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Criteria for Referral of Pre-School Children by Pediatricians and Family Practice Physicians to Audiologists and Otolaryngologists

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CRITERIA FOR REFERRAL OF PRE-SCHOOL CHILDREN BY PEDIATRICIANS AND FAMILY PRACTICE PHYSICIANS TO AUDIOLOGISTS AND OTOLARYNGOLOGISTS

BY

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THESIS

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ABSTRACT

The purpose of this study was to investigate whether pediatricians and family practice physicians were using a standard criteria when referring pre-school children to otolaryngologists and/or audiologists. Data was collected regarding the types of instruments and procedures used in the referral, in addition to the etiologies most frequently referred. Comparisons of referral criteria were made between pediatricians and family practice physicians.

A 17 item questionnaire regarding audiological tests, procedures and pathologies was sent to 108 pediatricians and 112 family practice physicians in the Central Florida area. Similarities in tests and procedures used by the two groups of physicians were limited to the use of the otoscope and pneumatic otoscope. Chronic otitis media and speech/language delays were revealed as the most often referred etiologies. Significant differences were noted between the two groups of physicians in the use of tuning forks and tympanometers. Results suggested a need for a more consistent set of procedures and tests in the comprehensive assessment of hearing status in the pre-school child.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

One of the most serious handicaps a young child can have is hearing impairment, which if undetected may lead to a speech and language deficit, that in turn could affect his intellectual development (Garrity and Mengle, 1983). Delays in identification are common as well as costly to the child in terms of "irretrievable loss of time for habilitation of the child's hearing problem" (Northern and Anderson, 1980). Pediatricians or family practice physicians, who are usually the first medical professionals with whom children come in contact, may have difficulty identifying these problems due to the subtlety of the symptoms (Diaz, Fosarelli, Groner, Grossman, Hall, Joffe, Lobovits and Holtzman, 1982). Since the responsibility for the expeditious identification, treatment and referral of hearing disorders in children often rests with the pediatrician (Levine, 1980) or family practice physician, it would seem that they must not only have a thorough understanding of hearing impairment and instrumentation for identification of these disorders, but must also make use of a comprehensive set of criteria for evaluating and referring children.

REVIEW OF THE LITERATURE

Incidence

Congenital and acquired deafness is found in approximately one out of every thousand children under five years of age (Wong & Shah, 1979). In newborns, Lobovits (Diaz et al., 1982) reported as many as 1 in 1200 normal neonates and one in 60intensive care neonates have hearing losses in the moderate to severe range. The incidence of transient middle ear problems in children under five is between 60 and 71% (Grimes, 1985). In fact, Shimizu (1976) found that 33% of postnatal hearing losses are due to otitis media. Statistics show otitis media is one of the most common reasons for visits by preschoolers to physicians (Poland, Wells & Ferlauto, 1980).

Even though a high incidence of deafness occurs in the crucial period of language development (Mouney, 1979), the average age at which deafness in children has been diagnosed in the United States is about 2.3 years of age (Stewart, 1984). Furthermore, the National Census of the Deaf Population (NCDP) indicate that approximately 75% of the people deaf at age 19 have lost their hearing prior to age three and in fact more than 50% are deaf before one year of age (Catlin, 1978). In view of these findings, it is not surprising that 44,000 children in the United States require special education due to their hearing deficits (Mouney, 1979).

Types of Hearing Loss

Conductive, sensorineural and mixed hearing loss are traditionally the types of hearing losses reported in the literature (Northern & Downs, 1984; Hicks, Wright & Wright, 1982; Mouney, 1979; Davis & Silverman, 1978). Conductive losses involve a pathology or problem of the outer and/or middle ear; sometimes fluctuating in nature, the severity usually will depend on the degree of middle ear involvement (Grimes, 1985). Of all the etiologies of conductive losses reported (atresias, cholesteatoma, traumas, Eustachian tube dysfunction, impacted cerumen, etc.), otitis media, an infection in the middle ear, has been the most prevalent pathology (Schlieper, Kisilevsky, Mattingly & Yorke, 1985; Klein, 1984). Klein (Bluestone, Klein, Paradise, Eichenwald, Bess, Downs, Green, Berko-Gleason, Ventry, Gray, McWilliam & Gates, 1983) stated that otitis media is one of the most common infectious diseases in childhood. One specific type, serous otitis, is identified as a clear fluid that collects in the middle ear. The fluid may become infected which results in acute otitis media. When this condition persists for three months or more, it is then classified as chronic otitis media (Bluestone et al. 1983).

Serous otitis and acute otitis media usually respond well to anti-histamines, decongestants and antibiotics, and are often remediated in a short period of time. If the fluid is allowed to remain, it frequently ruptures the tympanic membrane or else may thicken to a gluey consistency (Cowan, 1982). The surgeon may perform a myringotomy (lancing of the tympanic membrane) and insert a pressure equalizing (PE)

tube in the patient's tympanic membrane to help relieve the problem (Hicks et al., 1982). Furthermore, Hicks et al. (1982) suggested that infected adenoids may cause a continuation of the problem and therefore, they are often surgically removed.

The second type of hearing loss, sensorineural hearing loss, involves the area beyond the middle ear called the inner ear which contains the auditory areas including the cochlea and the auditory nerve. The cochlea may be damaged in some way or the auditory nerve may dysfunction. The causes of these losses which may involve cochlear damage or auditory nerve dysfunction include: genetic, prenatal and perinatal factors, infection, trauma and the effects of ototoxic drugs (Northern & Downs, 1984; Catlin, 1978; Wong & Shah, 1979). Such hearing losses are characterized as being irreversible and vary from mild (25 dBHL) to profound (over 90 dBHL).

Mixed hearing loss refers to a hearing impairment in which both conductive and sensorineural components are present. A child with this type of loss will experience improved hearing when the conductive component is remediated (Hicks et al., 1982), however, he will continue to have the sensorineural component, as that part is permanent.

Implications of Hearing Loss

"There is growing evidence demonstrating a correlation between middle ear disease with hearing impairment and delays in the development of speech, language and cognitive skills" (Signer, 1985). Holm and Kunze (1969) revealed that those children with fluctuating hearing loss due to

chronic otitis media had a significant delay in language development. The implications from their study suggested that physicians dealing with this population should inform the parents of the need for continued medical care and the special educational needs of their children.

A study which appears to reinforce these ideas, by Schlieper, Kisilevsky, Mattingly and Yorke (1985) suggested that children who experience recurrent middle ear problems are at risk for continuing language delay. These researchers studied 13 children between the ages of three to five years, who had mild conductive hearing losses and a history of otitis media, were matched with audiologically normal children. Analysis of language assessments confirmed that the experimental group had depressed scores. A follow-up one year later indicated that the experimental group continued to show significiant lags behind the normal hearing group. More recently, Signer (1986) reported that even mild otitis media, which is persistent and recurring during the first three years of life, can have great impact upon the child's speech and language development. It has been suggested that children who have not been remediated from otitis media after three months should have home language intervention and possible amplification with a hearing aid (Bluestone et al., 1983), however, amplification is most effective when a bilateral loss is present (Davis, 1986).

Zinkus, Gottlieb and Schapiro (1978) stated that hearing disorders reduce scores on general intelligence tests. Further research indicated failure to detect a hearing loss can have ramifications on the child's educational and emotional development (Istre, 1980). Levine (1980) warned

that the longer one waits in the identification of the hearing deficit, the greater the impact on the child's emotional growth, social growth and mental health. Gottlieb, Zinkus and Thompson (1979) suggested that proper care of otitis media during early childhood may help prevent certain psychoeducational disorders. Assessment of the disorders included evaluation of activity level, attention span, distractibility, impulsivity, anxiety level, motivation, and attitude.

Identification of Hearing Loss by Physicians

"A plea is made for the education of first-contact physicians in the importance of early detection of hearing problems" (Shah, Chandler & Dale 1978). Culbertson, Norlin and Ferry (1981) referred to the physician as not only the first professional to come in contact with children with hearing disorders and also with children with communicative disorders. Delays in identification of children with hearing impairment may come from the physician's refusal to listen to parents when they suspect a hearing loss in their child; their failure to screen children for hearing and speech problems; or their reluctance to refer the child for audiological evaluation (Wong & Shah, 1979).

Brookhouser (1979) and Garrity et al. (1983) described some behaviors of normal hearing children which may help in the identification of children with hearing loss:

1. The normal hearing child from the first few days of life will usually be startled by loud noises.

2. After the first few weeks he will respond to his mother's voice and be quieted by a soothing voice or sound.
3. The child from three to six months will turn toward a quiet sound and after that period away from the sound source.
4. Around one year of age the child will be producing one word sentences and will be able to follow a one step command. His speech will be 25% intelligible. He will be pointing with his index finger.
5. At two years of age he can be expected to use two-word phrases and following two-step commands. At this time speech is intelligible 50% of the time.

The child with a hearing deficit may not follow these milestones. While he does "coo" and gurgle like his hearing counterpart during his initial six months, his verbalizations decrease and by the time he is two may have stopped entirely. If he does continue verbalizing, it may be at a lower level than expected for his age (Garrity et al.1983).

Brown (1975) listed some behaviors which should alert the pediatrician to the possibility of his patient having hearing loss.

1. Infants who babble normally until six months and then reduce their vocalizations gradually.
2. Children who are not using certain sounds such as fricatives and high-pitched consonants or omit initial consonants after three years of age.

3. Children who do not listen when the radio is playing or who want it at unreasonably high volume levels.
4. Children who are inattentive to conversation.
5. Children who use "garbled" speech.
6. Children with poor voice quality -- too loud, monotone, etc.
7. Children who do not turn to the sound source after four months of age.
8. Children whose speech is unintelligible after the age of three.
9. Children who are not talking by the age of two.
10. Children during the first year who are not startled by loud noises.
11. Children who by the age of six to nine months do not respond to their name.

Gottlieb et al. (1979) indicated that physicians should be cognizant of the importance of "recurrent middle ear disease, possible hearing loss, delayed speech and language and behavioral problems." Hixson (1980) concluded that pediatricians must have some standard procedure in determining the speech and language development of pre-school children and the existence of hearing impairment.

Basic Tests and Techniques for the Determination of Hearing Loss

Upfold (1978) found that a larger percentage of children with hearing loss were diagnosed when the use of the high-risk register was employed. In 1972, The Joint Committee on Hearing Screening formed by the American Academy of Pediatrics (AAP), the American Academy of Otolaryngology

(AAOO) and the American Speech and Hearing Association (ASHA) developed the following "high-risk register" for the identification of hearing impaired infants and children:

1. Family history of childhood deafness
2. Maternal rubella during pregnancy, or other intrauterine viral infections
3. Hyperbilirubinemia
4. Maxillofacial anomalies
5. Prematurity (birth weight of 1,500 gm. or less)

It was recommended that infants fitting these criteria should receive an audiological evaluation during their first two months of life, and then be screened on a regular basis (Poland et al., 1980). Additional recommendations were added to the high-risk register in 1975:

1. Middle ear status should be considered in older infants and children.
2. Parental questionnaires should be used.
3. Behavioral screening testing should be carried out with all children after the age of seven months.

Jerger, Hayes and Jordon (1980) confirmed that neonates can be tested successfully within the first few days of life by an audiologist using brainstem evoked response audiometry. This form of audiometry assesses the peripheral auditory mechanism with unfiltered clicks as stimuli, usually at frequencies above 1500 Hz. Another method of screening (Crib-O-Gram), used in hospital nurseries, was developed by Simmons and Russ (1974). The Crib-O-Gram is described as a motion sensitive transducer placed in the

child's crib which provides a record of bodily movement before, during and after a sound is presented (Diaz et al., 1982).

One of the most evident signs of hearing impairment is in the delayed or absent development of language skills (Matkin, 1986). The use of the Early Language Milestone Scale (ELM Scale) provides a quick reference to auditory expressive, auditory receptive and visual language skills for children under 36 months (Coplan, 1985). Other more detailed language measures are the Receptive-Expressive Emergent Language Scale (Bzoch and League, 1971) and the Sequenced Inventory of Communication Development (Hedrick, Prather and Tobin, 1975).

While severe losses are readily identified during the first two to three years of life, those children with mild to moderate losses (mainly conductive in nature) may not be detected for long periods of time (Diaz et al., 1982). The American Academy of Pediatrics (AAP) recommended the evaluation of hearing and communicative skills for any children with persistent middle ear problems (longer than three months). The AAP further stated that a full "evaluation for this condition should combine pneumatic otoscopy and possibly tympanometry, with a direct view of the tympanic membrane" (Signer, 1985). It has also been suggested that infants and young children should receive examination for middle ear disease as part of their regular medical checkups (Signer, 1986).

Bluestone (1982) stated that the most important diagnostic tool in the evaluation of otitis media was the patient's medical history, followed by a pneumatic otoscopic examination and impedance audiometry. His

recommendations regarding air-conduction audiometry were guarded, due to the fact that hearing loss is not always present with otitis media. Bluestone suggested that aggressive treatment of otitis media with infants and children should be attempted.

Eighty-four children with middle ear disease were subjected to otoscopic examination, tympanometry and air-conduction audiometry (Bluestone, Berry and Paradise, 1973). Tympanometry was found to be the most dependable followed by otoscopic examination. Tympanometric screening is a simple, rapid test which is important in detecting middle ear disorders. It measures the acoustic energy that is passed through the middle ear or the energy reflected back by the tympanic membrane. Audiometry, although not as valid a test for middle ear disease, was of value in determining the degree of impairment (Bluestone et al.1973).

Otoscopic examination may reveal fluid behind the tympanic membrane or a perforation of the membrane. However, identifying middle ear disease is sometimes difficult because symptoms are not always present, otoscopic examination is difficult at times, and abnormalities of the tympanic membrane can be hard to detect (Paradise, Smith and Bluestone, 1976). Unless a "careful and precise technique of examination is adopted" there will be misdiagnosis (O'Connor, 1982). In addition, it is important that an otoscopic examination be done prior to impedance testing because excessive cerumen may result in erroneous findings (Grimes, 1985). Istre (1980) and Brown (1975) endorsed the use of impedance audiometry in the

identification of those children with middle ear losses and suggest that this technique is preferable over the physician's use of the pneumatic otoscope.

O'Connor (1982) outlined some simple hearing screenings which include a whisper test and tuning fork procedures. Several additional screening tests reviewed by Diaz et al. (1982) include noisemakers, Ewing Screening Procedures, Verbal Auditory Screening for Children (VASC), Visual Reinforcement Audiometry (VRA) and play audiometry.

In addition to testing, it is extremely important to have a complete detailed case history which may help in the diagnosis and management of the hearing impaired individual (Mouney, 1979). Brookhouser (1979) recommended the use of a developmental screening questionaire filled out by the parent which can guide the pediatrician in considering referral to an otologist or audiologist.

Upfold (1978) stated that one of the most important clues the pediatrician has available to him is the suspicion by the parent or someone in contact with the child that he may not be hearing. Yet Robinson, Willits and Benson (1965) found only 33% of the families having infants less than one year of age with a hearing loss suspected a problem in their children. The figure jumped to 89% being correctly suspected by their families during the first three years of life.

CHAPTER TWO

STATEMENT OF THE PROBLEM

Pre-school children have been found to have hearing losses due to various etiologies (Grimes, 1985; Wong et al., 1979; Poland et al., 1980). While pediatricians and family practice physicians have generally enlisted the services of audiologists and/or otolaryngologists when the child's symptoms are obvious to both the physician and parents, delays in identification of children with hearing impairments are common (Northern and Anderson, 1980). It would seem that if a method was devised that would enable the physician to evaluate certain behaviors and/or results of testing on a consistent and uniform basis, more children would be spared temporary and/or permanent auditory isolation. The purpose of this study was to determine the answers to the following questions:

1. Are pediatricians and family practice physicians using a standard criteria when referring pre-school children to otolaryngologists and/or audiologists?
2. What types of instrumentation and procedures are used?
3. Are they referring certain etiologies more often than others?
4. Do these criteria for referral differ between the pediatricians and family practice physicians?

CHAPTER THREE

METHODOLOGY

A list of 112 family practice physicians and 108 pediatricians, limited to those practicing in the Central Florida area, was obtained from the Florida Medical Society's directory of members . Central Florida was defined as including Seminole, Volusia, Lake, Sumter, Polk, Orange and Osceola counties.

Each physician was mailed a questionnaire (Appendix A) which included nine possible tests and procedures used in the identification and referral of speech, language and/or hearing problems and seven possible etiologies involving the hearing mechanism or the speech/language mechanism. The design of the questionnaire was tested in a preliminary study and judged to be satisfactory (Appendix B).

The items included in the first half of the questionnaire, which pertain to tests and procedures, are documented in the literature as providing information for diagnosing speech, language and/or hearing difficulties. They are by no means the only available methods, therefore a space was provided for additional items to be added by the participating physicians. Further, the etiologies used were selected because they are some of the

most commonly detected problems in pre-school children.

The questionnaire was constructed using a five point scaling procedure (Edwards, 1957) with responses ranging from usage of tests or procedures in the referral process at levels of 99%, 75%, 50%, 25% to 1% or less. The same scaling system was utilized for the designation by the physicians of which etiologies they referred to otolaryngologists and/or audiologists.

A cover letter (Appendix C) explaining the purpose of the study and instructions for completion of the questionnaire was enclosed along with a return-addressed stamped envelope. Coding of the physician group was done by placing designated stamps on the return envelopes.

CHAPTER FOUR

RESULTS

Questionnaires were completed by 58 of the 112 family practice physicians (52%) and 61 of the 108 pediatricians (56%) surveyed. The data collected was viewed from the standpoint of whether there was a difference between the criteria used by the family practice physician and the pediatrician and whether there are commonalities in procedures and tests used. Etiologies which consistently resulted in referral of preschool children to otolaryngologists and audiologists were also studied.

Analysis of Responses Between Groups of Physicians

Chi Square (alpha $\leq .01$) results (Table 1), utilized to determine whether the medical groups should be evaluated separately or as a whole, showed significant findings in some procedures and techniques. Fiqures 1 through 4 are raw data percentages for the two groups which were the basis of the Chi Square results. The findings suggested that family practice physicians used tuning forks significantly more ($p < .006$) than pediatricians. Thirty-four percent of the family practice specialists used tuning fork results more than half of the time in determining need for referral. Pediatricians used screening tympanometers significantly more ($p< .001$), with 33% reporting

TABLE 1

RESULTS OF CHI SQUARE TESTS ON SURVEY DATA COMPARING 61 PEDIATRICIANS AND 58 FAMILY PRACTICE PHYSICIANS ITEM BY ITEM

SURVEY ITEM NUMBER	SAMPLE SIZE	VALUE	PROBABILITY
1	114	3.376	0.497
2	108	9.300	0.054
3	103	14.421	0.006*
4	109	2.859	0.582
5	98	19.849	0.001*
6	99	7.703	0.103
7	100	4.625	0.328
8	105	5.603	0.231
9	102	8.020	0.091
11	116	6.974	0.031
12	113	4.237	0.120
13	116	0.569	0.966
14	118	3.616	0.460
15	111	9.140	0.058
16	111	4.307	0.366
17	115	0.467	0.977

* denotes significance (alpha ≤ .01)

that they used them 50% of the time or more. Comparisons of the other items on the questionnaire did not result in significant differences between the two types of physicians.

Comparison of Procedures and Tests

Since Chi Square results showed a difference between the groups of physicians, each group was examined individually using multiple comparisons with the Friedman Tests of Randomized Block Design. A value of 75.97 was determined to be the critical value for determining significant difference in the tests and procedure section. Each of the questions one through nine was compared individually to the other questions in that section. Results for any question differing by the critical value of 75.97, positively or negatively, from one or more questions were judged to be significant. Otoscopic examination, the most frequently used procedure in referral by both groups of doctors, had critical values ranging from 84 to 181.5 when compared with the other questions, which indicated an overall significant difference. For family practice physicians the pneumatic otoscope and the use of parental questionnaires only reached significance when compared with screening tympanometers [pneumatic otoscope: 82; questionnaire: 97.5] and standardized speech and language screening tests [pneumatic otoscope: 77.5; questionnaire: 93]. The use of the pneumatic otoscope by the pediatricians only reached significance when compared to tuning forks [98], noisemakers [98] and standardized speech and language tests [77.5] (see Table 2).

TABLE 2
MULTIPLE COMPARISONS OF THE TESTS AND PROCEDURES USING THE FRIEDMAN TESTS OF RANDOMIZED BLOCK DESIGN

SURVEY ITEM NUMBER	RANK SUM PEDIATRICANS	RANK SUM FAMILY PRACTICE PHYSICIANS	CRITICAL VALUE
1	91.0	97.5	75.97
2	180.0	197.0	75.97
3	278.0	205.0	75.97
4	207.0	229.0	75.97
5	212.5	279.0	75.97
6	278.0	241.5	75.97
7	226.5	230.0	75.97
8	204.5	181.5	75.97
9	257.5	274.5	75.97

TABLE 3

MULTIPLE COMPARISON OF ETIOLOGIES REFERRED USING THE FREIDMAN TESTS OF RANDOMIZED BLOCK DESIGN

SURVEY ITEM NUMBER	RANK SUM PEDIATRICANS	RANK SUM FAMILY PRACTICE PHYSICIANS	CRITICAL VALUE
11	290.5	266.0	60.98
12	294.0	276.0	60.98
13	270.5	260.0	60.98
14	107.0	106.5	60.98
15	271.0	225.5	60.98
16	197.0	165.5	60.98
17	110.0	100.5	60.98

Comparisons of Referral of Specific Etiologies

The multiple comparisons with the Friedman Tests of Randomized Block Design was also used for the second section of the questionnaire. The critical value of this section of the questionnaire (items 11 through17) was 60.98. The physicians showed more unanimity on the specific etiologies they used for referral to otolaryngologists and/or audiologists with significant values for chronic otitis media [ranging from 90 to187] and delays in speech and language development [ranging from 65 to 184] as compared to all etiologies surveyed for both groups of physicians. Additionally, the family practice physicians referred significantly more of those with other middle ear disorders [ranging from 94.5 to 110.5] (see Table 3).

CHAPTER FIVE

DISCUSSION

It is important that children with hearing impairments be diagnosed as early as possible. This diagnosis is dependent on the primary care physician identifying potential hearing problems and referring them to a hearing specialist. The purpose of this study was to investigate whether there are differences in referral criteria between family practice physicians and pediatricians when referring pre-school children to otolaryngologists and/or audiologists.

The findings of the study indicated that there were two differences in the referral procedures between the physicians. First, the family practice physicians, perhaps because they have patients with a wider range of ages, used tuning forks significantly more often than the pediatricians. In contrast, 70% of the pediatricians indicated that they did not use tuning forks as criteria. This suggests that they may be more attuned to the abilities of the pre-school child, since tuning fork tests are normally difficult tasks for young children to perform. This is evidenced by the absence of recommendation in the literature of this technique for testing pre-school children.

The second difference is with the use of screening tympanometry. Pediatricians chose it significantly more often than did the family practice physicians. Tympanometry is an objective means of determining middle ear status and proves quite useful in evaluating conductive hearing loss. Because it does not require a response or even patient cooperation, it is an excellent assessment procedure for the pre-school child (Diaz et al., 1982). Unfortunately, even though pediatricians used this effective method more often than family practice physicians, approximately half of the pediatricians responding did not use it as criteria for referral.

In the study, few procedures and tests were found to be used consistently by all physicians. The use of the otoscope and the pneumatic otoscope were the only two practices consistently used by both groups of physicians. While it would be unwise for the physician to eliminate the use of the otoscope, the accuracy of diagnosis using this instrument in assessing hearing problems is somewhat limited (Paradise et al., 1976). The more useful instrument, the pneumatic otoscope, was cited as being used regularly by 60% of the pediatricians and 40% of the family practice physicians. In addition to these instruments, almost half of the family practice doctors relied on parental questionnaires which have been reported to effectively reveal hearing problems. Together, the combination of otoscopy, pneumatic otoscopy and parental questionnaires seems to be a good start toward the comprehensive assessment of a child's auditory abilities, but they do not give actual hearing levels and thus can be incomplete. A more useful identification battery that would

supply more definitive data should also include the use of screening audiometry, screening tympanometry and a speech/language screening test.

Moreover, this survey studied the types of etiologies the physicians most often referred to otolaryngologists and/or audiologists. The results showed the physicians would most likely refer children with chronic otitis media and speech and language delays. Since it has been noted in the literature that chronic otitis media has been implicated in delays in speech, language and cognitive skills this referral combination will insure that many children will receive specialized treatment. However, since the use of speech and language screening tests are not commonly used by these specialists, it is suspected that some of the pre-school children with speech delays, but without chronic otitis media, are overlooked.

While it may be difficult to generalize from a small sampling (119) of physicians, the results of the preliminary study (Appendix B) conducted in the Tallahassee area (13 family practice physicians and 26 pediatricians) indicate similar practices among their doctors to those of the Central Florida group. Although a survey that encompassed pediatricians and family practice physicians from other major regions of the country would certainly provide more data regarding hearing referral practices, it is anticipated that Central Florida, due to its rapid population growth, probably represents practices common to most areas of the nation. A review of the Florida Medical Society's directory indicates the physicians come from training centers scattered throughout the country.

In summary, much has been said about the need to identify children with hearing impairments as early as possible (Signer, 1985), yet this study shows little indication that an effort is being made to utilize a consistent set of procedures and tests that will comprehensively assess the hearing status of the pre-school child. While pediatricians and family practice physicians are using some tests and procedures regularly, there are still further assessment tools that they could utilize to more effectively identify hearing deficits.

The study suggests that further investigation should be made to ascertain an easy-to-administer and all-inclusive battery of tests which would identify children with hearing impairments at an earlier age. If such a test battery could be developed and shown to improve the identification of hearing impaired children by physicians using it, this would provide a strong argument for its widespread use.

APPENDIX A

Check the approximate percentage of time you use the following tests and procedures as criteria for referral of pre-school children to otolaryngologists and/or audiologists for evaluation and/or treatment.

	99%	75%	50%	25%	1% or less
1. Otoscope	☐	☐	☐	☐	☐
2. Pneumatic otoscope	☐	☐	☐	☐	☐
3. Tuning fork	☐	☐	☐	☐	☐
4. Screening audiometer	☐	☐	☐	☐	☐
5. Screening tympanometer	☐	☐	☐	☐	☐
6. Noisemakers	☐	☐	☐	☐	☐
7. Behavioral response test	☐	☐	☐	☐	☐
8. Parental questionnaire	☐	☐	☐	☐	☐
9. Standardized Speech and Language Screening Test	☐	☐	☐	☐	☐
10. Other _____	☐	☐	☐	☐	☐

Check the approximate percentage of time you refer pre-school children with the following etiologies to otolaryngologists and/or audiologists for evaluation and/or treatment.

	99%	75%	50%	25%	1% or less
11. Impacted cerumen	☐	☐	☐	☐	☐
12. External otitis	☐	☐	☐	☐	☐
13. Acute otitis media with effusion	☐	☐	☐	☐	☐
14. Chronic otitis media with effusion	☐	☐	☐	☐	☐
15. Other external ear disorders	☐	☐	☐	☐	☐
16. Other middle ear disorders	☐	☐	☐	☐	☐
17. Speech and/or language delays	☐	☐	☐	☐	☐

APPENDIX B

A preliminary study was conducted to determine if the survey tool was appropriate, clear and concise; if the physician's letter would elicit an adequate response; and what type of response to expect on the expanded study. The study was conducted in the Tallahassee area and involved the mailing of the letter (Appendix C) and questionnaire (Appendix A) to the 21 pediatricians and 41 family practice physicians listed in Florida Medical Society's Roster of Physicians in the capital area.

Thirteen of the pediatricians (62%) and 26 of the family practice physicians (63%) returned usable responses. Three pediatricians and one family practitioner indicated that they were unable to fill out the questionnaire due either to retirement or their lack of services to pre-school children.

A response rate of 60 % is considered good when analyzing and reporting survey information (Ventry & Schiavetti, 1983). Conjointly, the feedback from the physicians regarding the make-up of the questionnaire and the appeal of the letter were positive, thus implying use of the survey instrument and physician's letter should be equally as successful in the Central Florida study.

APPENDIX C

January 10, 1987

Dear Doctor _____:

As a graduate student in Audiology (Communicative Disorders) in the College of Health at the University of Central Florida, my thesis deals with the criteria pediatricians and family practice physicians use to refer their pre-school patients to otolaryngologists and/or audiologists.

Appreciating how busy you are, the enclosed questionnaire is very brief. Kindly check the approximate percentage each item is used in your decision to refer.

Thank you for your help in this research.

Sincerely,

Janet James, B.S.

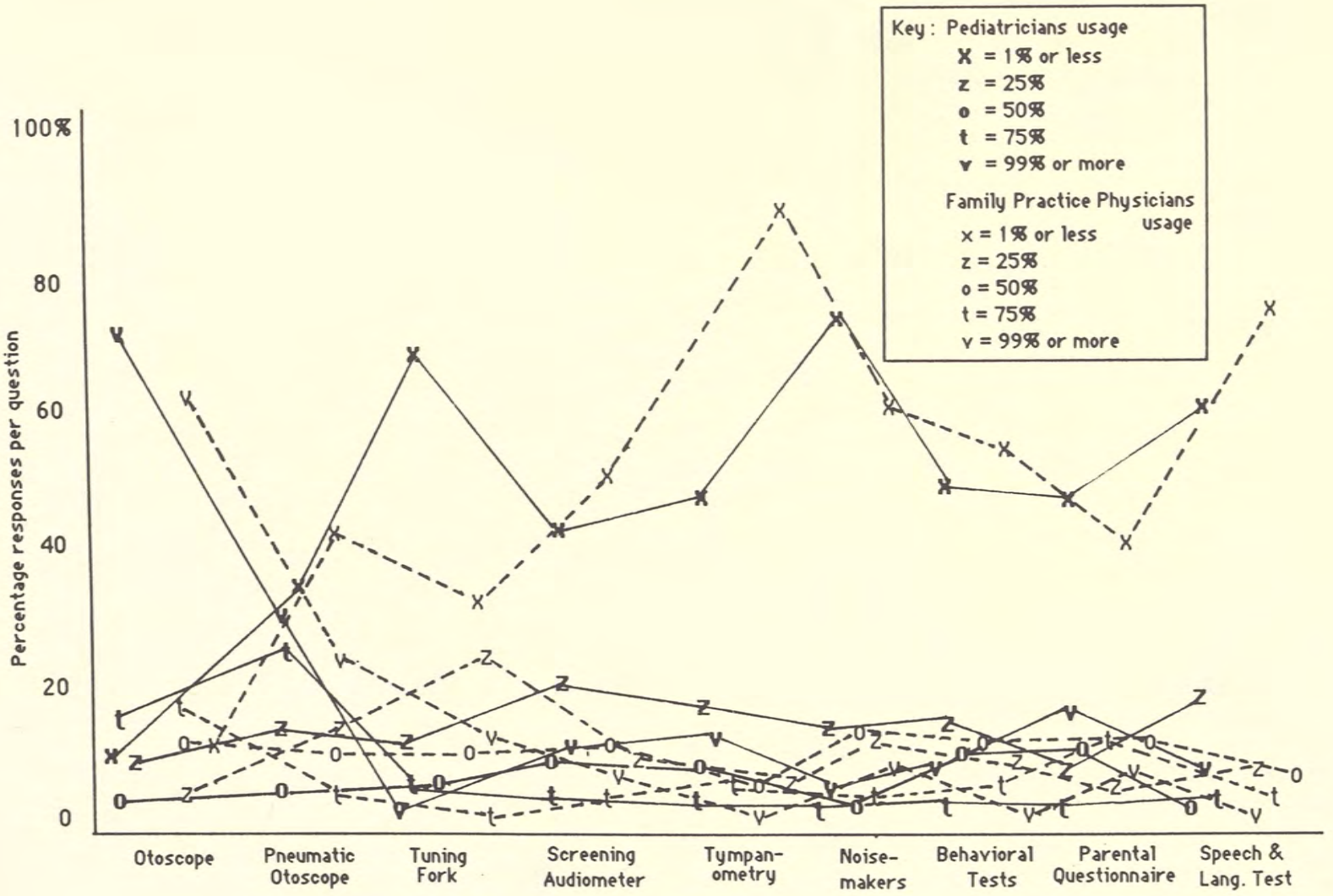

Figure 1. Percentage of responding pediatricians and family practice physicians versus the percentages of times they use certain tests and procedures for referral to audiologists and/or otolaryngologists.

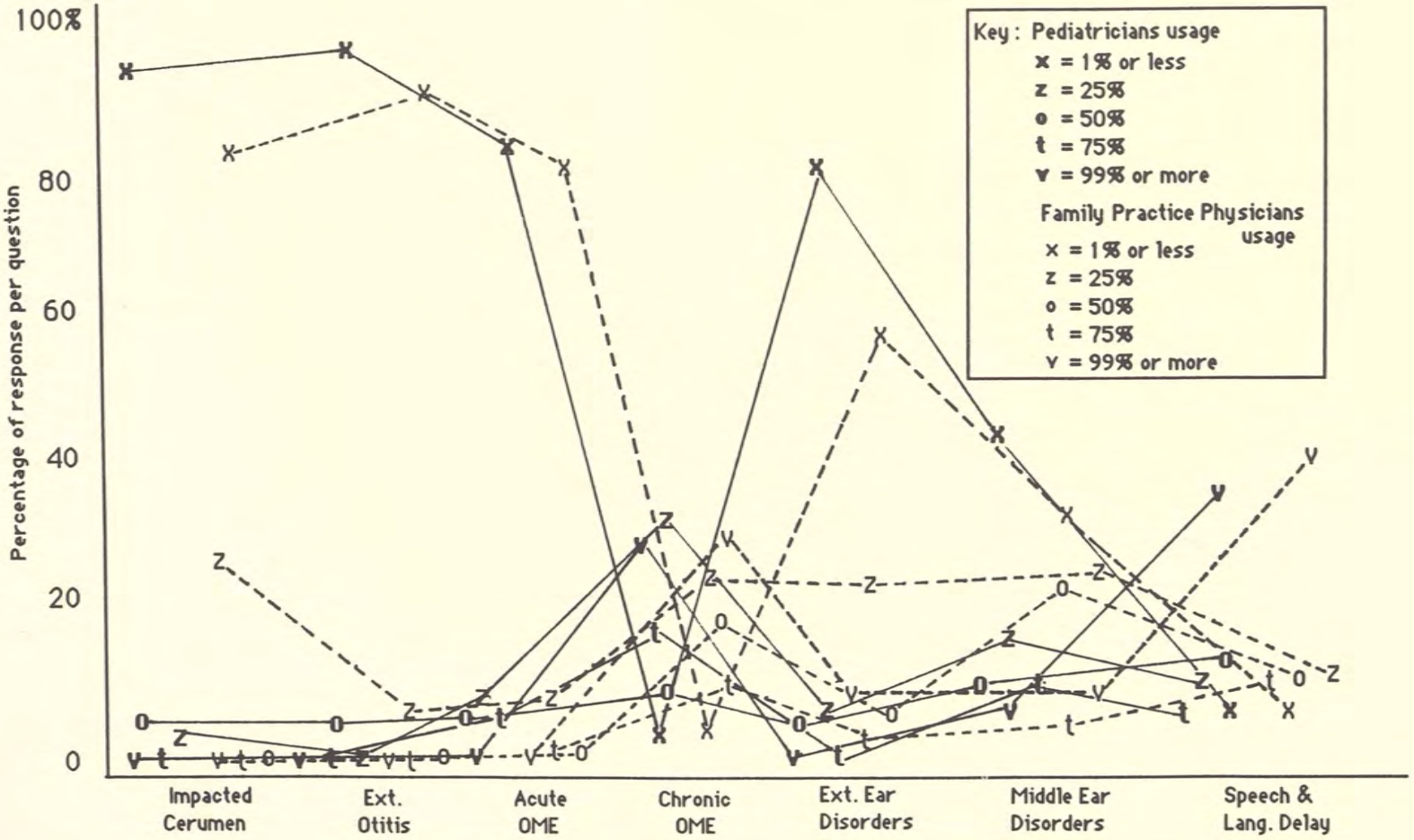

Figure 2. Percentage of responding pediatricians and family practice physicians versus the percentages of times they use certain etiologies as a basis of referral to audiologists and/or otolaryngologists.

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