An Evaluation of Coverage of Autism Spectrum Disorders in Speech-Language Pathology

Masters Programs

Marissa Stockstad

Appalachian State University

Abstract

The incidence of autism spectrum disorders (ASD) in America has been demonstrated over the past decade to be consistently rising. With this rise, the number of speech-language pathologists (SLP) working with this population is also increasing. Previous research in this area has consistented of self-report data from practicing SLPs and has shown that SLPs are not confident working with, diagnosing, or treating individuals with ASD. This study took a step back to see how SLPs are trained in their graduate studies to work with these individuals by surveying 98 affiliates of ASHA-certified master's programs in speech-language pathology (46 program directors and 21 clinical coordinators). Results from the study confirmed that many of the programs' students are working with the ASD population following graduation. It also showed that program directors and clinical coordinators have a high confidence in their graduates' preparation to work with individuals with ASD, despite a lack of training of overall ASD characteristics as well as relevant evidence-based interventions both in academic coursework and clinical exposure.

Training Autism Spectrum Disorders in Speech-Language Pathology

Communication is an important area of intervention for many diagnoses, including autism spectrum disorders (ASD). Speech-Language Pathologists (SLP) work with children and adults who have communication disorders (ASHA, "Speech-Language Pathologists," n.d.). A large percentage of both school-based (90%; American Speech-Language-Hearing Association [ASHA], 2014a) and healthcare-based (22%; ASHA, 2011) SLPs report working with individuals with an ASD diagnosis. While many practicing SLPs work with individuals with ASD, it is unclear whether and how the practitioners are learning to work with these individuals during their graduate training.

Autism Spectrum Disorder is characterized by the *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-V)* as a neurodevelopmental disorder that is defined by impairments in social communication as well as restricted and repetitive patterns of behavior (American Psychiatric Association [APA], 2013). Currently estimated to occur in about 1% of the population (5th ed.; *DSM–V*; APA, 2013), ASD is believed to be the fastest growing developmental disability in the United States (Schwartz & Drager, 2008). According to the most recent report from the Center for Disease Control and Prevention (CDC), 1 in 68 children aged 8 had a diagnosis of ASD in 2010 (CDC, 2014). Autism is more frequently diagnosed in males with 1 in 42 boys and 1 in 189 girls identified as having ASD in this report. Since the second surveillance report from the CDC in 2002, the prevalence estimate for children aged 8 who are identified as having ASD has increased by 123% (CDC, 2014). While this is a very large increase, it is unclear whether this increase in prevalence is due to "expansion of DSM criteria to include sub-threshold cases, increased awareness, differences

in study methodology, or a true increase in frequency of ASD" (5th ed.; *DSM–V*; APA, 2013, p. 55).

According to the *DSM-V*, the diagnostic criteria for ASD include: (1) deficits in social communication and interaction and (2) restricted, repetitive behaviors, interests, and/or activities. Further, the symptoms of ASD present during the early developmental period, up to during the second year of life, but may not become fully apparent until the individual is unable to meet social demands or may be masked by learned strategies to overcome the deficits. Symptoms must also cause impairment that is considered clinically significant in important areas for functioning, such as social and occupational tasks. Lastly, these features cannot be better explained by either intellectual disability or a global developmental delay (APA, 2013). Individuals with a diagnosis of ASD may also have an intellectual impairment and/or language impairment (5th ed.; *DSM–V*; APA, 2013).

Speech-Language Pathology in ASD

Due to the range in symptom presentation and severity of ASD, numerous providers could be involved in the treatment of ASD across the life span. Providers include, but are not limited to, applied behavior analysts, special educators, occupational therapists, physical therapists, and speech-language pathologists. In general, speech-language pathologists (SLPs) "work to prevent, assess, diagnose, and treat speech, language, social communication, cognitive-communication, and swallowing disorders in children and adults" (ASHA, "Speech-Language Pathologists," n.d.). SLPs may work in many different contexts, including in education, health care, and research, and may work in collaboration with other professionals to provide the best possible treatment.

As SLPs work with a large variety of populations, most will work with individuals

with ASD at some point during their career (Schwartz & Drager, 2008). According to ASHA

Caseload Surveys, a large percentage of both school-based (90%; ASHA, 2014a) and

healthcare-based (22%; ASHA, 2011) SLPs report working with individuals with an ASD

diagnosis. While the exact statistics vary, many SLPs report having at least four individuals

with ASD on their caseload at any point in time (84.8%, Plumb & Plexico, 2013; 56.7%,

Schwartz & Drager, 2008). The reason for this is that deficits in social communication and

interaction are part of the core definition of ASD, according to the DSM-V (APA, 2013).

Children with ASD may have difficulties in multiple areas of communication, including

receptive and expressive language and comprehension (LaRue, Weiss, & Cable, 2008). Areas

an SLP might thus target for intervention could include basic "functional" communication to

get wants and needs met, reciprocal communication and interaction, and understanding and

using nonverbal communication. According to the ASHA Roles and Responsibilities in the

context of individuals with ASD, SLPs are responsible for the "screening, assessment,

diagnosis, and treatment of persons with ASD" (ASHA, "*Autism*," n.d.). ASHA lists many

areas where the involvement of the SLP in the care of individuals with ASD is essential,

including: (a) clinical and educational services, (b) educating other professionals on the

needs of the individual, (c) diagnosis and management of ASD, (d) screening for further

assessment and/or referral, (e) assessing need and requirements for alternative and

augmentative communication (AAC) and training for individuals involved in the care of the

client, (f) serving as a member on the school planning team, (g) treatment planning for

speech and language services and assessment of self-regulatory and social interaction

functions, (h) providing family and individual counseling on communication-related issues,

and (i) partnering with families in the assessment and intervention with individuals with ASD

(ASHA, "*Autism*," n.d.). Thus, an SLP could be involved in every aspect of care for

individuals with ASD (e.g., screen, diagnosis, and treatment).

Preparation of SLPs to Work with Individuals with ASD

Given that social communication and interaction is a core deficit of ASD and that

SLPs work specifically in the area of speech and language (i.e., communication), it stands to

reason that SLPs would be trained to work with this population and be fluent in evidence-

based assessment and intervention methods. Surprisingly then, research suggests that

practicing SLPs have little confidence in their understanding of the ASD diagnosis and the

evidence-based interventions that should be implemented with these individuals (Cascella &

Colella, 2004).

Speech-language pathologists' familiarity with diagnostic criteria. Stone (1987)

conducted the first research documenting the views of ASD amongst various professions.

Stone compared perceptions of ASD in general and current ASD diagnostic criteria across

autism specialists (i.e., individuals with direct and extensive involvement in research or

clinical work with autism for at least five years), pediatricians, clinical psychologists, school

psychologists, and SLPs. Stone's research was the first to show that SLPs may not have a

solid understanding of ASD. For example, SLPs often described ASD as an emotional

disorder (not a developmental disability). SLPs were also more likely to indicate that non-

diagnostic behaviors and characteristics such as attention deficits, inappropriate laughing and

giggling, mutism, sudden mood changes, and aggressive behavior were key for diagnosis

ASD (Stone, 1987).

More recently, Cascella and Colella (2004) used a self-reported rating scale to assess the pre-professional training, general knowledge of ASD, and knowledge of communication disorders associated with the ASD diagnosis across 82 school-based SLPs in Connecticut. Of the 82 respondents, 77.8% reported having a child with ASD on their caseload for at least four years. Most of these SLPs reported having little to no academic preparation (69.2%) as well as little to no clinical training (75.3%) to work with individuals with ASD (Cascella & Colella, 2004). While the majority of the participants (81.7%) had attended continuing education courses specific to ASD, the SLPs still reported being unsure about much of the general knowledge and communication disorders associated with ASD. This survey assessed the SLPs general knowledge about ASD behavioral characteristics, DSM-IV-TR categories (i.e., Asperger's Disorder, Rett's Disorder, Childhood Disintegrative Disorder, Autistic Disorder, and PDD-Not Otherwise Specified), related education intervention strategies, related education assessment formats, and the inclusion of children with ASD. Of these categories, SLPs felt the most knowledgeable about behavioral characteristics and felt the least knowledgeable about assessment and intervention practices (Cascella & Colella, 2004).

Focusing specifically on assessment, Schwartz and Drager (2008) surveyed 67 school-based SLPs. They found that SLPs did not have the knowledge of the ASD DSM-IV-TR diagnostic criteria needed to make accurate diagnoses. More specifically, they found that 21%, as well as 15%, of the surveyed SLPs did not think that impairments in social interaction and communication, respectively, were required for diagnosis. Additionally, only 52% of the SLPs thought that stereotypical and repetitive behaviors and interests were required for diagnosis. Given that these are the two primary diagnostic criteria for Autism Spectrum Disorder, it is disturbing that many SLPs would not see these are requirements for

the diagnosis. Lastly, 15% of the respondent SLPs did not agree that communication

impairments were an essential characteristic for the diagnosis of ASD, which is especially

interesting since this is the primary area of intervention for SLPs (Schwartz & Drager, 2008).

       Speech-language pathologists' familiarity with evidence-based interventions.

Schwartz and Drager (2008) also examined treatment planning by surveying this group of

school-based SLPs. They found that 25.3% of the SLPs surveyed did not feel comfortable

determining treatment goals for children with ASD. According to ASHA ("Speech-Language

Pathologists," n.d.), this is one of the essential roles of an SLP in working with individuals

with ASD. In Fact, ASHA ("*Autism*," n.d.) has developed a list of interventions that SLPs

have reported using with individuals with ASD. However, inclusion of the intervention on

this list does not imply empirical support or recommendation of the intervention by ASHA

(see Table 1).

       Although definitions of evidence-based practice vary somewhat across disciplines

and reviews, most emphasize the integration of empirical evidence with professional

expertise and values of consumers (National Autism Center, 2011; "Introduction to

Evidence-Based Practice," n.d). The National Autism Center conducted a meta-analysis of

experimental studies evaluating efficacy or effectiveness of various interventions for autism

spectrum disorder. In this review, interventions were classified as established, emerging,

unestablished, or ineffective/harmful based on the number of experimental studies and the

rigor of those studies (for specific criteria see nationalautismcenter.org). The National

Autism Center identified 11 interventions as established and 22 as emerging, these

interventions are indicated as such in Table 1.

Possible Reasons for Lack of Confidence Concerning SLPs in ASD

While there may be many reasons SLPs are not confident working with, diagnosing, and/or treating individuals with ASD, this research will focus on the possibilities of a lack of training during graduate training and a lack of time and access to continuing education resources. While graduate programs often cover ASD as a topic in their program, this is not always the case, nor does it always make the students feel as though they are fully competent in the area of ASD. With the growing incidence of ASD and the need for SLP interventions, it is important for SLPs to get the training they need to work with this population prior to entering the field.

According to the research by Schwartz and Drager (2008), 91.0% of the SLPs in their sample stated that they could have benefitted from more ASD-related coursework and training. In their study, only 2 respondents, out of 67, reported taking courses that solely focused on ASD during their graduate training. 16.4% of the respondents had no coursework during their graduate, or undergraduate, training that even addressed ASD as a topic. On the other hand, 13% of the SLPs had ASD addressed as a topic, but in a special education course, rather than in the context of speech-language pathology (Schwartz & Drager, 2008).

More recently, Plumb and Plexico (2013) examined academic preparation of SLPs by surveying 401 practicing school-based SLPs. They reported that the majority of respondents had no coursework focused solely on ASD (76.8%), while some had no classes that even addressed ASD as a topic (13.5%). Additionally, for those that did have ASD addressed in coursework, some reported only spending one week on the topic of ASD (38.9%), while others reported spending only one class period on the topic (35.7%). Regardless of time

spent, 83% of the SLPs in this study reported that they could have benefitted from more coursework on the topic of ASD (Plumb & Plexico, 2013).

Another area where SLPs during their graduate education have the opportunity to learn about and work with individuals with ASD is during their clinical training. However, previous research also suggests that SLPs may not be afforded this opportunity to work with these individuals either. Schwartz and Drager (2008) reported that over half (55.2%) of responding SLPs reported that they had never worked with an individual with ASD during their clinical training. In their survey of 401 school-based SLPs, Plumb and Plexico (2013) asked participants to indicate whether they worked with individuals in ASD in any of the following settings during their graduate training: University clinic (42.4%), part-time off campus clinic (56.1%), full-time off-campus clinic (42.4%). Given that these are the three settings a graduate SLP student would work within, it is surprising that the majority to do not work with individuals with ASD in any setting.

Another reason SLPs may not feel well versed in ASD diagnosis and treatment is because of a lack of time and access to continuing education resources. Reilly (2004) reported that SLPs are not only lacking in the skills needed to search and appraise current literature, but they also have difficulties translating the research findings to their clinical settings given the high workload, limited budgets, and long waiting lists associated with the profession. Additionally, Cheung, Trembath, Arciuli, and Togher (2013), identified four areas that might influence SLPs in their finding and implementation of evidence-based practices (EBP) associated with ASD. The first area identified is workplace culture and support of EBP. SLPs work in a multitude of settings, in many of which the management is not comprised of clinicians. For this reason, management may not understand the need for

EBP and thus, do not supply the need for EBP. The second area identified by Cheung et al.

(2013) was time. Like Reilly (2004), Cheung and colleagues acknowledged the fact that

SLPs often do not have time to find and review the literature (2013). Furthermore, the

waiting list takes priority over the use of EBP in most workplaces, and EBP is not included in

the SLP's workload allocation, so they are not given the time to research and implement

effective EBP interventions. The third area Cheung et al. (2013) identified was cost of

journals and EBP professional development courses. Lastly, Cheung et al. acknowledged the

availability and accessibility of EBP resources to SLPs. Not only do SLPs need to be given

access to these resources, but they also need to be taught how to use and analyze the

resources in order to implement the interventions for individuals with ASD.

While it may be an issue that SLPs are not receiving support or resources to properly

intervene using EBP, previous research has shown, via self-reports from practicing SLPs,

that they have little confidence in the area of ASD and the majority feel as though they would

have benefitted from more training during their graduate education. In this research, we hope

to answer the question of what extent SLP providers are receiving training in working with

individuals with ASD during their graduation education from the perspective of the graduate

speech-language pathology master's programs. We hope that by obtaining information

regarding teaching and experience in both academic coursework and in clinical practicum

that we will be able to better understand the current knowledge of today's SLPs. While past

research has demonstrated a need for more education and a policy for roles and

responsibilities for SLPs regarding ASD was developed in 2006, there is currently no policy

included in the ASHA standards for the teaching of ASD during the graduate education. This

research hopes to show that a new policy regarding the training of graduate SLP students

needs to be made in order to allow SLPs to have more confidence in their screening,

diagnosis, and intervention with individuals with Autism Spectrum Disorders.

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Methods

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In this research, a mixed qualitative and quantitative method was implemented. Using

an online Qualtrics survey, we asked program and clinical directors of graduate speech-

language pathology programs to reflect on the training provided to students in the area of

autism spectrum disorders.

Materials

All study procedures for this research were approved by the Appalachian State

University Institutional Review Board. Data were collected via an online survey administered

through Qualtrics. Some items were constant across participants (see Table 2) whereas others

varied depending on whether the respondent indicated a primary role as program director or

clinical coordinator (see Table 2.1 for director-specific questions and Table 2.2 for clinical

coordinator-specific questions). For our research purposes, a program director was a faculty

member who was the head of a master's program in speech-language pathology or

communication sciences and disorders and a clinical coordinator, also seen as "clinical

director," was a faculty member who oversees clinical educators and student clinical

placements.

Procedures

A recruitment email, which included a link to the survey, was sent to 250 program

directors and 170 clinical coordinators. Individuals recruited were identified via the ASHA

EdFind search portal, program website, or phone call. Of the 260 ASHA-certified master's

degree Speech-Language Pathology programs, we were unable to find either the program

director or the clinical coordinator for seven programs.

Data Cleaning and Analysis

Participants were given three weeks to complete the survey; after which, the survey

was closed and data was exported from Qualtrics into Microsoft Excel. A total of 105

respondents opened the survey; however, six individuals did not answer any questions. Thus,

the sample included 98 participants who answered at least one question on the survey.

Because many respondents did not complete the entire survey, we cleaned the data on a

question-by-question basis. For some questions, respondents did not select zero but instead

left some items blank. In such cases, we replaced blanks with "0" before analyzing the data.

We did this only when respondents provided information for at least a portion of the given

question. In the results below we report the total number of respondents for each question.

Results and Discussion

Results are organized as follows. First, general information about participating

programs and graduates is provided. Next, results specific to program directors are provided.

Finally, results specific to clinical coordinators are described.

General Program Information

 We asked respondents to provide information about (1) populations students worked

with after graduation, (2) settings students worked in after graduation, (3) graduate

preparation in working with the five areas of deficit for ASD, and (4) respondent's role in the

program. The specific questions that were asked are listed in Table 2.

When asked about populations that students go on to work with after graduating from

their program, 91 individuals (92.9% of the sample) responded. A potential limiting factor is

that percentages did not have to equal 100%. This was an intentional decision when making

the scale as many SLPs work with multiple populations but it could conflate the findings.

As is shown in the top panel of Figure 1, across programs, over half of graduates

reportedly go on to work with individuals who have articulation and phonological disorders

(*M*=61.8%, range 0% to 100%) and/or autism spectrum disorders (*M*=51.7%, range 0% to

91%) From 20% to 40% of graduates go on to work with individuals with hearing loss

(*M*=21.4%, range 0 to 100%), individuals with auditory processing difficulties (*M*=22.0%,

range 0% to 71%), individuals who are nonverbal and require augmentative communication

(*M*=28.5%, range 0% to 80%), and/or individuals with dysphagia (*M*=39.7%, range 0% to

80%).

When asked about settings that students go on to work with after graduating from

their program, 81 individuals (82.7% of the sample) responded. Program graduates

reportedly work in a variety of settings, with just over half (50.7%) working in education

(range 19% to 84%). Over a third of graduates, 34.3% work in healthcare (range 9% to 60%);

substantively fewer graduates work in other areas (see middle panel Figure 1).

We asked respondents to indicate how prepared they believed their graduates to be to

work with common behavioral deficits or excesses often exhibited by individuals with ASD

and received a response rate of 85.7% (84 individuals). Respondents rated each behavioral

deficit or excess using a likert-style scale on which 0 indicated not at all prepared and 10

indicated very prepared. Across programs, respondents indicated they believed their

graduates were generally well prepared to address all aspects of ASD, with the highest

confidence being, not surprisingly, in social interaction and communication deficits (*M*=7.9,

range 1 to 10) and the lowest confidence being in restricted ranges of interests and

stereotypical behavior (*M*=6.4, range 1 to 10, see bottom panel Figure 1).

Information Regarding Academic Coursework

A total of 46 participants indicated their role in the program as "program director."

Program directors were asked four specific questions involving (1) academic coursework

focused on ASD, (2) training for DSM-V criteria for ASD, (3) training to administer standard

autism evaluations, and (4) clinical interventions often utilized with individuals with ASD.

The specific questions that were asked are listed in Table 3.

When asked to report the extent to which ASD-related topics were covered in

coursework, 69.6% of program directors responded (31 individuals). Program directors were

asked to indicate if they offered a concentration or certificate in ASD (we left the definition

of this up to program directors and it is likely that these programs varied widely in

requirements), required one or more courses with ASD-related content, offered at least one

elective course with ASD-related content, or had no such courses. As seen in the top panel of

Figure 2, graduate programs varied in their offerings of ASD-specific material. Two

programs (6%) reportedly offered a concentration or certification in ASD whereas just under

half (43.8%) reportedly require students to take at least one course with ASD-related content.

Six programs (18.8%) offered an elective with ASD-related content while an additional six

programs had no courses with ASD-specific content. Four programs responded "other" and

indicated that their programs offered ASD coursework embedded in multiple courses, offered

both required and elective courses, and offered electives related to ASD through another

department such as education or psychology. A limitation is that how much of a given course

was devoted to ASD-related topics is not known. Thus, one program director might have

indicated included a course in which less than an hour was devoted to ASD-specific content

while another may have included only courses in which a substantive proportion of class time

as devoted to such content.

We asked program directors to report on training in DSM-V diagnostic criteria and

use of norm-referenced autism evaluations and received a response rate of 67.4% (31

respondents). The majority of program directors reported that their graduates receive training

in DSM-V criteria for ASD (*M*=93.5%). On the other hand, 6.5% of programs report that

their students did not receive DSM-V training in relation to ASD. According to program

directors, on a sliding scale of zero to 100 (0=not at all trained, 100=very well trained),

students were not well trained to administer standardized autism evaluations such as the

ADOS (Autism Diagnostic Observation Schedule; *M*=47.1%, SD=25.3).

Information Regarding Clinical Experiences

A total of 21 participants indicated their role in the program as "clinical coordinator."

Program directors were asked four specific questions involving (1) clinical educator

experience with ASD, (2) clinical educator experience with specific ASD deficits, (3) student

work with ASD in clinical settings, (4) student work with ASD clients of specific age groups,

(5) student work with ASD clients of various severity, and (6) clinical interventions often

utilized with individuals with ASD. The specific questions are listed in Table 4.

According to the clinical coordinators, 100% of their programs' clinical educators

have experience in working with individuals with ASD (100% response rate). Clinical

coordinators were also asked about their clinical educators' experience with the five

diagnostic criteria of ASD (i.e., cognitive impairment, limited or no means of communicating

wants or needs, restricted verbal repertoire, social interaction deficits, and restricted,

repetitive, and stereotypical behavior patterns) and responded with a rate of 95.2% (20

individuals). They indicated that 95.2% of their clinical educators have experience in

working with four of the five diagnostic categories of ASD, with 90.5% of the educators

having experience in working with individuals who have restricted, repetitive, and

stereotypical behavior patterns (see top panel of Figure 4). A limitation is that it is unclear

what the coordinators meant by experience and whether that experience includes use of

assessment and intervention methods considered to be best practice.

　　　　When asked about the frequency of student work with ASD in a clinic, the highest

percentage of clinical coordinators reported that 40-60% of the individuals their students

work with in a clinic have ASD (40%), with one clinical coordinator reporting that more than

80% of the individuals their students work with in a clinic have ASD and another clinical

coordinator reporting that less than 20% of the individuals their students work with in a clinic

have ASD (M=3.1, SD=0.97, n=20, range 1-5; see middle panel of Figure 4). Unfortunately,

we do not know how much time students worked with individuals with ASD (i.e., number of

clinical hours), nor did we know what the work consisted of.

　　　　We asked clinical coordinators about the age groups students worked with in the

clinic when working with clients with ASD and received a response rate of 90.5% (19

individuals). Across programs, when working with clients with ASD in a clinic, graduate

students reportedly worked primarily with children. 100% of students worked with school

age children (6-21 years old, range 11 to 19), 89.5% with young children (ages 3-6), and

73.7% with very young children (ages 0-3). Just over half, 57.9%, reportedly worked with

adults (see bottom panel of Figure 4).

Training in Interventions for ASD

Finally, we asked both program directors and clinical coordinators to indicate whether students in their program learned about commonly used interventions for individuals with ASD. 69.6% of program directors and 95.2% of clinic coordinators responded. Respondents were presented with a list of interventions ASHA identified as frequently used by SLPs with individuals with ASD (ASHA, "*Autism*," n.d.) and asked to indicate whether an intervention was taught via coursework or used in clinic. To provide a rubric for interpreting findings we used a recent meta-analytic review of commonly used interventions for ASD conducted by the National Autism Center (NAC, 2011). Based on available, peer-reviewed evidence, the NAC coded interventions as "established," "emerging," or "unestablished." Although in some cases the NAC used the same terms as ASHA (e.g., social stories, pivotal response treatment), in many cases different names were used. In these situations, we used descriptions provided by ASHA to match their labels to the NAC review. For example, ASHA defined milieu therapy as "a range of methods including incidental teaching that are integrated into a child's natural environment" (ASHA). Because ASHA included incidental teaching (scored by NAC as established), we scored milieu therapy as established. We do not know the extent to which survey respondents were familiar with or used definitions provided by ASHA and so it is possible that respondents were referring to different intervention features in at least some cases.

Results are depicted in Figure 4. We found that the two most frequently taught interventions were social stories (*M*=84.4%) and functional communication training (*M*=87.5%), which are both considered established interventions. Similarly, the two most commonly used interventions in clinic were functional communication training and positive

behavior support. Surprisingly, many interventions that reportedly are frequently covered in

coursework or used in clinic are considered unestablished. Six unestablished interventions

(social scripts, social skills groups, social thinking, TEACCH, SCERTS, and literacy

interventions) reportedly were taught in coursework and/or used in the clinic according to

50% or more of program directors or clinical coordinators. Seven interventions considered

established or emerging (discrete trial training, pivotal response training, time delay, LEAP,

Exploring Feelings, Denver Model, Project Data) were reportedly taught or used by less than

50% of programs.

Conclusion

This study adds to research to date examining preparation of SLPs to work with

individuals with a diagnosis of ASD. Whereas prior studies surveyed SLPs in the field, we

took a step back and asked program directors and clinical coordinators their perceptions of

training provided. Thus, combining our findings with that of prior studies provides a unique

opportunity to compare graduate educators' views of what is being taught with practitioners'

perceptions of their own training.

Implications for Training and Practice

The data collected in this research bring to light many issues in the profession of

speech-language pathology when working with individuals with ASD. Although survey

respondents reported that over half of their graduates go on to work with individuals with

ASD, less than half reported that they required courses focusing on ASD and some had no

courses at all. It is somewhat surprising then that the vast majority of program directors

believed their graduates were highly prepared to work with individuals with ASD across the

range of deficits that these individuals often present with. It could be that program directors

assumed their students gained sufficient expertise in this area via clinical and practicum work during graduate school, however the proportion of clients with ASD served in training clinics varied widely and it is not clear that most students gained either breadth or depth of exposure to work with individuals with ASD. Further, a number of interventions that are taught or used were not evidence-based. Additionally, SLPs are licensed to diagnose ASD; however, less than half of the master's programs reported that their graduate students are taught to administer standardized autism evaluations.

This information has many implications for the graduate education and training of SLPs. We have determined from this research and previous research that many SLPs work with ASD and that the incidence of ASD is growing. Given the significant role that SLPs can play in diagnosis and treatment, and that past research suggests SLPs feel under-prepared for such work (Cascella & Colella, 2004; Schwartz & Drager, 2008), it is clear that graduate programs should provide more training in this area. Although the amount of training needed probably cannot be specified, an ideal might be for all programs to provide "foundational training" with some programs offering specializations or concentrations. Foundational training should focus, at minimum, on current DSM criteria for the diagnosis of ASD, including how these criteria are manifested across the spectrum of the disorder. Graduate students should also learn the ways in which deficits of ASD might be addressed via evidence-based interventions. Although it would be ideal if all SLPs were trained in diagnosis of ASD, this training requires an in-depth understanding of ASD and experience with individuals with ASD and so is probably beyond the scope of generalist SLP programs.

It is likely that SLPs would be better trained to work with individuals with ASD if more programs provided a concentration or specialization in this area. These programs could

provide not only foundational knowledge but also advanced skills in diagnosis and

interventions via coursework and practicum experiences. Ideally, programs would provide

training only in interventions that are based on solid evidence supporting efficacy and

effectiveness. Graduate students also should be taught to work as part of an interdisciplinary

team as many individuals with ASD have multiple providers.

Limitations

Several limitations exist within this research and thus, results and implications must

be considered with caution until further studies are completed. One important limitation to

consider is the low response rate for both program directors and clinical coordinators. Survey

invitations were sent to 250 identified program directors and 170 identified clinical

coordinators; however, response rates were 14.4% and 12.4%, respectively. Additionally,

those who identified within the survey as either a program director or clinical coordinator did

not always answer all of the questions within their category.

A second limitation is that the researchers could not identify whether the director or

clinical coordinator of the programs answered the general program questions, or if both

individuals from the university answered these questions. Additionally, we failed to collect

any demographic information through the survey, so this information cannot be supplied to

readers or future investigators.

With regard to coursework and practicum work with ASD, although many

respondents reported that coursework was offered and that students regularly worked with

individuals with ASD in the clinic, there is no way of determining the content of the

coursework or applied clinical experiences or the extent to which they mapped on to best

practices in ASD.

Finally, a seventh question was originally included in the clinical coordinator-specific questions asking about the proportion of individuals served with autism who had co-occurring intellectual disability. Unfortunately, all responses were coded as zero, so the question and responses had to be thrown out.

Future Research

While this research gives insight into the teachings of master's degree programs in speech-language pathology, it does not give information on how this teaching is translating to practicing speech-language pathologists. In the future, research should survey current practicing speech-language pathologists to determine if the reports from the master's programs reflect the same information as those that are currently working with individuals with ASD. From this, the surveys from the SLPs could be linked to surveys from their grad programs so specific correspondences could be investigated.

Additionally, course content could be reviewed for the programs that reported provided coursework in ASD to their students. This information would help to determine whether or not the coursework is following best practices for ASD. Similarly, information for clinical educators with regard to their ASD experience could be collected to determine the educators' extent of knowledge in reference to ASD.

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