

Preparation of Speech-Language Pathology Graduate Students to Work with Children with Autism Spectrum Disorders

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Abstract: The expectations and preparation requirements for students in Communication Sciences and Disorders to work with children with autism spectrum disorders were explored. Five hundred and fifty-one speech-language pathologists working with children with autism spectrum disorders were surveyed about knowledge of autism spectrum disorders and expectations for student preparation. Student outcomes from a graduate course in autism spectrum disorders in Communication Sciences and Disorders were measured. Survey responses indicated that speech-language pathologists believed that their coursework and clinical training did not prepare them to start working with children with autism spectrum disorders. Responses also indicated that speech-language pathologists expect graduates who are beginning a clinical fellowship to have had coursework and to have completed practical training related to autism. Student outcome measures demonstrated that students had limited experiences with autism prior to the course and lacked foundational knowledge. The results of this study support existing descriptions in the literature of the knowledge and training of speech-language pathologists in school-based settings and further emphasize the need to include autism as a required component of graduate programs to meet preparation expectations in the field.

Keywords: Autism spectrum disorder, graduate education, knowledge, speech-language pathology, survey.

INTRODUCTION

The prevalence of children with autism spectrum disorder (ASD) has been estimated at a rate of 1 in 88 by the Centers for Disease Control and Prevention [1]. ASD is a developmental disorder that is diagnosed based on impairments in communication, social interaction, and behavior. Speech-language pathologists (SLPs) are an integral part of the multidisciplinary teams that work with children with ASD. Of school-based SLPs, 90% reported working with children with ASD as part of their caseload [2]. These professionals have received a wide variety of education and preparation to serve this population [3]. One negative consequence of the widely varying educational backgrounds of school-based SLPs is the use of treatment programs that have little supporting evidence of their effectiveness with children with ASD in school settings [4]. Therefore, adequate preparation in assessment and intervention in ASD must be part of the knowledge base that SLPs acquire through coursework and practicum experiences during the graduate program of study.

Students graduating from accredited graduate programs in Communication Sciences and Disorders must demonstrate competency in areas such as receptive and expressive language or social aspects of communication [5] but there is no stipulation for which diagnostic populations must be included. It is well understood that children with ASD present specific challenges in assessment and intervention

when compared to other children with receptive, expressive, or pragmatic language disorders [3]. In 2006, the American Speech-Language-Hearing Association (ASHA) issued guidelines for the knowledge and skills needed to work with individuals with ASD [6]. There is no guarantee, however, that students completing a graduate program of study will have these necessary skills prior to entering the workforce. Although students may acquire this competency by working with individuals with ASD, it is entirely possible that they will graduate without adequate knowledge in ASD unless university programs build it into their curriculum. Access to such preparation is not found in all accredited graduate programs despite a desire from SLPs to have additional specialized training [3,7] and the increased levels of comfort that accompany that training [8]. Some institutions, Brooklyn College, for example, have implemented a specialized certificate [9] while others have more recently begun to offer specialized coursework. There have also been new state-level policies related to SLPs who work in educational settings. New York instituted a state requirement in 2009 for educators, including SLPs, to take a 3-hour course in ASD. In 2013, half of the graduate programs in New York that responded to a survey about ASD courses were offering an ASD course. Of those, one required the course in the graduate program of study [10].

Prior literature on the skill levels of those holding undergraduate and graduate degrees has indicated that students require additional knowledge related to prevalence information and contributing factors to ASD [11]. Classroom lectures and assigned readings were the primary sources of information. While courses in language disorders and augmentative and alternative communication typically integrate information on ASD, there is far too much content

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for students to acquire in just a few lectures. In addition, some misconceptions students may have about ASD would be topics of instruction not covered in other courses. For example, students may believe that diet modifications are effective in all cases [11]. Other areas requiring further instruction based on the prior literature were related to genetics of ASD and diagnostic criteria [3,7,11].

To match the growing landscape of ASD and the ever increasing role that SLPs can and should have in that landscape, it is important that the preparation of new SLPs keeps pace. By obtaining input from SLPs already in the field who will act as mentors for new professionals, programs can tailor course work to meet those expectations and provide the knowledge base for the practical application that will follow. Knowledge about what licensed SLPs expect of new graduates, however, is only the first step. The second step is to train graduate students in those areas. Assessing student outcomes will ensure that students who have completed coursework in the assessment and treatment of ASD are ready to begin practicum experiences and initial employment.

Based on the conclusion that graduate programs need to offer specialized coursework in ASD [7], a two-step process was undertaken. First, a survey was distributed to school-based speech-language pathologists working in the Midwestern region of the United States. The purpose of the survey was to obtain current levels of knowledge, information about expectations for the preparation of graduate students, and an overview of the role of the SLP. Second, outcomes were assessed for students completing coursework in ASD to examine their prior knowledge and to relate course learning to preparation expectations reported by SLPs.

MATERIALS AND METHODOLOGY

Survey Participants

Participants were licensed school-based SLPs working in five states: Colorado, Kansas, Missouri, Nebraska, and Oklahoma. To address prior limitations from similar surveys, such as the use of a relatively small geographic size [3] or a low number of respondents [7], the current survey was distributed to a large geographic region. The states selected also represented locations where graduate students participating in the ASD course were likely to be employed. Respondents were contacted *via* email using email addresses obtained from the ASHA member directory. The directory is a database where users self-report their geographic location, certification type, and work setting information. Respondents received no compensation for completing the survey but were able to enter a drawing for a gift card as an incentive. The Institutional Review Board of Kansas State University approved this study.

Survey

The survey tool, adapted from prior literature assessing the knowledge base of SLPs in ASD, included Likert-scale questions, objective measures of knowledge, and open-ended questions for obtaining opinion information [3,4,7,12]. The questions adapted from the survey tool for SLPs used in

Connecticut were validated for both item and content validity [3]. All Likert scales used a 5-factor model: 1 (*strongly disagree*) to 5 (*strongly agree*). Survey format and delivery followed suggested guidelines for web-based surveys [13]. SLPs completed 58 questions divided into the following categories: demographic/background information including training and experience, perception of knowledge regarding ASD, objective knowledge of ASD, perceived challenges for working with children with ASD, expectations for graduate coursework, and skill expectations for a clinical fellow (CF). The survey was distributed and collected using Axio, version 3.1, a tool developed and maintained at Kansas State University [14].

Student Outcome Measures

The graduate students who completed a course in ASD ($N=25$) were asked questions to determine their prior experience with children with ASD and to obtain their levels of knowledge in areas similar to the questions on the SLP survey tool. The pre-/post-test used included 40 questions in the following areas: 7 background questions, 29 objective (true/false) questions to assess knowledge about ASD, and 4 open-ended questions about diagnosis and intervention for children with ASD.

RESULTS

SLP Survey

Of the 2,765 SLPs who received the survey, there were 551 respondents for a return rate of 19.9%. Some questions were left unanswered by some participants so the sample size for each question varied. Demographic data was summarized and is reported in Table 1. Almost all respondents were female and had obtained a Master's degree as their highest professional degree, both of which are consistent with the demographic characteristics of school-based SLPs. Approximately half of the respondents had supervised a practicum student within the last 5 years (45.9%) and approximately one-quarter had supervised a CF within the last 5 years (25.9%).

Participants were asked to self-report whether they believed they had received adequate preparation from coursework and clinical practicum/extern experiences prior to beginning their CF using Likert scales (see Table 2). The majority of participants believed that they were not ready to begin working with individuals with ASD based on their academic or clinical training ($M = 2.36$ and 2.42 , respectively). The majority (92.7%) of participants indicated that they had worked with 0-5 children with ASD during their clinical training. Respondents were also asked to indicate what expectations they had for students graduating from training programs and entering their CF using Likert scales (see Table 2). The majority indicated that a student who has completed a Master's program should have experience in both assessment and intervention specific to ASD ($M = 4.15$ and 4.40 , respectively). Respondents also indicated a preferred number of practicum hours a CF should have completed as a graduate student specific to assessment and intervention for ASD: 0 hours (0.6%), 1-10 hours (16.6%), 11-20 hours (39.4%), 21-30 hours (30.0%), and greater than 30 hours (13.4%).

Table 1. Demographic Characteristics of Survey Respondents

| Characteristics | Proportion of Respondents |
|--------------------------------------|---------------------------|
| Gender (N=551) | |
| Female | 98.2 |
| Male | 1.8 |
| Age (N=551) | |
| 30 or younger | 9.6 |
| 31-40 | 34.1 |
| 41-50 | 25.6 |
| 51-65 | 30.5 |
| Over 65 | 0.2 |
| Highest Degree Earned (N=550) | |
| Master's degree | 99.3 |
| Doctoral degree | 0.7 |
| Graduation Year (N=545) | |
| Before 1975 | 4.2 |
| 1976-1986 | 22.0 |
| 1987-1997 | 35.2 |
| 1998-2009 | 38.5 |
| Community Type (N=521) | |
| Urban | 21.9 |
| Suburban | 52.0 |
| Rural | 26.1 |

Participants were assessed on their general knowledge of ASD using true/false questions to ascertain which areas/concepts were well understood and which areas/concepts may require additional training (see Table 3). Areas related to the ASD population (e.g., more common in boys) and prognosis (e.g., outgrow the disorder, cannot cure autism) had high response accuracy. Areas related to genetics (e.g., incidence in twins), age at diagnosis (average age and youngest reliable diagnostic age), and additional treatments (e.g., anti-yeast therapy) demonstrated lower response accuracy.

Survey respondents were also asked to indicate their perception of the importance of topic areas related to ASD.

Table 2. Responses to Likert-Scale Questions

| Statement | N | Strongly Disagree | Disagree | Neither Disagree/Agree | Agree | Strongly Agree |
|--|-----|-------------------|----------|------------------------|-------|----------------|
| Upon completing your academic program in speech-language pathology, you were ready to begin working with individuals with ASD. | 548 | 22.3% | 42.7% | 14.4% | 18.4% | 2.2% |
| Your clinical training prepared you for working with individuals with ASD. | 545 | 20.9% | 40.4% | 16.7% | 19.6% | 2.4% |
| A Clinical Fellow should have had experience in the assessment of children with ASD. | 501 | 5.6% | 0.6% | 7.0% | 46.7% | 40.1% |
| A Clinical Fellow should have had experience in the treatment of children with ASD. | 501 | 4.8% | 0.2% | 5.2% | 42.7% | 47.1% |

Areas were ranked based on responses. For assessment in ASD, participants ranked the following topics from most to least important: communication abilities, early signs & symptoms, characteristics of ASD, informal assessment tools, standardized assessment tools, diagnostic criteria, report writing, risk factors for ASD, genetics, potential causes, and prevalence statistics. For treatment in ASD, participants ranked the following topics from most to least important: evidence-based practice, collaboration on treatment teams, behavior management, alternative and augmentative communication, intervention for sensory problems, applied behavior analysis, writing treatment (Individualized Education Plan) objectives/goals, and supplemental treatments. Respondents were asked if a graduate program should require a standalone course for ASD using a Likert scale. The majority (86.9%) of respondents agreed or strongly agreed such a course should be required ($M = 4.33$).

Student Outcomes

The course in ASD was required in each student's program of study toward earning a Master's degree in speech-language pathology. Students were given an assessment (pre-test) on the first day of class and then again on the final day of class (post-test). The assessment questions related to background information about experience with ASD and general knowledge questions. The knowledge questions matched those used in the survey tool distributed to SLPs for assessment and treatment of ASD as well as some questions related to course content. All students completed the assessments as part of class expectations but students were informed that performance on the pre-/post-tests would have no implications for their course grades. Students could also choose to opt out of inclusion in the research study. Twenty-five students completed the pre-/post-tests and no students chose to opt out.

Students were asked about the source of information pertaining to ASD. The majority (16/25) of students reported that classroom lectures and assigned readings were their main source of information for ASD. Most (21/25) students indicated that they had a moderate amount of knowledge upon entering the course. When asked to quantify their experience level prior to the course, they had exposure to very few children with ASD: 11 students had worked with no children, 8 had worked with 1-3 children, 6 had worked with 4-6 children, and no student had worked with more than 6 children.

Students demonstrated an increase in knowledge, as measured by response accuracy, for the objective questions pertaining to characteristics of ASD (78% to 86%),

Table 3. Response Accuracy for Knowledge-Based Questions (True/False Statements)

| Statement | N | Proportion who Answered Correctly |
|--|-----|-----------------------------------|
| ASD are more commonly diagnosed in boys than in girls. | 518 | 97.7% |
| According to the CDC, if one child in a set of identical twins has ASD, the other child will also have ASD 60-96% of the time. | 506 | 60.5% |
| Children with ASD may demonstrate no real fear of danger. | 511 | 83.6% |
| The average age of diagnosis for ASD is between 4 1/2 and 5 1/2 years of age. | 504 | 51.8% |
| ASD tend to run in families. | 505 | 75.4% |
| There is no difference in outcomes between children who receive early intervention services and children who receive intervention that begins at school-age. | 507 | 99.8% |
| A child can be reliably diagnosed with ASD starting at 18 months of age. | 505 | 47.5% |
| The main characteristics that differentiate children with ASD from other developmental disorders include difficulties with eye gaze, difficulty pointing to or showing objects of interest, and difficulty with imitation. | 500 | 59.6% |
| Using the Picture Exchange Communication System (PECS) is not recommended for children with ASD. | 502 | 96.6% |
| With the proper treatment, most children diagnosed with ASD eventually outgrow the disorder. | 504 | 100.0% |
| ASD occurs more commonly among families with higher socioeconomic and educational levels. | 494 | 81.2% |
| With the proper treatment, ASD can be cured. | 503 | 99.4% |
| Echolalic phrases used by children with ASD have no communicative functions. | 501 | 83.6% |
| Research indicates that sensory integration therapy can be an effective treatment for problems associated with ASD. | 497 | 95.2% |
| It is important that all children diagnosed with ASD receive some form of speech-language therapy services. | 499 | 80.6% |
| Dietary modifications are useful in treating all children with ASD. | 494 | 63.6% |
| Anti-yeast therapies are not a recommended treatment for ASD. | 487 | 39.4% |

prevalence & causes of ASD (76% to 85%), and diagnosis & intervention in ASD (83% to 89%). At pre-test, students were asked to name programs that are used in the treatment of children with ASD. The majority of students (18/25) were able to name 0-1 programs while a few students (7/25) were able to name 2-3 programs. At post-test, all students were able to name 3 programs.

DISCUSSION

The study aimed to determine the expectations that SLPs working in school-based settings have about the preparation of graduate students to work with children with ASD. Using a self-report of perceptions of preparation for working with ASD, the survey demonstrated that most of the SLPs working in schools had some education and training with children with ASD but did not believe the training was adequate preparation for initial CF positions. The findings from the survey supported those of prior research that indicated that SLPs need specialized training to work with individuals with ASD [3, 7] and that training is expected to occur prior to beginning a CF. Based on the survey of SLPs, there was a clear expectation that coursework specific to ASD should be offered to students that is distinct from other traditionally offered courses. The reasons a graduate program has or has not incorporated courses in ASD are not clear. Possible factors may be related to the availability of faculty to teach graduate-level courses in ASD in a field experiencing a shortage of individuals pursuing academic careers. In addition, required courses in ASD would increase the total credit hours for students, and potentially lengthen

their program, since no courses can be eliminated while maintaining accreditation standards. These types of challenges provide a rich opportunity for accredited graduate programs to discuss how to best prepare students entering the profession. The Council for Clinical Certification in Audiology and Speech-Language Pathology (CFCC), in its capacity for overseeing the knowledge and skills standards used by accredited graduate programs, has recently issued updated standards to reflect current practices. During the upcoming years leading to the next revision with the expectation that the prevalence of individuals diagnosed with ASD will continue to increase, a discussion of the addition of ASD as a classification within those standards is likely warranted. Adding a specific disorder group, such as ASD, does have precedence within the standards (e.g., traumatic brain injury). The Council on Academic Accreditation in Audiology and Speech-Language Pathology (CAA) would then oversee implementation by accredited graduate programs.

The importance of increased coursework and practicum opportunities related to children with ASD is supported by these findings. It has been shown that SLPs in school settings require skills for assessment and intervention that are specific to ASD [15]. As with special education teachers, SLPs who have had no coursework in ASD prior to completing a Master's degree may not be viewed as qualified professionals [7]. There are many intervention programs that are used almost solely with children with ASD (e.g., TEACCH) and thus students would not be exposed to them in other courses that cover related areas such as

language intervention. Specialized training is needed to teach these areas. SLPs clearly expressed an expectation of such training for the CFs they will supervise in school-based settings.

The respondents indicated which topic areas they considered important to SLPs and that should be included in coursework in order to prepare recent graduates for their CF experiences. While each of the topics included in the survey would be relevant to include in a course, SLPs have expectations about where to place emphasis when teaching these areas. For assessment, SLPs emphasized characteristics and early signs/symptoms. It is often the case that children are referred to SLPs for concerns in the area of communication and further referrals for assessments leading to diagnosis stem from there. It is a key skill for SLPs to understand and recognize the characteristics of ASD and to be able to do so early in a child's development. In the area of treatment, more emphasis was placed on evidence-based practice, collaboration, and behavior management than on understanding genetics and theories of etiology. While evidence-based practice is a theme in all intervention coursework, the field of ASD is especially vulnerable to treatments that lack clear evidence, some of which may be based on pseudoscience [16]. Working with children with ASD almost always requires a team approach, so the ability to work collaboratively with others and to understand the role of the SLP is of special importance whether as part of a diagnostic team, a treatment team, or both. Behavior management is a key area ranked high by SLPs and also as a theme in the open-ended questions related to training needs. One of the main characteristics of children with ASD is difficulty with behavior (i.e., repetitive and restrictive behaviors). Intervention programs that incorporate behavior management and behavior-based strategies have been well-established and are widely utilized. One such example is a behavior-based curriculum used by almost all graduate students in the university clinic when working with children with ASD [17].

Student outcomes demonstrated that students require specialized coursework in ASD to meet the expectations of SLPs. It was also of interest that students were not generally aware of their own lack of knowledge upon beginning the course. Their self-ratings indicated that the students knew a moderate amount about ASD, despite little to no practical experience. Following the course, many students realized that children with ASD are more complex than they had initially believed. Learning outcomes from the students completing the graduate course demonstrated that students had the knowledge base they needed for practical application either through clinical experiences at the university clinic or during off-campus externships. The outcomes also lend evidence that students are receiving coursework related to general expectations in the field [18]. It is important to keep open the lines of communication between university faculty and the SLPs who serve as supervisors and/or colleagues for new graduates because this exchange of information allows educational initiatives to respond to professional needs.

LIMITATIONS AND FUTURE DIRECTIONS

As is the case with survey data the response rate was within an acceptable range but could have been improved.

Participants may also have been more likely to respond if they had an interest in ASD or the preparation of graduate students. However, the data presented represents a larger sample size among published research articles in this area of inquiry (i.e., over 500 compared to less than 100). Additionally, the respondents included a range of ages, communities, levels of education, years of experience, and levels of knowledge about ASD. School-based SLPs are primarily women and this was reflected in the number of female and male respondents to the survey. It would be of interest to explore potential gender differences in both perceptions of preparation to work with children with ASD as well as expectations for new graduates. The current sample of male respondents was not sufficiently robust to draw any such conclusions.

For student outcomes, the author was the instructor of the course and so had knowledge of the topics that were covered and what materials were used. While this created no apparent bias in the students' performance or interpretation of findings, it would be of interest to use the same pre-/post-test for courses taught by other instructors at other institutions. While students were aware that responses would not affect course grades, there was the potential for authority bias with the use of the tool in the context of the course. In future, an assessment conducted separately from the course and by someone other than the course instructor would alleviate such a bias. In addition, outcomes related to clinical experiences (both on- and off-campus) would be of interest. Students may take a course concurrently with or prior to serving a specific disorder population and potential differences in self-ratings of preparedness would be of interest. Future research should also be conducted to follow up with those students who have completed the coursework in ASD within the last few years. Those students could comment on their readiness for initial CF positions, compare themselves to other CFs from other university programs, and describe what training they may have required or sought out to continue their professional development.

CONCLUSION

The findings of the current study support prior work related to knowledge and perceived skills for SLPs working in school settings [3, 7, 15] and add additional information related to expectations of new graduates and student outcomes following completion of a course in ASD. It is important that university programs begin to implement these types of courses if they have not done so already. While some have stated that it may be unrealistic for programs to add a course specific to ASD [7], there is a clear expectation in the field that university programs should do so. In addition, measures of student outcomes can be used to ensure that students acquire the types of knowledge that will be expected of them as they enter the workforce.

ABBREVIATIONS

ASD = Autism Spectrum Disorder

ASHA = American Speech-Language-Hearing Association

SLP = Speech-Language Pathologist

CF = Clinical Fellow

CONFLICT OF INTEREST

The author confirms that this article content has no conflict of interest.

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