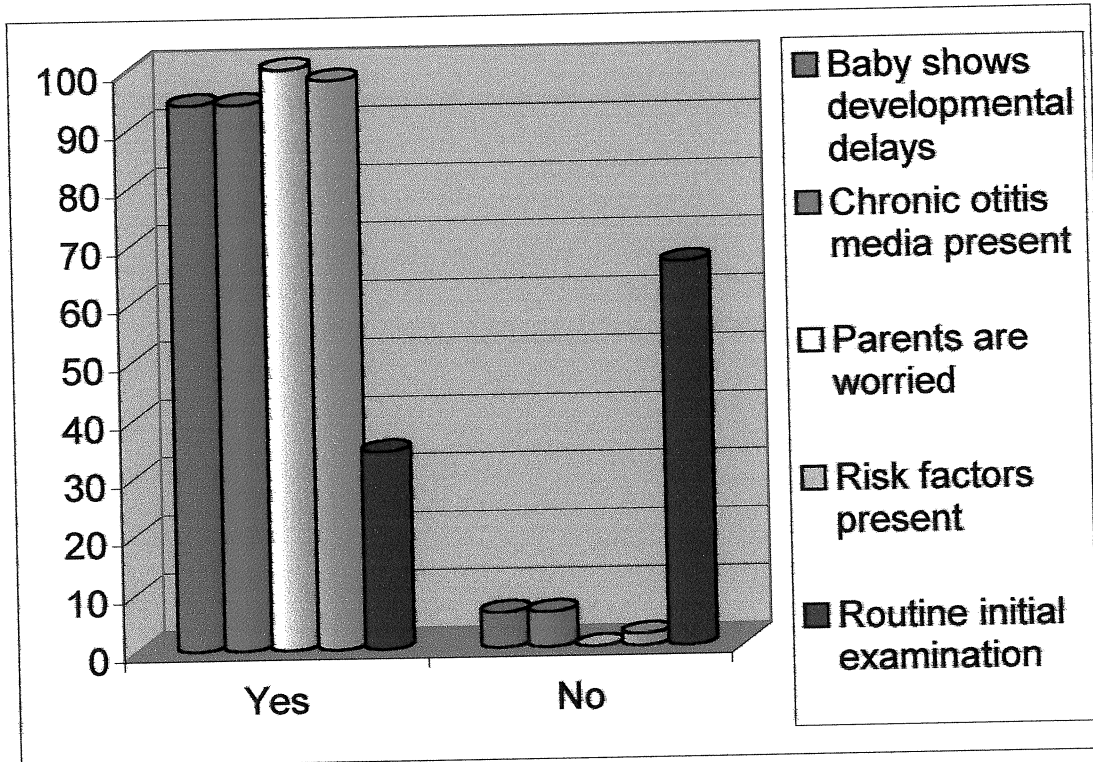


Figure 4.7: Preferences of referrals to an audiologist

It is essential that pediatricians refer infants/children with possible hearing loss to the correct disciplines or programmes as soon as possible to minimize or rule out the effects of hearing loss. A hearing test can even be requested as an initial examination (Hall, 2000). This is deemed important to cancel out any risk factors that might cause a hearing loss (Hall, 2000).

The results in Figure 4.7, indicate that most respondents refer their patients for a hearing test under the following circumstances:

If the infant/child shows a developmental delay, 95% of the respondents indicated that they would refer the infant/child to an audiologist for a hearing evaluation. In the case of chronic otitis media, 95% of the respondents also indicated referral. If risk factors are present, as indicated in paragraph 4.3, 98% of the respondents were said to refer to an audiologist. When the parents show concern about the infant's/child's hearing, 100% of the respondents indicated referral to an audiologist for a hearing test.

These results show a positive awareness in terms of references of infants/children for a hearing test. It can also be concluded that the respondents are aware of factors that

can lead to, and characteristics that can follow hearing loss. It must be noted that infants/children with a possible hearing loss do not always present the same pattern to indicate the presence of hearing loss. Therefore the pediatrician must be alert for any vital signs that can indicate hearing loss.

Also noted in Figure 4.7 is that only about 36% of the respondents refer infants/children to an audiologist as part of an initial examination. As already mentioned, many infants/children with hearing loss go undetected because loss of hearing is a hidden handicap (Boswell & Cherow, 1999). If hearing tests can become part of an initial examination, earlier referrals can be made, problems can be diagnosed earlier, eliminated or treated. An infant/child must be evaluated holistically; therefore respondents must not hesitate to integrate services of other relevant disciplines.

4.7 A DISCUSSION ON THE KNOWLEDGE AND ATTITUDE OF PEDIATRICIANS REGARDING THE INTERVENTION METHODS AVAILABLE FOR SENSORINEURAL HEARING LOSS

This section was divided into the following categories namely:

- Hearing tests preferred by the respondents;
- Efficiency of amplification methods available for infants/children, as well as the pediatric selection criteria for cochlear implants;
- Knowledge of the ideal age for amplification for infants/children.

In order to determine the hearing tests preferences by pediatricians, a visual presentation is given in Figure 4.8.

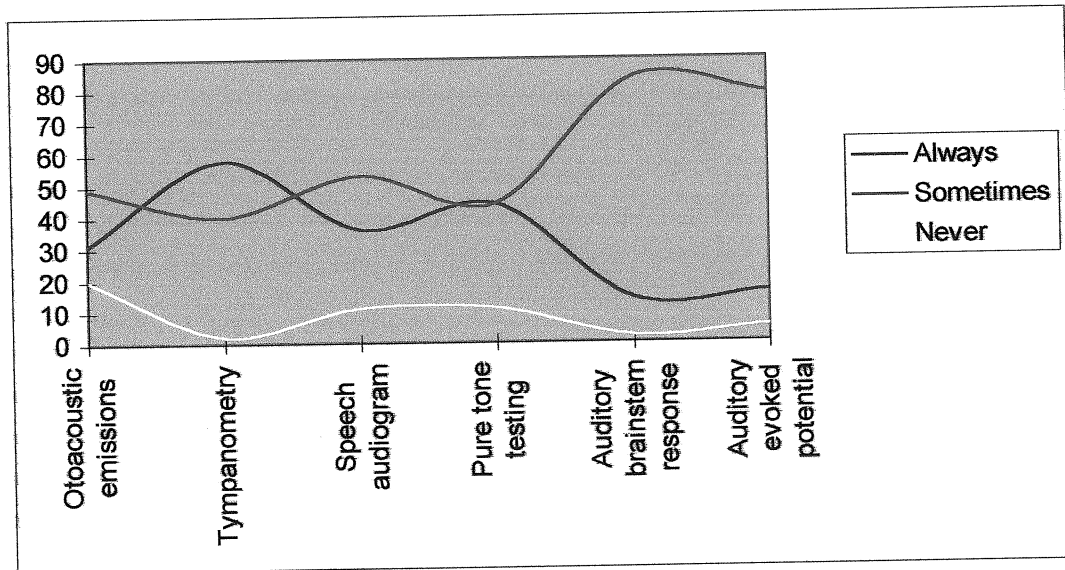


Figure 4.8: Hearing tests preferred by respondents for infants and children

During this section the knowledge of the respondents, regarding the tests available for hearing evaluation, was determined. This was as a result of the rapid development and improvement of technology regarding pediatric hearing evaluation. Another reason being that it takes more than one test to get reliable and valid results (the cross-check principle). Different tests show different points of possible damage from the outer ear up to the auditory nerve. These results can therefore be compared with the results obtained by the pediatrician.

The results show that the majority of respondents use some method to test hearing. The most preferable method of conducting hearing tests required by the respondents is tympanometry (58%) and pure tone testing (42%). Other assessments that are sometimes required with tympanometry and pure tone tests, are auditory brainstem response (82%) and auditory evoked responses (79%). These results are positive since the pediatricians do show an awareness of available tests.

As mentioned the use of more than one test is recommended. The results indicate that the majority of the respondents request appropriate hearing tests as well as a combination thereof. Unfortunately, it is also true that the infants/children are still identified and diagnosed later than expected. The researcher is of the opinion that the reason might be because the older respondents do not appear to be aware of all hearing tests available as well as the uncertainty of when it is necessary to refer (see

Figure 4.8). During the results it became evident that 20% of the respondents never request an immittance test, and this is crucial to determine the middle ear volume, pressure and compliance and the reflexes of the stapedius muscle as well a test for the presence of otitis media (Martin & Clarke, 2000). Other assessments that have never been requested before by some respondents are speech audiometry (10%) and pure tone testing (10%). Without the necessary assessments and referrals from pediatricians on a regular basis, early identification, diagnosis and intervention cannot be realized. The effectiveness of technology is linked to the health care professionals skills and attitude. Technology and the use thereof does not function in isolation, especially in hearing health care services. Patient care must be the focus of the integration of technology into service (Masterson et al., 1999).

In Figure 4.9 and Figure 4.10 a visual presentation is provided on how valuable/effective the respondents deem the hearing aid as well as the cochlear implant.

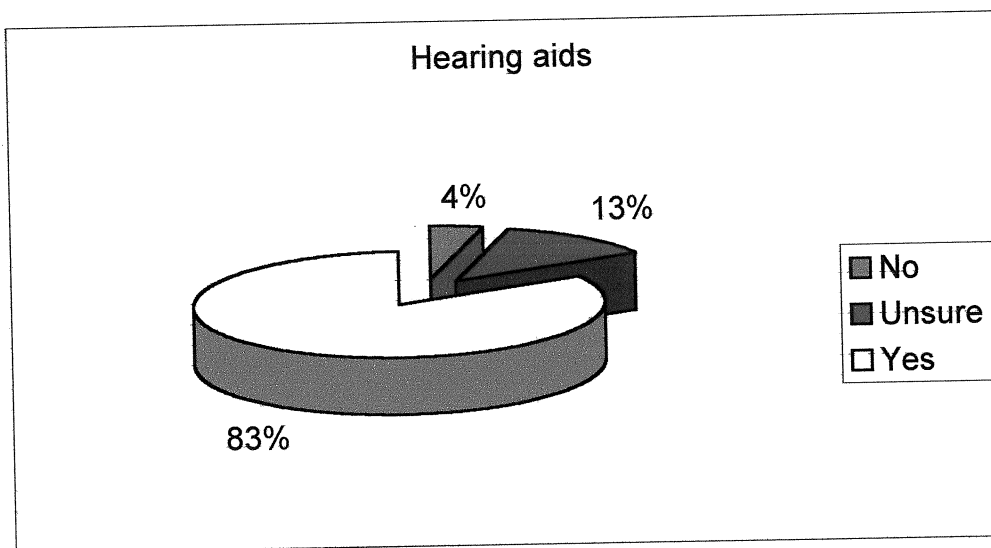


Figure 4.9: Efficiency of hearing aids

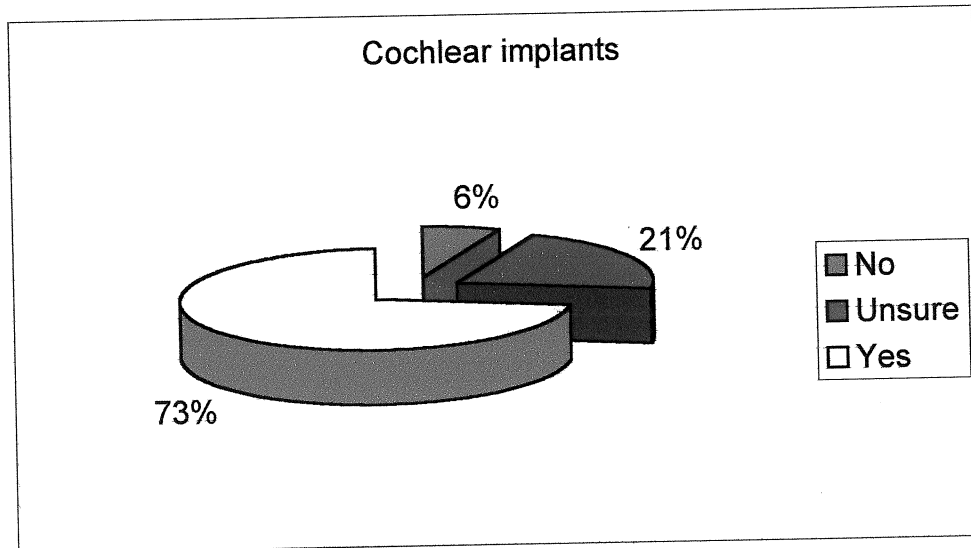


Figure 4.10: Efficiency of cochlear implants

In order for adequate intervention to take place it is important that other disciplines are aware of the devices available for intervention of hearing-impaired infants and children. It is also necessary for them to have knowledge of the effective devices available, in order to educate and motivate families. The two devices used mostly for a person with a hearing impairment are hearing aids and cochlear implants. With the appropriate amplification, infants and children with a hearing loss, can lead 'normal' lives and develop at the same rate as their peers. In order to motivate parents about the importance and efficiency of both the hearing aid and the possibility of a cochlear implant, other medical personnel (in this study, the pediatricians) must believe in the device being part of the habilitation programme for the child with severe hearing loss.

As seen in figure 4.9, 83% of the respondents said that they experience hearing aids as an efficient solution for hearing impairments in infants and children, 13% were unsure and 4% didn't think hearing aids are effective. The results are positive regarding hearing aids, since hearing aids are mostly used for infants and children with sensorineural hearing loss. This positive attitude of respondents will also increase referrals to and teamwork with audiologists.

In terms of their attitude towards cochlear implants, it is seen in figure 4.10 that 73% of the respondents believe that this method is effective, 21% were unsure and 6% believe it to be insufficient.

Hearing aids have come a long way and most medical personnel are comfortable with hearing aids as well as the safety surrounding their usage. Technology surrounding cochlear implants on the other hand is developing at a rapid pace and implantation of infants and children at a young age is becoming more favourable. The researcher is of the opinion that this might be the cause of the large percentage of uncertainty surrounding efficiency of cochlear implants for infants and children. This lack of knowledge can be ascribed to insufficient education during studies (see Figure 4.3).

Even though the majority of infants and children receive hearing aids, rather than cochlear implants (see chapter 2), it is important to determine the respondents' knowledge of the selection criteria before they are assessed for a cochlear implant. The reason for this is that cochlear implantation is a relatively new, and fast-developing field and, as seen in Figure 4.10, a large amount (21%) of respondents are still unsure about the benefits and outcomes of this device. As technology develops, so to must education, in order to keep pace with changes as the specially designed adaptive technology will increase and change (Davila, 1994).

In Figure 4.11 the respondents' knowledge surrounding the selection criteria establishes the need for pediatricians to gain more knowledge and information.

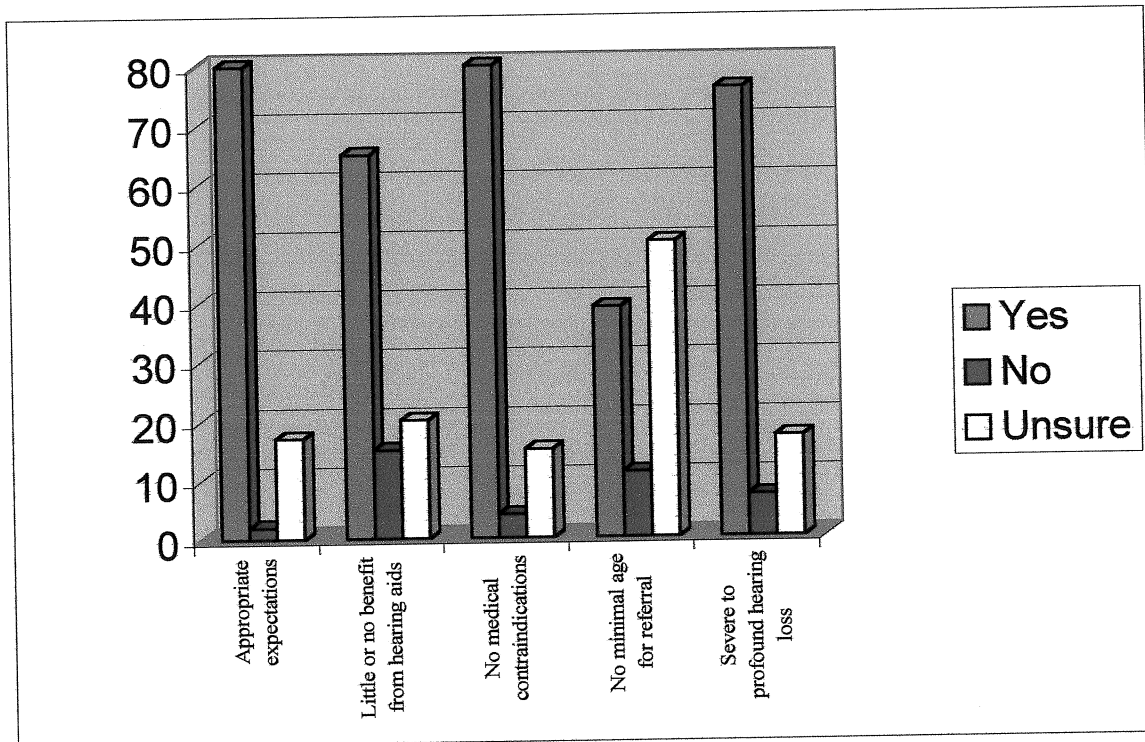


Figure 4.11: Selection criteria for cochlear implants in the pediatric population

From the illustration in Figure 4.11 it is clear that most respondents are aware of the selection criteria which are required for a cochlear implant for infants and children. The following results were found in terms of the positive indication of respondents regarding the pediatric selection criteria: 80% of the respondents replied that both the patient as well as the family need to have appropriate expectations regarding the outcomes of the cochlear implant. Another 65% said that a cochlear implant could only be implanted if no or little benefit is received from the hearing aid. Regarding the absence of indications of medical constraints and the patient having to have a severe-to-profound hearing loss, the results were respectively 80% and 76%.

With professionals becoming more confident in implanting younger children and realising the benefits of earlier implantation, there is a growing demand for referring infants as early as possible to the implant teams (Sirimanna, 2001). Therefore it is especially important to note that only 39% of the respondents replied that they were sure that there was a minimum age for referral for a cochlear implant. The researcher came to the conclusion that this might be one of the main reasons why ear-nose-and-

throat specialists and audiologists get late referrals of infants and children for a cochlear implant.

It must also be noted that there is a need for more information, since a large percentage of the respondents answered the questions with 'unsure'. With both 'appropriate expectations of the patient and family' and 'the patient must present with a severe-to-profound hearing loss' 17% of the respondents indicated uncertainty about the criteria selection. With 'little or no benefit from hearing aids', 20% of the respondents indicated uncertainty, while 15% were said to be unsure about whether a patient is to be implanted if 'medical contra-indications' were present. Yet again, it became evident that there is a need for pediatricians' to realize that an infant/child cannot be evaluated soon enough, since 50% said that they are unsure whether there is a minimal age for referral.

In Figure 4.12 the knowledge of the respondents regarding age of intervention is portrayed.

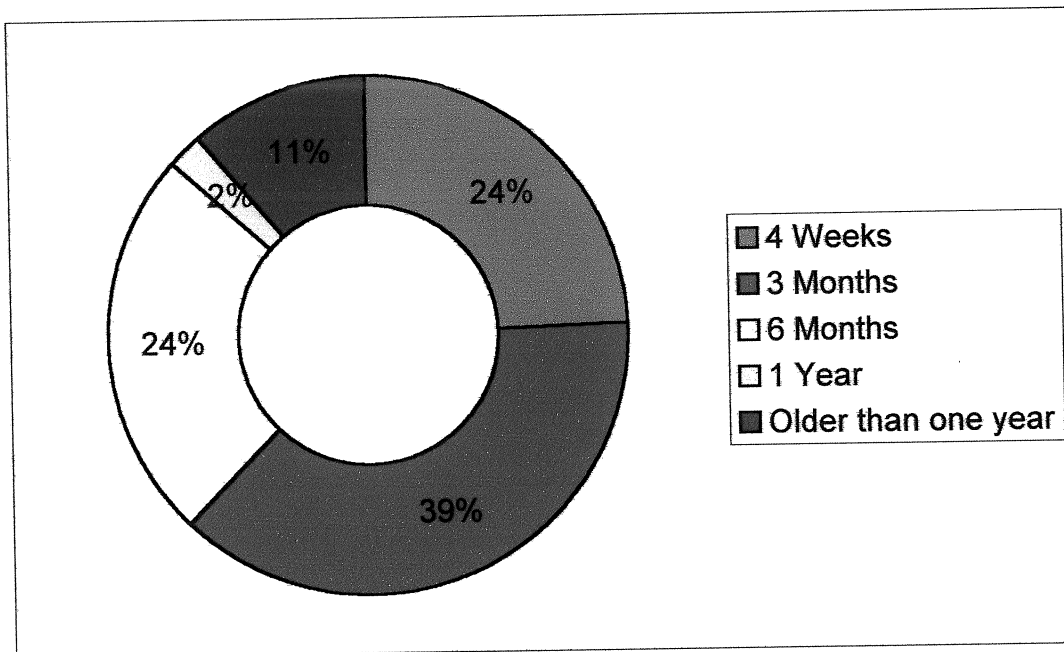


Figure 4.12: Age for intervention to take place

According to Yoshinaga-Itano (2001) the goal of early intervention is to identify infants with hearing loss at or before the age of 3 months and to provide appropriate

intervention before or by 6 months. If this does not happen the infant/child starts to show a delay in areas of development (usually in language and speech development).

As seen in figure 4.12 the respondents appear to be up-to-date regarding the age of intervention for infants and children. An aggregate of 24% of the respondents said that intervention could already be conducted at 4 weeks of age, while 39% said that intervention could start at 3 months of age. As said by Yoshinaga-Itano (2001) the ideal is for intervention to start as early as 6 months of age, and 24% of the respondents agreed to this age of intervention.

Unfortunately, 13% of the respondents still replied that an infant/child could only be fitted with amplification from the age one year and above. This indicates the need for further education of pediatricians in order to continue reinforcement of optimal intervention of infants and children in all areas.

Professionals involved in the pediatric evaluation and amplification must work together closely, in a coordinated effort, to ensure that the hearing-impaired infant/child obtains maximum benefit from amplification.

4.8 DISCUSSION OF THE ATTITUDES OF PEDIATRICIANS REGARDING THE ROLE AND EFFICIENCY OF AUDIOLOGISTS

The seventh sub-aim formulated in 3.2.2.7 determines the attitudes of pediatricians regarding the role and efficiency of audiologists, as well as hearing programmes, in terms of diagnosis and intervention of infants and children with sensorineural hearing loss.

In Figure 4.13 the frequency of respondents who consult with professionals at Hearing Programmes is illustrated.

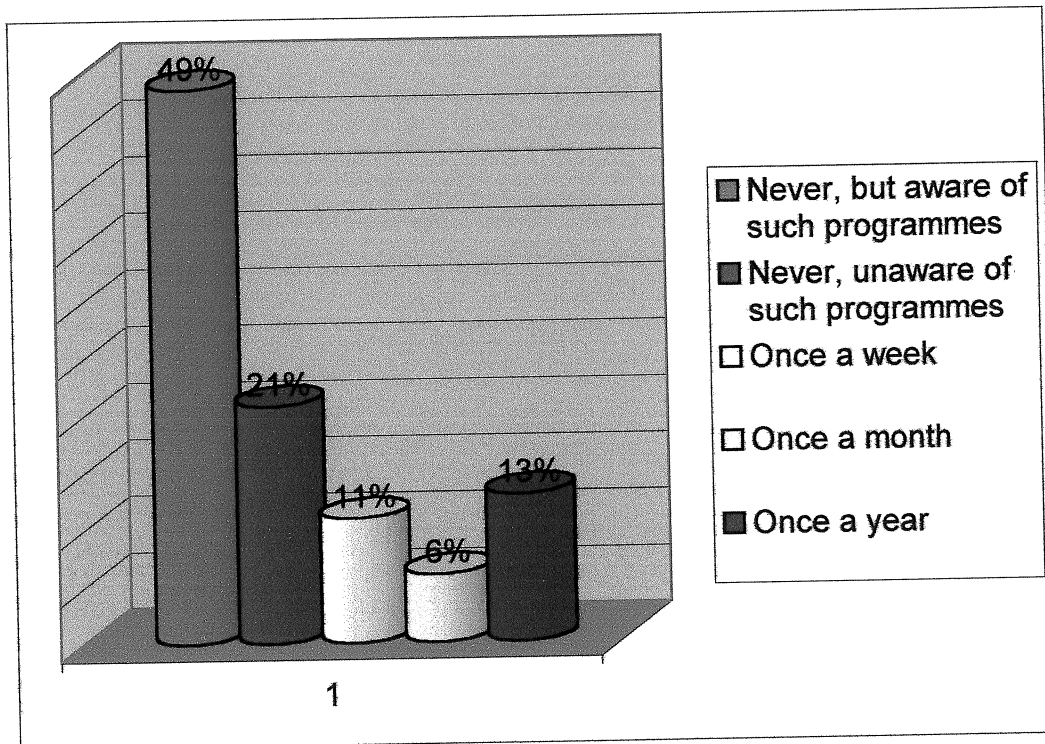


Figure 4.13: Consultation with professionals at hearing programmes or hearing clinics

Teamwork between the different disciplines is crucial in order to ensure that services are being coordinated and that early identification and intervention is ensured. As found in the literature, no discipline can have sufficient knowledge surrounding all aspects of pathologies. It is therefore important that the professionals of the different disciplines must be aware of the different programmes available for continuous education. By drawing on such programmes their knowledge surrounding all aspects of hearing development and pathologies will be improved.

The results found in Figure 4.13 may be a good indication of why so many infants and children with sensorineural hearing loss are diagnosed incorrectly or referred at a late age. The results were disturbing, since 70% of the respondents admitted never to have consulted with any hearing programmes.

The remaining 30% of respondents appears to be consulting with professionals at clinics or hearing programmes along the following frequency:

- Once a week: 11%
- Once a month: 6%

- Once a year: 13%

The researcher is of the opinion that close co-operation with hearing programmes and clinics is essential for pediatricians for the following reasons:

- After the identification and diagnosis of the hearing-impaired infant/child suitable recommendations must be made with regard to intervention. Recommendations should be implemented through a team process on the basis of a holistic approach of the infant/child.
- Monitoring the infants/child's progress in order to determine whether the original intervention methods used were correct. This is done by receiving reports from the professional people working with the infant/child.

It is important to note the importance of co-operation and mutual confidence between these programmes and the team members involved.

In order to improve service delivery to patients and their families, pediatricians must be empowered with knowledge and skills for appropriate referral and treatment of patients. There is also a need for interdisciplinary assessment centers to provide a coordinated service and to undertake the training for the intervention of hearing impairment.

In Figure 4.14 the efficiency, values and accessibility of hearing programmes and clinics according to the respondents is illustrated.

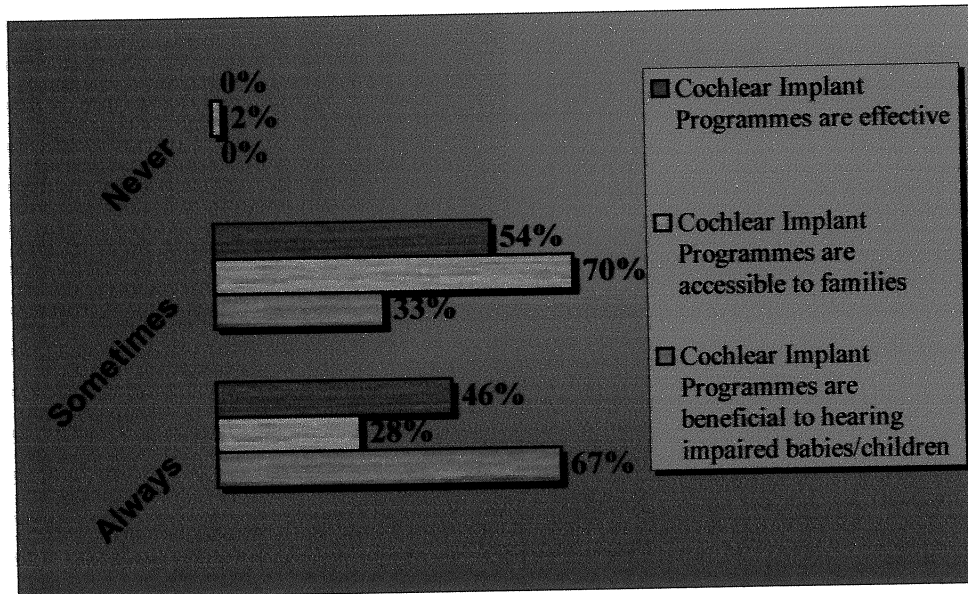


Figure 4.14: Opinions concerning hearing clinics and programmes for children with hearing loss.

Figure 4.14 illustrates that only 46% of the respondents agree that hearing programmes and clinics are effective for children who have sensorineural hearing loss. Only 28% of the respondents believed these programmes and clinics to be accessible to families. These might be seen as the main reasons why the infants and children with sensorineural hearing loss are not referred to audiologists who are involved with hearing programmes or hearing clinics on a regular basis. Another reason is that there might be uncertainty surrounding these programmes and clinics and the role the pediatrician plays in the consultation and referral of clients thereto.

The majority of the respondents (67%) deem these programmes and clinics to be effective for infants and children with a hearing loss. This positive attitude of respondents might be helpful in increasing referrals and making teamwork more efficient.

Yet again, there seems to be uncertainty surrounding the role of the audiologist and relevant hearing programmes. This is concluded from the results found in Figure 4.14 since a large percentage of the respondents replied with the answer 'sometimes'. The results indicated that 54% of the respondents replied that hearing programmes might be effective, while 70% said that these programmes and clinics might be accessible to

families. Another 33% of the respondents replied that these programmes and clinics might be beneficial to hearing-impaired infants and children. Pediatricians should feel confident that they will receive correct and timely documentation on infants and children tested and that follow-up will take place if needed. Pediatricians need the diagnostic, treatment and support services provided by other healthcare professionals (White, 2002).

4.9 DISCUSSION OF RESPONDENTS' NEED FOR INVOLVEMENT AND CONTINUED EDUCATION

In order to answer the sub-aim formulated in 3.2.2.8 a visual presentation is provided in Figure 4.15. Through this the respondent's needs for involvement are determined.

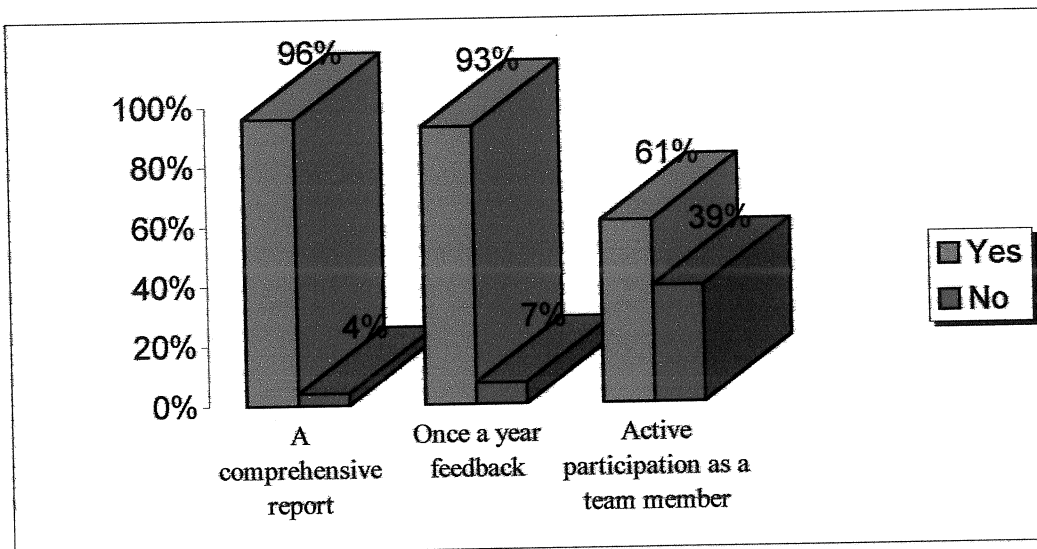


Figure 4.15: Needs of involvement

Before pediatricians can become more involved during the identification and intervention process of infants and children with hearing loss it is important to determine their needs in terms of feedback and involvement. Programme management requires periodic reporting (Finitzo & Crumley, 1999).

Positive feedback was found in terms of the responsiveness and willingness of participants to become more involved in hearing programmes. A positive 96% of the participants said that they would like to receive a comprehensive report of the patient,

while 93% would like to get feedback on the patient's progress once a year. Long-term involvement and dedication on the part of pediatricians, audiologists, speech pathologists, surgeons and family is critical for maximizing the benefit the child receives (Kim, Bothwell & Backous, 2002).

Unfortunately, only 61% said that they would like to be active participants in the intervention process of the infant/child, while the remaining 39% were not interested. Successful hearing screening and intervention programmes require the support and expertise of pediatricians (Hall, 2000).

It is recommended that the interdisciplinary team approach should be accepted in principle with regard to all aspects of the development of the hearing-impaired infant/child, and that the responsible members devise mechanisms to give effect to this team approach.

The respondent's need for further knowledge regarding infants and children with sensorineural hearing loss will be depicted in Figure 4.16.

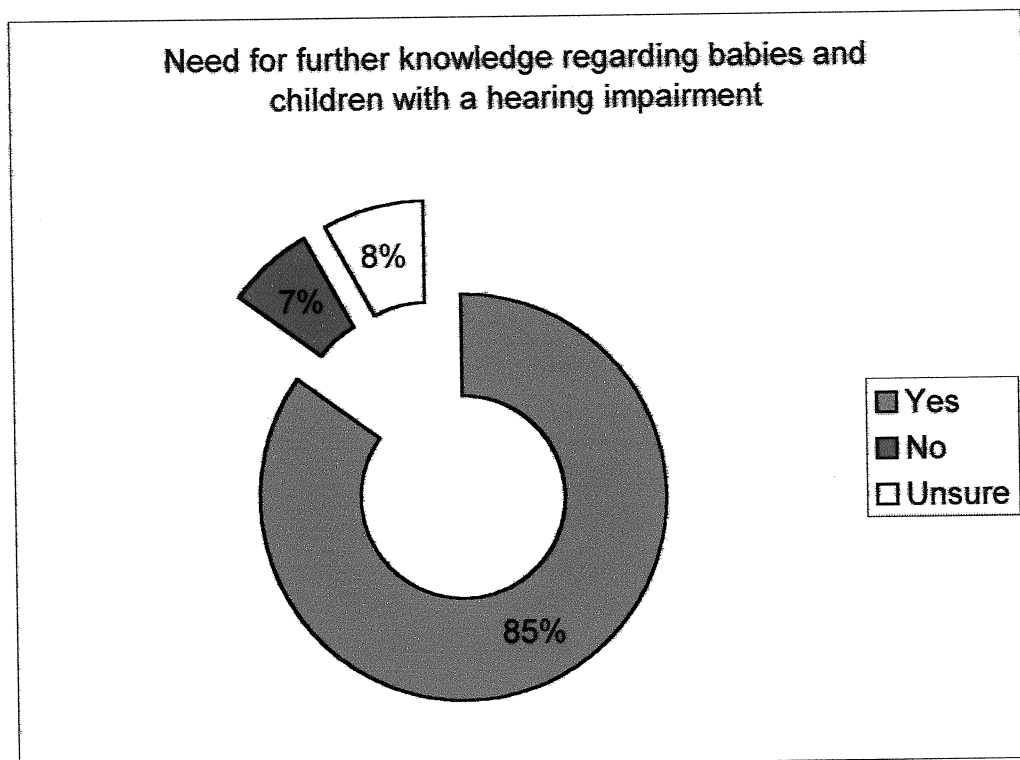


Figure 4.16: Need for further information

The results indicate that most of the respondents (85%) have a need for more information regarding infants and children with sensorineural hearing loss. These results indicate a positive attitude from pediatricians and can lead to the enhancement of cooperation between pediatricians and audiologists.

Throughout the literature (for example Wachtel & Compart, 1996), as well as in the results of this study, it is found that pediatricians have a need for further education and training in the intervention process of infants and children with sensorineural hearing loss. This is based on the results found throughout the study, in terms of a void in certain areas surrounding effective intervention of hearing loss.

4.10 CONCLUSION

The main aim of this study was to investigate the pediatrician's knowledge and attitudes regarding the diagnosis and intervention of infants and children with a sensorineural hearing loss. This has been achieved by means of a questionnaire that was divided according to the sub-aims. The following conclusions were made accordingly:

The training of respondents (undergraduate and postgraduate) appeared to be inadequate in the sense that they are not made aware to consider the consequences of functional restraints while curative and other services are performed.

The respondents showed sufficient knowledge of the possible risk factors that may lead to sensorineural hearing loss, regardless of their 'limited' information gained during their student years on this subject. It is important to note that hearing loss is not an isolated condition, therefore one must have a greater understanding of related conditions and the individual infant/child's related technology and accessibility needs.

A hearing loss can affect an infant/child in quite a few development areas, as can be seen in Figure 4.4. There is a need to expand in-service educational opportunities, both to establish a better understanding of hearing impairment and its implications and to enable them to assist with the identification of undetected hearing loss.

This ensures greater recognition of the role that an interdisciplinary team plays in the assessment and intervention of the hearing-impaired infant/child in respect to all the problems he/she may experience. Early detection must be followed by proper action, referral, assessment and planning. To secure support for the high-quality audiologic screening and assessment, it is important that professionals from other disciplines should become involved and be made aware of the relatively high prevalence of hearing loss amongst special-needs infants and children.

The pediatric audiology landscape changed dramatically with the advances in screening and diagnostic procedures, amplification possibilities and early

identification outcomes. Working with infants/children with a hearing impairment requires a broad knowledge base (Boswell & Cherow, 1999). Technological developments taking place impact on the optimization of the quality of life of the hearing-impaired infant/child. Such developments include the cochlear implant, digital hearing aids as well as the objective electrophysiological tests available for infants and children.

Medical personnel must continuously provide new ways of increasing efficiency while maintaining a high standard of patient care (Vowles et al, 1997). Team members tend to work independently, providing evaluation services specific to their disciplines. There are shortcomings as well in the training of respondents in the handling of chronic and permanent illnesses.

The goal is to plan an intervention that requires the sharing of professional roles and responsibilities. A unique set of competencies is required to provide optimum pediatric assessment and intervention. Professional members must continue their education to upgrade their knowledge and skills about service delivery to children.

Knowledge of aspects of child development and establishment of an audiologist must be infused into all aspects of audiology care and maintained throughout the infant's/child's life. In order to keep pediatricians better informed information can also be presented during pediatric meetings through personal contact and communication.

4.11 SUMMARY

In order to achieve the main aim of this study, research results were discussed under each of the sub-aims. Research results were depicted in graphical formats. Conclusive remarks were provided in order to achieve the aim of this study: **To investigate the pediatricians' knowledge and attitudes regarding the diagnosis and intervention of infants and children with a sensorineural hearing loss.**