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The complexity of diagnosis for co-occurring minor speech, language and hearing problems: perception of parents

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Running Head: COMPLEXITY OF DIAGNOSIS

The Complexity of Diagnosis for Co-occurring Minor Speech, Language and Hearing Problems:
Perception of Parents

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Program in Communication Disorders

Honors Thesis

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Abstract

The purpose of this study was to explore the understanding that parents have about the diagnostic process associated with co-occurring minor speech, language, and hearing problems in young children. The participants were 16 parents of young children between the ages of 2 and 5 years. The materials consisted of a questionnaire that delineated the diagnoses of the problem and referrals experienced by parents, which was electronically distributed by posting the link to social media sites. Results of the study indicate most parents reported only single issues such as ear infections or differences in oral structures/functions. Only 5 respondents indicated that their children faced complex issues. While most of these were distinctly identified as a combination of speech and hearing issues, two participants indicated that the problems experience by their children were more vague and difficult to determine than those listed in the study questionnaire. The main source for diagnosis and intervention were medical whether this is associated with medical or surgery. Therapy was only reported for oral structure/function issues and speech-language pathology were the therapy of choice. Recommendations for this study would include expanding distribution of the questionnaire to a larger area of study, clarity of the questionnaire as to obtain the answers sought, and including the experience of the professionals via a separate questionnaire.

The Complexity of Diagnosis for Co-occurring Minor Speech, Language and Hearing Problems:
Perception of Parents

It has been noted by many that children at birth do not come with a user's guide or handbook. New parent as well as experienced parents with a new child who experiences health problems, even if these are minor, can be anxious and confused by the myriad of information available to them. This can range from a first question of whether or not to be concerned, to having to pull information from several professionals together to understand the impact of co-occurring conditions on a child's development. In the end, it is the task of the parents, who know their child best, to weave together information obtained from the doctors and other professionals in order to understand what the problem is, and in everyday life give their little one relief from pain and a chance to develop normally. The case of Sally Ann and her parents, Mr. and Mrs. Joe Jones, is an example of this.

Sally Ann was a beautiful baby who within months of her birth became colicky and had repeated upper respiratory problems. Primary care visits were frequent as were the suggestions from specialists, nurses, friends, and family. Sally Ann did 'grow' out of being colicky and by the time she was 8 months old, Mr. and Mrs. Jones were able to sleep through some nights each week. However, the ear infections that began as part of upper respiratory problems did not go away. By the time Sally Ann was a toddler, she had experienced multiple bouts of otitis media, which led to specialty care with an otolaryngologist and surgery to insert pressure equalization (PE) tubes. Little Sally Ann did begin to speak once she could consistently hear, but her speech was not clear. Mr. and Mrs. Jones were told this was probably due to the early ear infections and that the speech would improve. She began seeing a speech-language pathologist. More sounds came but

they always sounded like she had a cold which seemed possible sometimes since Sally Ann usually breathed through her mouth. It wasn't until her 3-year visit with the pediatrician that it was discovered that Sally Ann's tonsils were extremely large (tonsil hypertrophy). This required another surgery, and again things improved but were not quite right. Her speech could be understood but she just couldn't say certain sounds. Therapy continued. Then at a routine check-up at the dentist office yet another minor problem was discovered. Sally Ann's tongue could not move freely because of ankyloglossia. Another small surgery and at last all physical restrictions to Sally Ann's successful speech and language development were removed.

This is a success story but the happy ending came only after four years of doctor visits, three surgeries, and intermittent speech-language therapy. It came after sleepless nights for Mr. and Mrs. Jones and hours of worry about why Sally Ann might be different from their other children. It is unknown how common this scenario may be and what forms it may actually take. The purpose of this study is to explore these two questions.

Review of the Literature

This literature review will define the diagnostic process in general, and then review common children speech-language-hearing issues that may involve diagnostic procedures. In addition, the review will indicate who is involved in the diagnostic process, and the typical referral pattern/outcome. The review will end with the questions of the study.

Diagnosis

Diagnosis is the "identification of a disease or disorder based on the symptoms presented" (Paul & Cascella, 2007, p.342). A diagnosis could lead to other findings or the other

conditions could be ignored, remain unnoticed, and cause further problems. Conditions, as explained by the professionals, can be labeled a minor problem or a major problem. These problems can be categorized by their effect on hearing, for example otitis media can cause a range of hearing loss. In ankyloglossia, its severity lies within the amount of tongue mobility. All of these have a given range that supports the decisions about severity. In order to be considered minor the condition must have a supposed small impact on normal or expected functioning that ranges from none to severe.

Every profession performs diagnostics and/or assessments that are within the scope of their practice. This can be problematic for parents when they are receiving services from a variety of professionals working from different perspectives because they essentially become the case manager for their child. In this role, they know all the parts but do not usually have the knowledge or skill to see what questions to ask in order to bring all the pieces together. The following sections focus common co-occurring speech and hearing issues associated with young children. This part of the literature review will support the questions of the study as well as the data collection instrument.

Common Childhood Disorders of Hearing and Speech

Otitis Media

“Otitis media (OM) is the most frequently diagnosed illness among children in the United States” (Roberts & Porter, 2004, p.2) impacting approximately 75% of all children at least once before the age of 3 years (Silverman & Miller, 2006). OM is described as an inflammation of the middle ear. It is the portion of the ear where the complexity of bone movement is very important for the conduction of sound. Fluid build-up can cause the bones to become immobile, restricting the sound waves that would be conducted to the inner ear and sent on to the brain for

interpretation. The children at most risk for OM include children less than two years of age and those attending a daycare (Roberts & Porter, 2004). According to the literature, this time frame encapsulates the critical years of rapidly developing language and speech skills. Therefore, professionals believe OM can have a particular impact on language and speech development (“Causes of hearing, 2013).

Symptoms and Diagnosis. A variety of different symptoms occur with OM, which makes it difficult for parents to consistently associate behaviors their young children exhibit with the condition. These can include inattentiveness, misunderstanding directions, and unexplained irritability, all behavioral responses that cannot be limited to OM. The most common physical symptom, according to the literature, is the pulling or scratching at the ears (“Cause of hearing”, 2013) that is even more telling when there is draining of fluid from the ears, fever, and difficulty with balance (Joseph, 2013).

The complexity and differences between symptoms make identification of OM difficult for parents; however, the treatment is straight forward. Antibiotics are the first line of defense. If the infection continues after repeated rounds of this treatment, primary care physicians will often times refer to an audiologist for assessment of hearing and an Ear, Nose, and Throat (ENT) doctor who evaluates the need for PE tubes (Joseph, 2013). The audiologist will test the child’s hearing to determine if there is a loss, which is described as mild, moderate, or severe, and to determine if there is a need for behavioral intervention. Such intervention may be critical when the reoccurring OM is present during critical stages of speech and language development since hearing loss can continue for up to six weeks after the infection is healed (Joseph, 2013).

Conflict. Professional opinions vary about the impact of OM on speech and language development (Roberts & Porter, 2004). Joseph (2013) claims that “Even a mild temporary

hearing loss can delay the development of language skills” since “...the child with OM loses about 40% of speech in his environment” (p. 1). Correlation studies do indicated that recurrent OM is associated with early speech and language delay and latter problems with school work, poor self-esteem, and social problems (Joseph, 2013). An example of this kind of study is one reported by Gravel and Wallace (1995). They gathered medical histories on with 14 children to document the age and number of ear infections they had before the age of two and found that those children who experiences persistent OM in the first year of life had subsequent poorer academic abilities at school age, particularly in the area of reading.

One study does not settle the controversy of OM and its effects on speech and language development, but it does represent the kinds of research that supports the importance of early speech and language intervention for OM. Controversy remains because some children even with reoccurring ear infections have no difficulty developing speech and language or these subsequent problems. Therefore, parents may not be routinely referred for speech-language therapy services.

Summary. Hearing is critical for speech and language development, especially before the age of two years. Otitis media is a frequent and often silent childhood illness that reduces hearing in young children. Parents look to medical professionals for guidance, which is why the American Academy of Pediatrics states, “Any child whose parent expresses concern about whether the child hears should be considered for referral for behavior audiometry without delay” (“Cause of hearing”, 2013). Parents appreciate the swift nature of the professionals and their willingness to answer any questions as quickly as possible as it is their primary responsibility to seek out and obtain the appropriate information. As the literature suggests, informed parents who understand the ramifications of OM become the best advocates for services that may be needed by their children.

Tonsil Hypertrophy

Tonsil hypertrophy can be defined as a “medical term for abnormally enlarged tonsil tissue” (Palmer, 2003, p. 1). A child can be born with tonsil hypertrophy or the condition can develop due to infections and bacteria. Literature suggests that there is often a link between OM and tonsil hypertrophy since this condition as well as the sinusitis that accompanies it can enlarge surrounding tissue that “may impede proper drainage of the Eustachian tubes and sinus cavities” (Palmer, 2003, p.2).

Conflict. Some literature supports the idea that the large and swollen tonsils associated with this condition restrict breathing and causes the tongue to protrude (Palmer, 2003). As the child ages, this may be particularly obvious during normal speech. Such protrusion is a ‘red flag’ that may be overlooked when it co-occurs with OM in the early years of development. It can, however, lead to further problems with speech production that remain after OM has been successfully treated.

Summary. Tonsil hypertrophy is a medical condition that often co-occurs with OM. The condition’s developmental impact may be ignored in the push to treat OM in order to reduce potential speech and language delay. Left untreated, tonsil hypertrophy can lead to tongue protrusion that impacts speech production that begins in childhood and becomes a life-long habit. Parent awareness and persistence in seeking information from medical professionals is key to changing the developmental speech consequences of this condition.

Orofacial Myofunctional Disorder

Not all tongue protrusion is due to tonsil hypertrophy, which is associated with OM. . Orofacial myofunctional disorder (OMD) is one such condition. While the tongue protrusion is similar to that exhibited in tonsil hypertrophy, this condition is structural in nature. “The tongue

may lie too far forward during rest or may protrude between the upper and lower teeth during speech and swallowing, and at rest” (“OMD”, 2013). This can result in specific sound errors, most commonly /s/, /z/, “sh”, “zh”, “ch”, and “j” all of which are impacted by an incorrectly positioned tongue tip associated with oral-motor weakness (“OMD”, 2013).

Conflict. Unlike otitis media, OMD does not have a specific combination of symptoms that guide its early diagnosis. More like tonsil hypertrophy, one either has or does not have it. While the condition must officially be diagnosed by professionals such as a dentist, orthodontist, physician, or a speech language pathologist (“OMD”, 2013), it can be detected by the parents for obvious reasons yet they may not be aware of the possible consequences to speech development.

Speech therapy is the primary treatment for this condition. This treatment increases the child’s awareness of mouth, facial muscles and tongue postures, which results in increased muscle strength, speech sound production, and improved swallowing patterns (OMD, 2013). This therapy can change the social life of a child or adult since OMD can be both heard and seen by others as it becomes more pronounced.

Summary. OMD is yet another co-occurring disorder that has a developmental basis. Unfortunately, since it is not associated with OM or an infectious process, it may not be diagnosed by a medical doctor. Parents fatigued by chronic childhood illnesses may not notice this as a co-occurring disorder until dental or orthodontic check-up alert them to the physiologic consequences of untreated OMD. Speech therapy is the treatment of choice for this condition.

Ankyloglossia

The most controversial condition of the review is ankyloglossia, commonly known as being tongue-tied. Tongue-tied can be defined as an “uncommon but not rare congenital anomaly...characterized by a thick short lingual frenulum which restricts the mobility of the

tongue” (Hooda, Rathee, Yadav, & Gulia, 2011, p. 2). Basically ankyloglossia limits the movement of the tongue by the tightness of the frenulum that may be located too far forward. This is usually present from birth but not initially problematic. As Hooda et. al (2011) state, the frenulum becomes thinner and has more of a posterior connection as the mouths of infants grow and change. Its presence is higher in males at a ratio of “3 to 1” (p.3).

The many characteristics that define tongue-tied are “v-shaped notch at the tip of the tongue, inability to stick out the tongue past the upper gums, inability to touch the roof of the mouth, and difficulty moving the tongue from side to side” (“Fact sheet”, 2013). The tongue can appear “heart-shaped” (Hooda et. al, 2011, p. 3). The literature also indicates there may be several places of attachment (Dollberg, 2010). The attachment can over time result in dentition issues. Specifically, when the attachment is not developmentally realigned posteriorly but rather remains fixed at the anterior portion near the gum line, the teeth may be pushed to the side during speaking and swallowing.

Conflict. There is disagreement among practitioners about the impact of this condition on speech production. Dollberg (2010), among others, believes this condition has a significant impact on speech since the tongue is the main articulator for speech. Therefore, left untreated, speech difficulties cannot be remediated. This treatment is medical and consists of clipping the frenulum to free the tongue’s movement. Yet a separate set of literature claims “some children with ankyloglossia develop normal speech, and compensate for limited tongue tip mobility without surgical repair or need for speech therapy” (Hooda et. al, 2011, p.4).

According to the literature there are four classes of ankyloglossia; “mild, moderate, severe and complete depending upon the measured free tongue length of 12-16mm, 8-11mm, 3-7mm and <3 mm respectively” (Hooda et. al, 2011, p.7). In the diagnostic procedure, a client

completes a series of tongue movements to determine their range of movement. If these are limited more often than not the patient will be advised to undergo a frenotomy (Hooda et. al, 2011). It is stated that “parents should consider that this surgery often yields more benefit than is obvious by restoring ease of speech and self-esteem” (“Fact sheet”, 2013). Normally an otolaryngologist will make the official decision and perform the frenulectomy (“Fact sheet”, 2013). The American Academy of Pediatrics Section on Breastfeeding is also completely on board with the decision to clip the tongue (Dollberg, 2010). Their decision stems from the most common reasoning which is to allow an infant better ability to breast feed (Dollberg, 2010).

The literature points to many benefits of surgery. The teeth would be free of food, allowing the tongue to sweep and clean the mouth after consumption (Hooda et. al 2011). Yet another benefit is to allow for proper movement of the tongue to play wind instruments (Hooda et. al, 2011). The literature shows that during an experiment, children with tongue-tie did have more articulation errors than children that are not (Dollberg, 2010). Yet there is “no medical literature on any association between speech difficulties and tongue-tie in children” (Dollberg, 2010). Before surgery can be suggested, there is a preferred age of four years and surgery can only be offered to children that express speech problems (Hooda et. al, 2011).

Summary. There is an extensive and conflicting literature on the impact of ankyloglossia on speech. It is typically treated medically by clipping the frenulum to allow increased tongue movement. However, research has also illustrated that individuals with as well as without speech therapy can successfully articulate all speech sounds without this procedure. Since the condition is common, it can be a co-occurring condition that further complicated the decisions that parents face as they seek to best meet the medical and therapeutic needs of their developing children.

Summary and Questions of the Study

As can be seen from this review of the literature, a child's ears and mouth can present a host of medical conditions that can possibly impede development. The expertise for identifying and treating these conditions are spread among various health professionals including pediatricians, ENTs, dentists, orthodontists, audiologists, and speech-language pathologists. Each of these professionals may work from shared yet different knowledge bases and sets of procedures. The ultimate 'keeper' of the child's health and well-being is the parent, who will most usually not have the knowledge or skill set of any of these professionals. Therefore, when they sense a problem they come with questions and seek answers in order to help their child. Their task is not easy or simple when multiple, minor co-occurring conditions of the ear and mouth are present. The child conditions of otitis media, tonsil hypertrophy, orofacial myofunctional disorder, and ankyloglossia can seem very similar in diagnosis approaches and the awareness parents must retain.

The purpose of this study is to explore the understanding that parents have about diagnosis and outcomes of childhood conditions associated with speech, language, and hearing. This leads to the following questions of this study:

1. What speech, language, and/or hearing issues were identified by parents?
2. What diagnoses in what combinations did they associate with these issues?
3. From whom/where did they seek information and assistance?
4. What treatment/interventions did parents most rely on?

Methodology

Participants

Fifty parents of children, between the ages of two and five years, were sought for this study. There was no control for age, gender, or socioeconomic status.

Materials

A questionnaire was developed from the literature. It included a demographic section that delineated the diagnoses of the problem and referrals experienced by parents.

Procedure

The questionnaire was adapted for electronic distribution using a commercially available tool (e.g. Qualtrics). The link to the questionnaire was distributed via social media sites such as; Facebook and Twitter.

Analysis

Descriptions of responses were used to answer the questions of the study.

Results

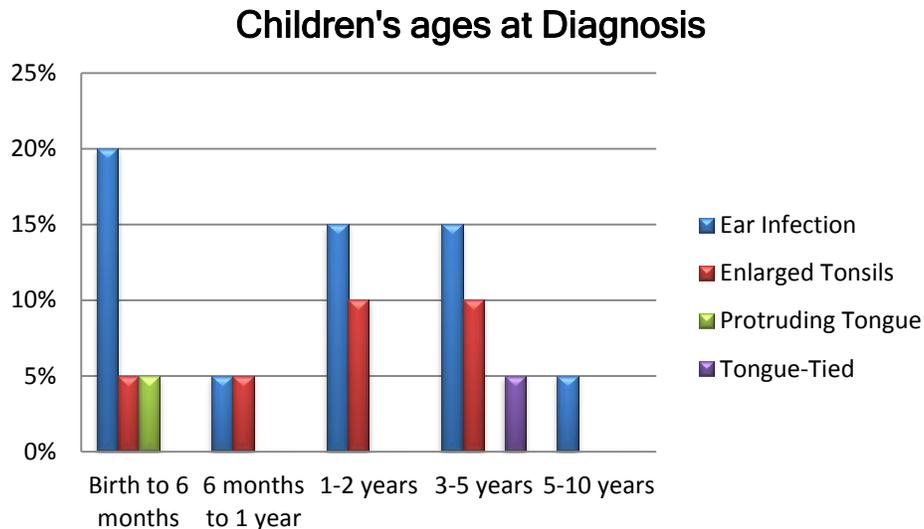
Demographics

Parents with children who have experienced issues with speech, language, and/or hearing were the targeted participants for this study. The first two items on the questionnaire were used to determine how well the respondents met these criteria. Twenty-four questionnaires were begun but of this number, responses from only the fifteen completed were used as data to answer the questions of this study. The parents who completed the questionnaire indicated that their children at the time of diagnoses ranged from birth to five years of age with one participant recording their child was eight years old before being diagnosed. Item 2 on the questionnaire

asked parents if they noticed their child having difficulty with speech, hearing or language to which ten participants answered yes. (see Table 1)

Table 1

Age of Children at the Time of Diagnoses



Question One

The first question of the study asked parents to identify the speech, language, and hearing issues their children experienced. Items 3 and 7 on the questionnaire were used to answer this question. The majority reported issues with ear infections (see Figure 1). As answered by Item 3 of the questionnaire, parents indicated mainly articulation issues, speech delays, and hearing difficulties as their major concern. Enlarged tonsils also had significant data with 43% of participants having this issue. Protruding tongue and tongue-tied made up 7% of the responses, respectively. The range of the parent's concern, as answered by Item 7, seemed to correlate with the issue of the child. The diagnosis age of these children, as mentioned above, spanned over the age groups with the majority of ear infections detected at very young ages and tongue-tied detected later in age.

Speech, Language, & Hearing Issues Identified

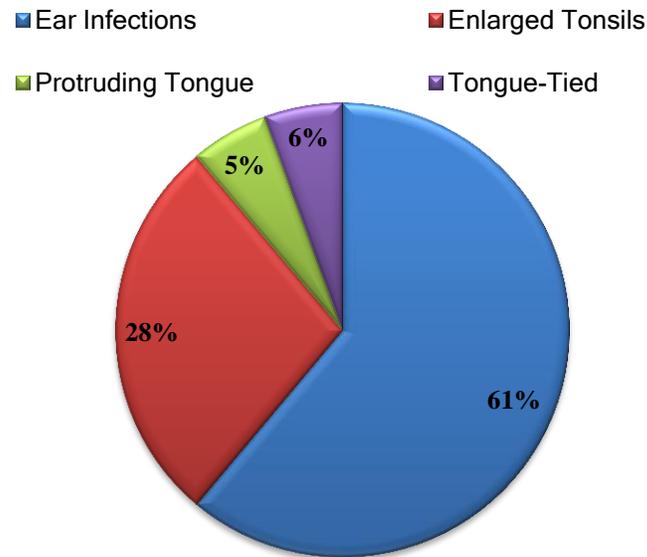


Figure 1. Identified speech, language, and hearing issues.

Question Two

The second question of the study explored the combinations of diagnoses. Item 4 of the questionnaire gave parents the opportunity to explain the complexity of their child's multiple diagnoses. Ear infections along with enlarged tonsils made up 29% which was the majority and the combination of ear infection, enlarged tonsils, and protruding tongue encompassed 7% of the participants (see Figure 2). These were the only two combinations reported as the majority of children had a single diagnosis. One parent was unable to respond to any of the diagnoses offered yet explained their child suffered developmental delays due to persistent pulmonary hypertension since birth. Another parent expressed their frustration with antibiotics and the inability to detect appropriate concerns of delay in their child or normal "child-like" behaviors.

Combination of Diagnoses

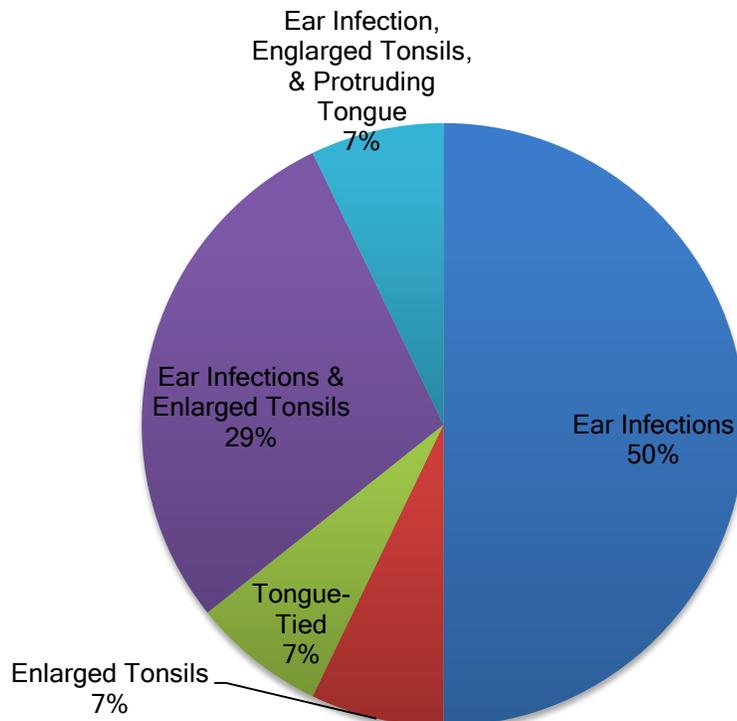


Figure 2. Combination of diagnoses.

Question Three

The third questions of the study examines where parents sought information and assistance for their child. Item 5 of the questionnaire focused on doctors, friends, family and internet to which all participants sought medical attention from doctors. Friends, family and internet were somewhat equally sought with internet drawing slightly more interest (see Figure 3).

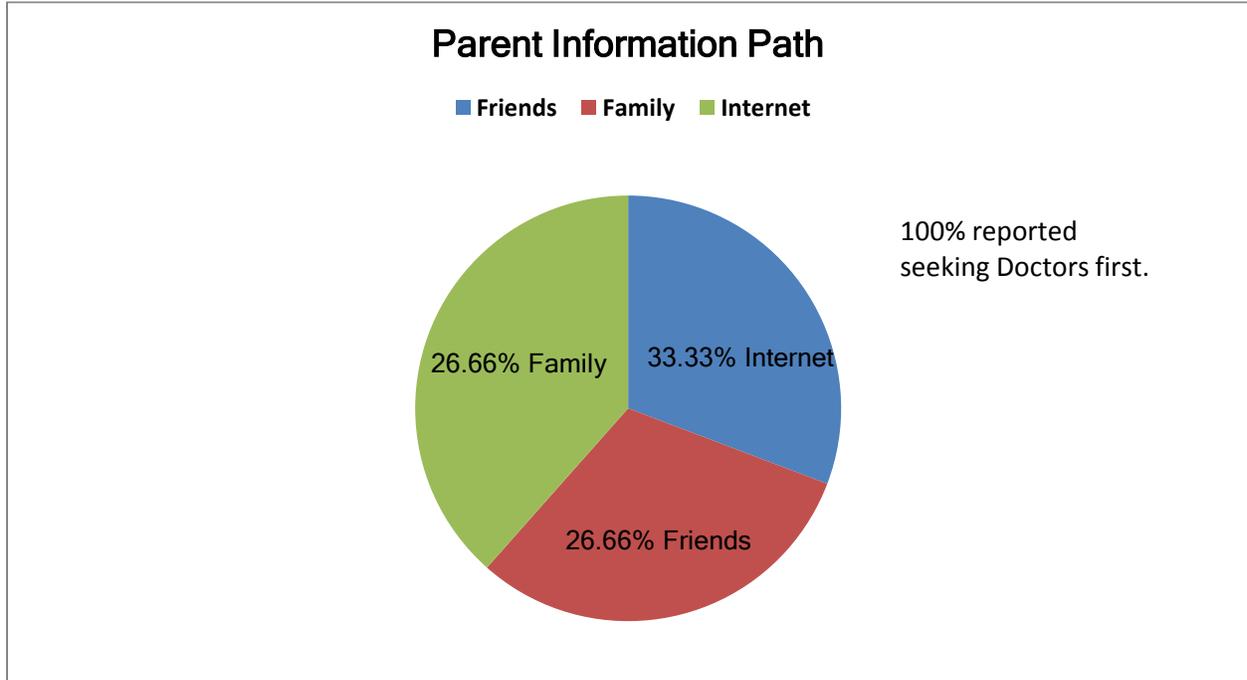
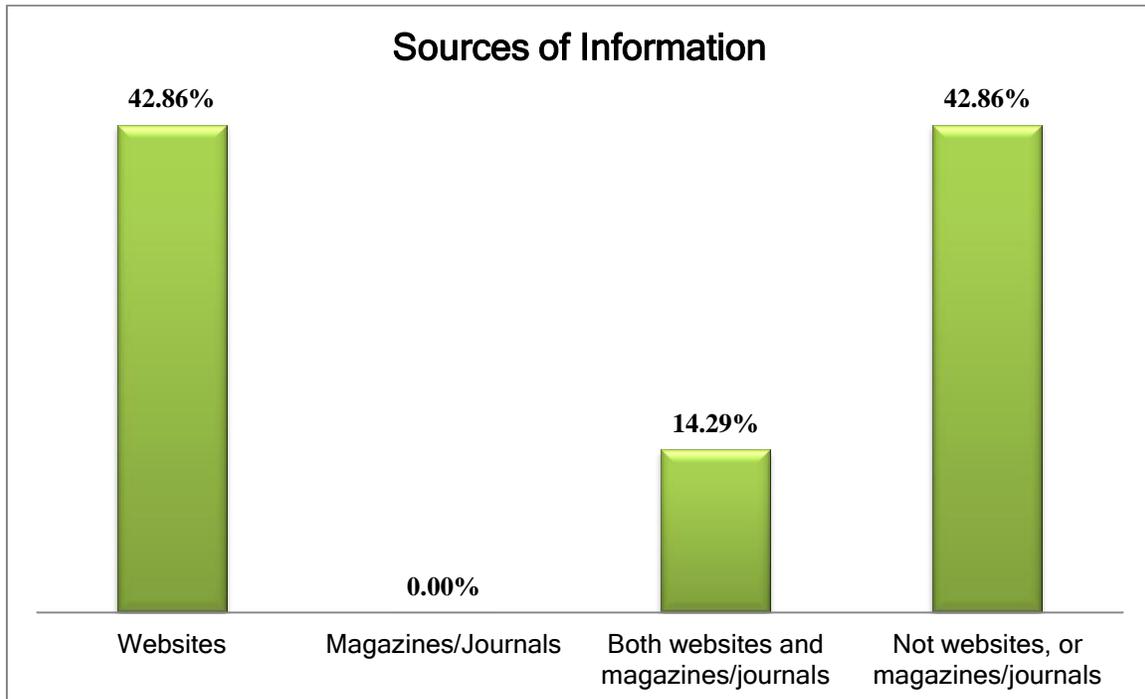


Figure 3. Parent information path.

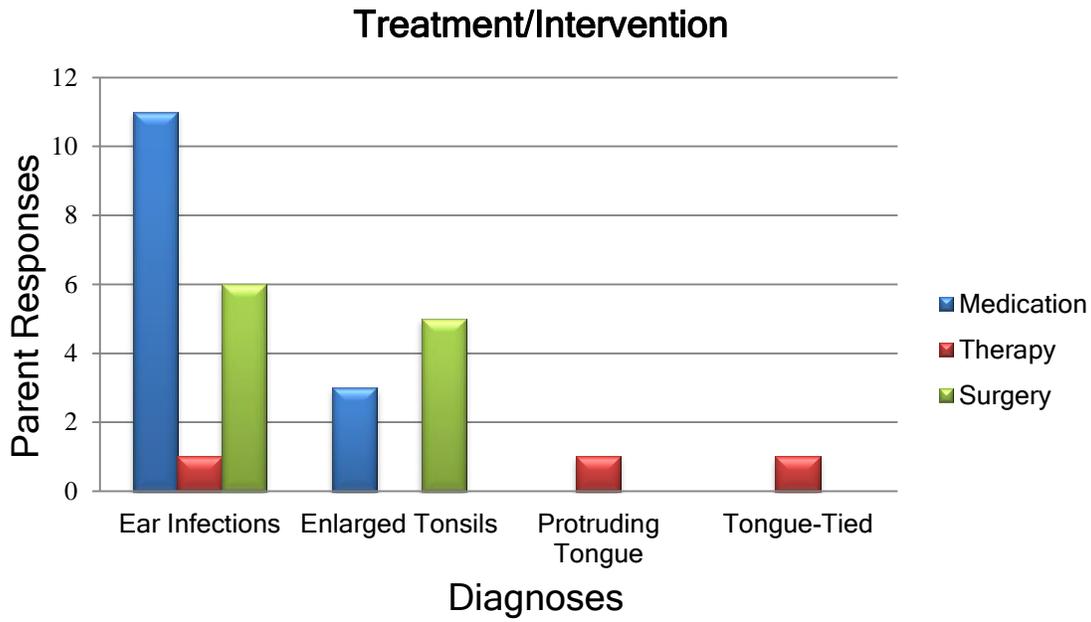
Item 6 of the questionnaire inquired about websites, journals, and magazines. The participants that used only websites made up the majority at 47% yet another 40% of parents recorded using no materials for assistance (see Table 2). One parent commented on using information provided on random “answer” sites while another used Web Md site. A professional journal article was also mentioned by a parent as the source that assisted them to seek medical guidance.

Table 2

Sources of Information**Question Four**

The fourth question of the study asked which treatments and/or interventions parents relied upon. Three choices were given; medication, therapy, and surgery. Medication was the first defense against ear infections followed by surgery (see Table 3). Therapy was a noted intervention for ear infection but was the only treatment sought for protruding tongue and tongue-tied. Surgery was also a reliable intervention for ear infections and enlarged tonsils. Item 12 of the survey allowed parents to express their satisfaction with the treatments of their choice. The majority of parents were somewhat satisfied to satisfied having only one parent reporting dissatisfied with the ear infection treatment they chose.

Table 3

Treatment and Intervention**Discussion**

The goal of this study was to better understand how common it is for parents to seek assistance for complex diagnoses related to speech, language and hearing, and within this process, what kinds of information and services they pursue. As can be seen from the results of this study, most parents reported only single issues such as ear infections or differences in oral structures/functions. Only five respondents indicated that their children faced complex issues. While most of these were distinctly identified as a combination of speech and hearing issues, two participants indicated that the problems experience by their children were more vague and difficult to determine that those listed in the study questionnaire. The main source for diagnosis and intervention were medical whether this is associated with medication or surgery. Therapy

was only reported for oral structure/function issues, and speech-language pathologist provided the therapy of choice.

Several results are striking given the information detailed in the literature review of this paper. With the recent push for parents/patients to be active in their engagement in health management it was surprising that results were evenly split between those who used websites, journals, magazines and friends versus those who indicated that they used none of these sources. One might ask where information about their child's possible problem, its diagnosis, and subsequent treatment was sought if not from publically available sources. There is little surprise in that answer: All the parents in this study reported going to their doctors.

A second surprising result was that the majority of parents reported single rather than complex diagnoses, and that the descriptive comments submitted by these individuals did not vary from those who had children with multiple diagnoses. Both groups of parents clearly stated frustration, worry, and feelings of not knowing how to proceed. It should be noted that there were only a small number of participants who actually fell into the latter group, which was surprising in that the review of literature indicating links between OM and tonsil hypertrophy (Palmer, 2003, p.2) and swollen tonsils with tongue protrusion (Palmer, 2003). This literature certainly suggests that complex diagnoses would not be uncommon. Perhaps it is the combination of rarity reported in this study with the lack of parental investigations of cause and treatment that is the more unexpected outcome.

Lastly, the very limited use of speech-language pathology professionals as a resource for information or diagnosis suggests that this field has not yet become 'the' source, and a first source, for any difficulties that young children experience with speech production, using or understanding language, or having difficulty hearing. It was documented in the literature that

therapy was the first choice for OMD, and in this study it is the only diagnosis for which participants indicated they sought a therapy-based intervention. Within the research literature and best practices guidelines for SLPs (ASHA), other conditions such as ear infections are associated with speech and hearing issues. Therefore, the responses of the participants in this study are somewhat different than expected. Perhaps this is because only speech therapy is used for OMD whereas a child might see the doctor and/or audiologists instead of the speech-language pathologist for hearing related issues. Additionally, the literature clearly outlines how speech therapy increases awareness of facial movements needed, speech sound production, and also improved swallowing techniques (OMD, 2013) while other conditions even in the literature relied on surgery. This was consistent with the report given by the participants in this study.

Limitations of the Study

Several factors limit the usefulness of this study. Only a small number of participants completed the questionnaire and most of these did not have children who experiences complex conditions. Therefore, the results cannot be generalized beyond this study. As the study proceeded it became clear that adding questions that included more information about kinds of professionals and their roles across medical conditions would have added dimension to the results. In addition, some questions were not as clear to participants as expected. This led to ambiguous answers. Lastly, the questionnaire was dispersed via social media sites such as “Facebook”. Given that approximately half of the respondents indicated that they did not use the web to gain information, it is possible that a large segment of the possible respondents were not aware of the study.

Future Directions

Future directives would include expanding distribution of the questionnaire to a larger area of study. Targeting elementary schools and ear nose and throat facilities around the country would provide a larger and extensive pool of information. Professionals should be sought and given a separate questionnaire as to include their experience with complexity of diagnoses. Clarifying a few of the questions to gain more specific answers would benefit future studies of this topic. The complexity of diagnoses would be more evident with a larger pool of respondents. Other combinations could also surface and lead to further research.

References

- Causes of hearing loss in children. (2013). *American Speech-Language-Hearing Association*, Retrieved from <http://www.asha.org/public/hearing/disorders/causes.htm>
- Fact sheet: tongue-tie (ankyloglossia). (2013). *American Academy of Otolaryngology-Head and Neck Surgery*. Retrieved from <http://www.entnet.org/HealthInformation/Ankyloglossia.cfm>
- Orofacial myofunctional disorders. (2013). *American Speech-Language-Hearing Association*, Retrieved from <http://www.asha.org/public/speech/disorders/OMD.htm>
- Dollberg, S. (2010). Evaluation of speech intelligibility in children with tongue-tie. *Acta Paediatrica*, doi: 10.1111/j.1651-2227.2011.02265x
- Gravel, J. & Wallace, I. (1995). Early otitis media, auditory abilities, and educational risk. *American Journal of Speech-Language Pathology*, Vol. 4, 89-94. Retrieved from <http://ajslp.asha.org/cgi/content/abstract/4/3/89?maxtoshow=&hits=10&RESULTFORMAT=&fulltext=otitis+media&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT>
- Hooda, A., Rathee, M., Yadav, S., & Gulia, J. (2011). Ankyloglossia: a review of current status. *Internet Journal of Otorhinolaryngology*, Vol. 12 Issue 2, p1-1.
- Joseph, P. (2013). Otitis Media and my child's speech & language development. Retrieved from http://www.speechhelp.com/pdf/002_Otitismedia.pdf
- Palmer, L. (2003). What is tonsil hypertrophy? Retrieved from <http://www.wisegeek.com/what-is-tonsil-hypertrophy.htm#>
- Paul, R., & Cascella, P.W. (2007). *Introduction to clinical methods in communication disorders*. Baltimore, MD: Paul H. Brookes Publishing Co.
- Roberts, J., & Porter, F. (2004, November/December). Otitis Media. *Access Audiology*, Vol.3,

No.6. Retrieved from <http://www.asha.org/aud/articles/otitismedia/>

Silverman, F.H., & Miller, L. (2006). *Introduction to communication sciences and disorders*.

Austin, TX: PRO-ED, Inc.

Appendix A Parent Questionnaire

1. Do you agree to this consent form? Yes/No
2. Have you ever noticed your child has/had difficulty with speech, hearing or language?
Yes/No
3. If yes. What was your concern _____
4. Has your child experienced any of the following and if so, at what ages? (Check all that apply.)
Ear infections Age _____
Enlarged Tonsils Age _____
Protruding Tongue Age _____
Tongue-Tied Age _____
5. Where did you seek medical advice? (Check all that apply)
Doctors _____
Friends _____
Family _____
Internet _____
6. Did you do any research via websites or magazines/journals? (If yes, please indicate which were more helpful.)
Yes, only websites _____
Yes, only magazines/journals _____
Yes, I utilized both websites and magazines/journals _____
No, I did not use any of the above _____

7. Please indicate your range of concern for each condition. (With 5 being of greatest concern.)

	Less	More
Ear Infections	1 2 3	4 5
Enlarged Tonsils	1 2 3	4 5
Protruding Tongue	1 2 3	4 5
Tongue-Tied	1 2 3	4 5

8. At what ages did you first seek medical advice for each and from what professional?

Ear infections age: _____ professional: _____

Enlarged tonsils age: _____ professional: _____

Protruding tongue age: _____ professional: _____

Tongue-tied age: _____ professional: _____

9. Check all that apply for medication:

Ear infection _____

Enlarged tonsils _____

Protruding tongue _____

Tongue-tied _____

10. Check all that apply for therapy:

Ear infection _____

Enlarged tonsils _____

Protruding tongue _____

Tongue-tied _____

11. Check all that apply for surgery:

Ear infection _____

Enlarged tonsils _____

Protruding tongue _____

Tongue-tied _____

12. How satisfied were you with the treatment of choice and the time needed for results:

(With 5 being satisfied and 1 being dissatisfied)

	Less	More
Ear Infections	1 2 3	4 5
Enlarged Tonsils	1 2 3	4 5
Protruding Tongue	1 2 3	4 5
Tongue-Tied	1 2 3	4 5

13. Please provide any additional information or comments that you would like to share.

Appendix B – IRB Approval

*Office of Research Compliance
Institutional Review Board*

January 13, 2014

MEMORANDUM

TO: Bethany Anderson
Fran Hagstrom

FROM: Ro Windwalker
IRB Coordinator

RE: New Protocol Approval

IRB Protocol #: 14-01-385

Protocol Title: *The Complexity of Diagnosis for Co-Occurring Minor Speech, Language, and Hearing Problems: Perception of Parents*

Review Type: EXEMPT EXPEDITED FULL IRB

Approved Project Period: Start Date: 01/13/2014 Expiration Date: 01/12/2015

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (<http://vpred.uark.edu/210.php>). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 100 participants. If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 210 Administration Building, 5-2208, or irb@uark.edu.