

# Pediatric physicians' referral of children aged 0-3 years for audiological evaluation in the public health care sector

Amisha Kanji, Razeena Kara

University of the Witwatersrand, Johannesburg, South Africa

## Abstract

The current study aimed to determine the current practice of pediatric physicians in the referral of children (0-3 years) for further audiological evaluation in the South African public health care sector. Sixty three pediatric physicians comprising of pediatricians, neonatologists, medical officers, registrars and interns from three academic hospitals completed a self-administered questionnaire. Most participants reported referrals to an audiologist when hearing loss was suspected. An average of eight risk factors for hearing loss listed on the Health Professionals Council of South Africa (HPCSA) 2007 position statement were identified by participants, indicating the need for referral. Generally, participants reported that referral/s occurred easily within the respective hospitals. Results highlight that pediatric physicians are aware of the role that audiologists play in the diagnosis and management of hearing loss, are involved in the referral of children that are at risk for hearing loss, and have awareness of some of the known risk factors associated with hearing loss. Further education regarding other risk factors is required in order to increase referral/s, and ensure appropriate referral of children at risk for hearing loss.

## Introduction

One of the most common congenital abnormalities in newborns that place children at risk for communication delay is hearing impairment.<sup>1</sup> It is estimated that approximately 6116 infants are born with or acquire early-onset, bilateral permanent hearing loss annually, in South Africa. Of the 6116 infants born with hearing loss, 5620 of these infants are born in the public health care sector.<sup>2</sup>

Early hearing detection and intervention (EHDI) programmes are recommended to identify, diagnose and treat these newborns and infants with disabling hearing loss as early as possible, to ensure optimum cognitive, emotional, psychosocial, speech and language development.<sup>3</sup> Improved outcomes have been noted with the implementation of EHDI programmes, which is not only dependent on adequate hearing, but effective methods of referral as well.<sup>4</sup>

A multidisciplinary team approach to early detection of hearing loss, may be beneficial in achieving the goal of EHDI<sup>5</sup> - particularly, in South Africa where a shortage of audiologists is one of the most frequently reported challenges in the public health care sector, preventing adequate implementation of newborn hearing screening programmes.<sup>6</sup> Audiologists, speech-language pathologists, pediatric physicians, otolaryngologists and nurses can work together for the benefit of the child.<sup>7</sup> According to the earlier position statement outlined by the Joint Committee on Infant Hearing (JCIH),<sup>8</sup> the audiologist or speech pathologist is the central figure within the team.

Pediatric physicians play an important role in screening and surveillance as well as counseling of families regarding detection of and intervention for hearing loss.<sup>9</sup> Pediatric physicians are seen as key members in the identification of hearing loss as they oversee an infant's well-being with continued monitoring thereafter.<sup>3</sup> Their involvement may also play an important role in ensuring timely diagnosis and intervention.<sup>10</sup> The Health Professions Council of South Africa (HPCSA)<sup>3</sup> position statement highlights that families and professionals need to work together to identify and manage hearing loss. It views pediatric physicians as key members of multidisciplinary teams together with otolaryngologists, audiologists, general practitioners, nurses and speech and language pathologists. The JCIH<sup>8</sup> position statement outlines the following responsibilities for the pediatric physician regarding hearing loss: i) monitoring of the well-being of the infant; ii) ensuring that infants that do not pass a screening obtain further audiological evaluation; iii) initiation of appropriate medical referrals to identify the cause of the hearing loss; iv) monitoring of the middle ear status as infections can further impact hearing loss; v) review of risk factors for hearing loss and ensuring that children that display risk factors for late onset hearing loss receive audiological assessment; vi) monitoring of developmental milestones of infants; vii) initiation of referrals for any other suspected disabilities.

The pediatric physician may often be the only professional that parents have access to and thus it is important that pediatric physicians

Correspondence: Amisha Kanji, University of the Witwatersrand, Private Bag 3, WITS 2050, Johannesburg, South Africa.  
Tel. +11.717.4551.  
E-mail: amisha.kanji@wits.ac.za

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know the necessary steps to take when their patients may exhibit a hearing loss.<sup>9</sup> The pediatric physician is often the primary care physician of a child and plays an important role in early intervention when developmental delays are present.<sup>11</sup> They are the first professionals that parents may seek assistance from.<sup>9</sup> Pediatric physicians also need to be aware of the signs and symptoms of hearing loss in order to make appropriate referrals and provide support to the families of hearing impaired children.<sup>12</sup> This can make a difference to the families of children identified with hearing loss as well as the development of these children.

Pediatric physicians' awareness of risk factors for hearing loss as outlined by the high risk register, other than parental concern is also vital to ensure referral for further audiological evaluation.<sup>3</sup> This is particularly important in contexts where universal newborn hearing screening programmes have not yet been implemented. Criteria are divided into factors for risk based screening and risk based surveillance.<sup>3</sup> Risk based screening is conducted in infants from birth to 28 days whereby they are screened if they present with one or more risk factors. Risk based surveillance is from 29 days to three years which allows professionals and families to identify late onset hearing loss that is not identified at a newborn screening.

There is currently no literature indicating the role that pediatric physicians play in EHDI in South Africa, particularly with regards to referral for further audiological evaluation. Hence, the current study aimed to identify the current practice of pediatric physicians in the referral of children (aged 0-3 years) for audiological evaluation.

## Materials and Methods

### Aims

The main aim of this study was to determine the current practice of pediatric physicians in the referral of children aged 0-3 years for audiological evaluation. Secondary objectives were to: i) determine to whom children were referred to if hearing loss was suspected; ii) determine the risk factors that pediatric physicians consider to be the most common for referral for audiological evaluation; and iii) describe factors that pediatric physicians reported to facilitate and/or inhibit referral for audiological evaluation, within the hospital setting.

### Participants

The participants of this study consisted of 63 pediatric physicians from three public sector, academic hospitals in South Africa. The pediatric physicians comprised of neonatologists, pediatricians, registrars, medical officers and interns in pediatrics. Non-probability purposive sampling was used. The number of years of work experience post qualification did not influence participant selection. Participants needed to be fluent in English as it was the language of the questionnaire. Of the 63 participants in the study, three were neonatologists, 22 were pediatricians, 27 were registrars, six were medical officers and six were interns. The maximum number of years of practice in the public health care sector was 37 years, with eight years being the average number of years of practice.

### Research design

A non-experimental, cross-sectional descriptive survey design was used to conduct this research.

### Measures/materials

A self-administered questionnaire consisting of open-ended and closed-ended questions was used. The questionnaire was initially pilot-

ed on three pediatricians with numerous years of experience. They were subsequently excluded from the final sample of participants.

### Data analysis

The data was analyzed using both quantitative and qualitative analysis as the questionnaire consisted of both open and closed ended questions. Open-ended questions were analyzed using descriptive content analysis which allows the researcher to sift through a large amount of data in a systematic manner.<sup>13</sup> Descriptive statistics was used to analyze the closed-ended questions of the questionnaire.

### Reliability and validity

Inter-rater reliability was ensured whereby a sample of questionnaires was given to another researcher to analyze. A pilot study was conducted prior to the research study to ensure content validity of the questionnaire.

### Ethical considerations

Ethical clearance was obtained from the University Institutional Review Board (IRB) prior to the pilot study and commencement of data collection. Anonymity was ensured whereby participant codes were used instead of participant names.

## Results

### Professionals to whom children are referred if a hearing loss is suspected

Most of the participants involved in the study indicated that they would refer to audiologists when hearing loss is suspected (Figure 1).

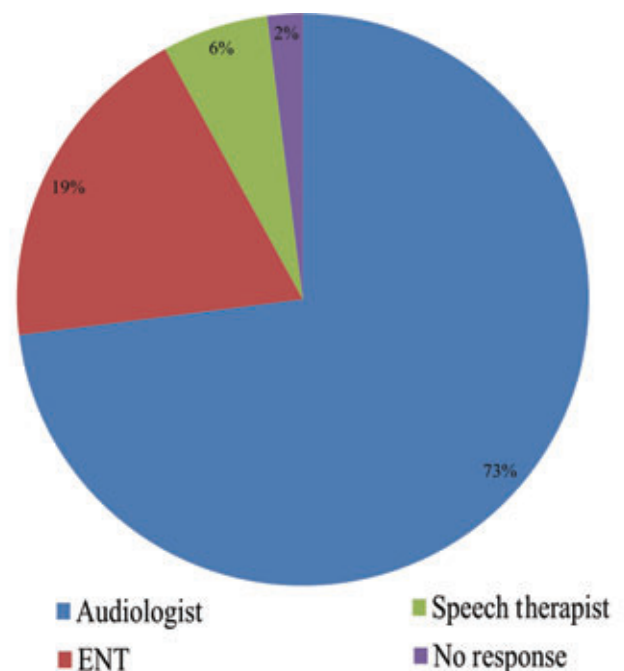


Figure 1. Professionals to whom pediatric physicians refer to for audiological evaluation when hearing loss is suspected.

These participants mainly consisted of pediatricians and registrars. Referral to the Ear, Nose and Throat (ENT) specialist was the second most commonly reported, followed by referral to the speech therapist. One participant, a registrar, did not provide a response as he reported that he has not referred any children before.

### Risk factors indicating the need for referral for audiological evaluation

Parental concern regarding speech and language delay, post natal infection, *in utero* infection, craniofacial abnormalities, recurrent otitis media with effusion for at least three months, family history of permanent childhood hearing loss, hyperbilirubinemia and syndromes associated with progressive or late onset hearing loss were reported as risk factors indicating the need for referral by more than half of the participants.

Additional factors (not included on the HPCSA high risk register) that were considered to be important for referral for audiological evaluation included pulling or tugging of ears, excessive crying, red ears and pneumonia.

From the risk factors indicated, participants were required to provide three factors that they considered to be the most common for audiological referral. Post natal infection (mainly bacterial meningitis) was considered to be the most common factor followed by parental concern regarding speech and language delay. The least common risk factors were family history of permanent childhood hearing loss, neonatal intensive care unit (NICU) stay for 48 h or greater, craniofacial abnormalities, sensory motor neuropathy, syndromes associated with hearing loss, aminoglycoside treatment and pulling or tugging the ears (Figure 2).

### Factors reported to facilitate referral for further audiological evaluation

Twenty-one (33%) participants did not provide a response within the self-administered questionnaire. Of the remaining 14 participants, availability of audiological services in the hospitals, parental concern, communication with speech therapists and easy access to referral forms were reported to facilitate referral for audiological evaluation. Five participants reported that the availability of contact details for audiological services within the hospital assists in referral whilst four stated that high risk infants are always referred. Two participants reported that good communication between the doctors and audiologists facilitates referral for audiological evaluation. Speech delay, neuro-developmental delay, present symptoms of hearing loss, failed screenings, advice from senior pediatric physicians, current phonology of a child and the level of knowledge of the role of speech therapists and audiologists by doctors were each considered by one participant. One pediatric physician suggested the use of a poster with a referral algorithm and a table of top conditions that are associated with hearing loss as a means of improving referral for audiological evaluation.

### Reported challenges with referral for audiological evaluation

Fifty-two (83%) participants reported that they experience no difficulties in referring children for audiological evaluation. Poor experience was reported by two participants. Lack of awareness of the role of audiologists and the location of the audiology department as well as poor knowledge of the types of patients that should be referred for audiological evaluation were each reported to pose a difficulty by one participant. Difficulty obtaining referral forms was reported to be a difficulty by two participants. Staff shortages made referral challenging for two participants. Broken equipment, a delay in appointments and difficulty experienced by patients having to attend different appointments

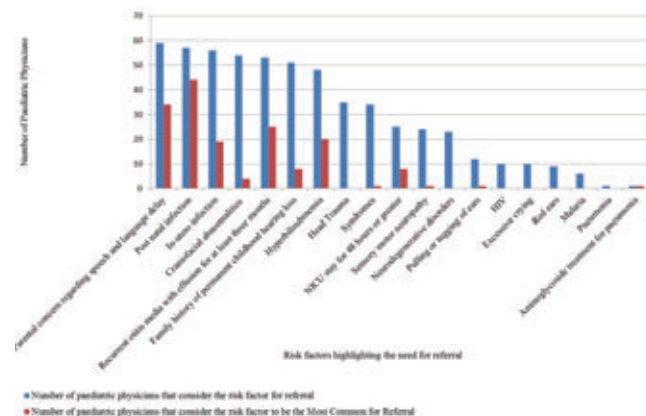


Figure 2. Risk factors highlighting the need for referral for audiological evaluation.

on different days were each challenges reported by one participant in the current study.

## Discussion

Findings from the current study suggest that pediatric physicians are aware of the role of the audiologist in the diagnosis of hearing loss as audiologists were reported as being referred to the most, followed by the ENT and speech therapists. These findings are contrary to an earlier study by Bailey<sup>9</sup> in the United States of America which found that 89% of the participants referred to the ENT and 76 % referred to an audiologist when hearing loss was suspected. Similar findings were reported by Brown *et al.*<sup>14</sup> whereby 89 % of referrals were made to an ENT whilst 50% of referrals were made to the audiologist.

Referrals to relevant professionals are also being made based on some of the suggested risk factors for hearing loss. In the current study, an average of eight risk factors (listed in the HPCSA<sup>3</sup> position statement) was reported by the participants involved in the study. These results may be influenced by each participant's clinical experience as some responses were not limited to risk factors outlined by the HPCSA position statement.<sup>3</sup> These findings are contrary to those reported by Moeller, White and Shisler<sup>15</sup> whereby pediatric physicians reported that they lack understanding regarding the factors that can cause hearing loss.<sup>15</sup> Knowledge of the risk factors can be improved to assist with an increase in referrals of high-risk neonates, particularly due to limited implementation of universal newborn hearing screening programmes in the public health care sector in South Africa.<sup>6</sup>

Bacterial meningitis was the most common postnatal infection reported as a risk factor by pediatric physicians in the current study. Similar results have been reported from studies in developed contexts. Ninety nine percent of the 1968 participants involved in the study conducted by Moeller *et al.*<sup>15</sup> reported that they will refer in the presence of meningitis. However, a study conducted in Brazil found that 46% of the 119 doctors involved in the study considered bacterial meningitis to be a risk factor for hearing loss.<sup>16</sup> Bacterial meningitis is an important risk factor as sensorineural hearing loss is considered to be the most common and severe consequence of it.<sup>17</sup> These differences in findings may highlight the differences in the prevalence of specific risk factors between countries and how these may change over time.

Family history of hearing loss was also considered to be the impor-

tant factor for referral. In contrast to the finding of the current study, family history of hearing loss was only considered to be a factor referral by 41% of the 119 participants.<sup>16</sup> NICU stay for greater than 48 hours was considered to be an important risk factor for hearing loss by 48% of participants in a study by Moeller *et al.*<sup>15</sup> The current study found that 40% of participants will refer if a child is in NICU for greater than 48 h whilst only 20% of participants considered it an important risk factor in the study conducted in Brazil.<sup>16</sup>

Children born to HIV positive mothers are considered to be at risk for hearing loss due to low birth weight, vulnerability to infections such as bacterial meningitis and cytomegalovirus.<sup>18</sup> However, only 10 of the participants in the current study reported that they would refer for audiological evaluation in the presence of HIV. A study conducted by Khoza-Shangase and Turnbull<sup>19</sup> on 62 children between the age of 18 months and six years at a hospital in Gauteng found that hearing is affected within the HIV population. The study found that otitis media was a common cause of hearing loss within the HIV population. Furthermore, it was found that abnormal hearing screening results can be obtained in this population across the various stages of the disease and that the type and degree of hearing loss can vary.

Most of the participants reported that they do not experience difficulties in referral for audiological evaluation. This could be attributed to the availability of audiological services in the hospitals involved in the current study which was highlighted to facilitate referral for audiological evaluation. Parental concern was also identified as a factor that facilitates referral and apart from it being one of the risk factors for hearing loss; it may also assist in ensuring adequate follow-up of the referral made by the pediatric physician. This finding further suggests that pediatric physicians recognize the role of parents in the referral process; and is consistent with findings by Dorros *et al.*<sup>10</sup> who reported that 77% of physicians in the study sample indicated parental concern as a factor that would prompt the referral for audiological evaluation.

An important facilitating factor suggested by one of the participants is the use of a referral algorithm. An algorithm has been developed by the American Academy of Pediatrics to inform physicians in the United States of America of EHDI and risk factors for hearing loss. It would be beneficial to develop such an algorithm for the South African context (at different levels of service delivery) to assist with a multidisciplinary approach to referrals within EHDI programmes. The sample size in the current study was limited to pediatric physicians working at three teaching/academic hospitals in a single province and may therefore not be representative of referral practices in South Africa.

## Conclusions

Pediatric physicians working in the hospital setting are aware of the relevant professionals involved in the diagnosis of hearing loss, which suggests that there is some collaborative approach to their referral practices. There is some awareness of the specified risk factors for hearing loss but there is still a need for more education regarding this. Although difficulties in referral were minimal, suggestions such as the use of a referral algorithm needs to be implemented in settings where a collaborative team approach to EHDI is required. The current study should be conducted with a larger sample size, inclusive of referral practices at different levels of service delivery.

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