

■ Knowledge of the Roles of Speech-Language Pathologists by Students in Other Health Care Programs

■ Compréhension des rôles des orthophonistes par les étudiants d'autres programmes de soins de santé

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Abstract

This study reports the findings from a survey of 268 students in their first and final years of the medicine, nursing, physiotherapy (PT), and occupational therapy (OT) programs at Dalhousie University. The focus of the survey addressed their knowledge of the roles of the speech-language pathologist (SLP). The final year nursing, PT, and OT students were more knowledgeable than the first year students in these programs. There was no difference between first and final year medical students. Significant differences were found among the programs, with OT and PT students showing more knowledge than students in either medicine or nursing. Overall, students were more knowledgeable about the role of an SLP with regard to speech difficulties than difficulties with language, especially cognitive or social language. The potential influences of interprofessional learning and varying clinical and personal experiences are discussed.

Abrégé

Cette étude donne un compte rendu des résultats d'un sondage de 268 étudiants de première et de dernière années des programmes de médecine, de sciences infirmières, de physiothérapie (PT) et d'ergothérapie (ÉT) à la *Dalhousie University*. Le but du sondage était d'évaluer leur compréhension des rôles de l'orthophoniste. Les étudiants de dernière année des programmes de sciences infirmières, de PT et d'ÉT étaient mieux renseignés que les étudiants de première année de ces programmes. Cependant, aucune différence n'a été relevée entre les étudiants de médecine de première et de dernière année. Par contre, des différences significatives d'un programme à l'autre ont été relevées, les étudiants d'ÉT et de PT démontrant une plus grande connaissance que les étudiants de médecine ou de sciences infirmières. Dans l'ensemble, les étudiants étaient mieux informés quant au rôle de l'orthophoniste à l'égard des troubles de la parole que des troubles de langage, notamment cognitifs ou sociaux. Les influences éventuelles de l'apprentissage interprofessionnel et des diverses expériences cliniques et personnelles sont étudiées.

Key words: interprofessional education, professional training, team work

The incidence of interprofessional collaboration in educational and health care settings has increased with the recognition that no one professional can meet all of the complex needs of an individual. Rather than promoting independent work, an interprofessional or interdisciplinary approach involves a team of professionals with different areas of expertise working jointly to provide maximally effective service delivery (Conner & Welsh, 1993; Halper, 1993; Wright, 1996). Although there are many advantages to this team approach, interprofessional efforts are not without obstacles. Of special interest to the

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current study is the notion that difficulties may arise when professionals are unaware of each other's distinct roles (Norwich, 1990).

Studies of health and education professionals involved in interdisciplinary activities have emphasized both benefits and concerns (Conner & Welsh, 1993; Edwards & Hanley, 1992; Halper, 1993; Wright, 1996). Wright interviewed 40 United Kingdom teachers and speech therapists regarding the advantages and disadvantages of interdisciplinary collaboration among education professionals. Reported benefits included support, reduced stress, and new knowledge about specific areas. As well, both groups of professionals gained greater knowledge about each other's roles. Concerns were that interdisciplinary teamwork was a time consuming process, and that each individual had to give up their valued professional autonomy. In an American survey of occupational therapists (OTs) and speech-language pathologists (SLPs) in the school systems, it was found that these professionals rarely engaged in cooperative planning and treatment, but when they did, such activities were reported to be very valuable (Edwards & Hanley, 1992). Above and beyond improved quality of therapy, one benefit for the professionals involved was the reciprocal exchange of knowledge and information. However, professionals in both OT and SLP reported concerns that they were not adequately prepared for their interdisciplinary roles and, thus, they were unaware of how to implement interdisciplinary strategies. Furthermore, respondents expressed the opinion that there may be limited understanding of each other's roles.

The existence of professional stereotyping is one factor that may limit understanding of one another's professional roles. Some studies have suggested that these typically negative attitudes towards other health professions may originate or become ingrained in health professional training programs (Carpenter, 1995; Leaviss, 2000; Streed & Stoecker, 1991). Negative attitudes included a lack of mutual respect and appreciation of knowledge and skills of other health disciplines. Streed and Stoecker suggest that the presence of such attitudes may be in part due to an absence of formal academic exchanges and informal social interaction between the two groups.

Given that barriers to interprofessional activities exist, it has been suggested that interprofessional education is a necessary addition to academic healthcare programs (Edwards & Hanley, 1992; Hall & Weaver, 2001). Accordingly, different institutions have incorporated interprofessional learning into the curriculum of various health care professions (Banks & Janke, 1998; Carpenter, 1995; Freeth & Nicol, 1998;

Greene, Cavell, & Jackson, 1996; Horsburgh, Lamdin, & Williamson, 2001; Johnston & Banks, 2000; Leaviss, 2000; McFarlane & Hagler, 1993; Parsell, Spalding, & Bligh, 1998; Richardson, Montemuro, Mohide, Cripps, & Macpherson, 1999; Russell & Hymans, 1999). Beneficial outcomes of such education were unanimously reported, and included the reduction of negative attitudes and stereotyped views and increased knowledge of the roles of other health care professionals. Dalhousie University, in Halifax, Nova Scotia has implemented interprofessional learning as part of the professional education of students in the faculties of Dentistry, Health Professions, and Medicine. One interprofessional module in particular examines professional roles and values with the learning objectives of describing one's own profession to others, to learn about roles and values of other health professionals, and to compare and respect the diversity of roles.

Speech-language pathology is a health profession with opportunities for interdisciplinary activities with a variety of other professionals. As a relatively new addition to the growing list of health professions, there may be an incomplete understanding about the role of the SLP. In an American survey of the rural public's awareness of speech-language pathology and audiology, it was found that there was a limited degree of knowledge about both of these professions and the services provided (Killarney & Lass, 1981). Killarney and Lass suggested that these results indicate a need for an increase in public awareness programs that highlight the nature and extent of services provided by SLPs, their training, and varied employment settings. In addition, they highlighted the necessity of investigating the knowledge that other health professionals possess about the profession of speech-language pathology; however, few researchers have since responded to their suggestion to explore this level of knowledge. As a result there is a paucity of research in this area. It is vitally important to the growth and development of speech-language pathology that other health professionals have an adequate knowledge of our particular roles so that they may act as appropriate referral sources, and so that we may engage in effective interdisciplinary efforts.

One recent endeavour by the Speech-Language and Hearing Association of Alberta (SHAA) investigated physicians' knowledge of speech-language pathology. Their survey of 134 physicians found that the majority was uncertain as to the situations in which to refer their patients to an SLP or audiologist (Speech-Language and Hearing Association of Alberta, 1999). Speech problems in children were identified as the most common reason for physician referral to an SLP, although only 22% of physicians indicated that they had ever done so. In

another study, 628 regular and special education teachers, elementary school principals and school psychologists from the United States were surveyed about the role and performance of school SLPs (Sanger, Hux, & Griess, 1995). Although the responses generally were positive in regards to the service they provided, some uncertainty was expressed regarding the role of an SLP.

To date, there is little empirical evidence of the knowledge of speech-language pathology by students of other health professions. This question is of interest because a lack of such knowledge may negatively impact client treatment as appropriate referrals and interdisciplinary efforts would be reduced. The purpose of the present study was to investigate the knowledge that students of various other health professions have about the roles of an SLP. The participants were students in either their first or last year of one of four health professional programs: medicine, nursing, physiotherapy (PT), or occupational therapy (OT). These particular health professions were chosen because of their close involvement with speech-language pathology and for their ability to act as referral sources. The research questions were as follows:

1. Do final year students in healthcare programs have greater knowledge of the roles of an SLP than first year students?
2. Does knowledge of the roles of an SLP differ across programs?
3. Is there a significant interaction effect between program and year?
4. Do students who had attended a greater number of Dalhousie University interprofessional modules have more knowledge about the roles of an SLP?
5. Do students who have had personal experience with an SLP demonstrate more knowledge about the roles of an SLP?
6. Do students who have had interactions with an SLP in their clinical placements demonstrate more knowledge about the roles of an SLP?

Method

Participants

The participants consisted of 268 health profession students attending Dalhousie University in Halifax, Nova Scotia. Of these students, 157 were in their first year of the program while 111 students were in their final year. Eighty-six students (51 first year and 35 final year) were from the Medical School; 53 students (35 first year and 18 final year) attended the School of Nursing; 70 students (36 first year and 34 final year) were from the School of Occupational Therapy; and 59 students (35 first year

and 24 final year) attended the School of Physiotherapy. These numbers corresponded to the following percentages of class participation: 57% of the first year medical students, 39% of the final year medical students, 29% of the first year nursing students, 21% of the final year nursing students, 75% of the first year OT students, 77% of the final year OT students, 73% of the first year PT students, and 50% of the final year PT students. Student participation was voluntary. Medicine and nursing are each four-year undergraduate programs, while OT and PT are three-year undergraduate programs.

Materials

The first author constructed a survey concerned with respondents' knowledge of the roles of an SLP with regard to a variety of fictitious health cases. In total, 18 health cases were presented. For each case the respondent was required to indicate the three most important professionals to be involved, other than the family doctor. Twelve professions were listed for the respondent to choose from. These were audiologist, dentist, dietitian, nurse, occupational therapist, pharmacist, medical specialist (for which the respondent could specify), physiotherapist, psychologist, recreation therapist, social worker, and speech-language pathologist. There was also a space for "other." Of the 18 cases, 13 were within the scope of the profession of speech-language pathology. These cases were designed to represent a variety of populations and conditions that the profession encounters. These included autism, voice disorder, dysphagia, global developmental delay, cleft palate, cerebral palsy, traumatic brain injury, dementia, language delay, apraxia, laryngeal cancer, right hemisphere stroke, and Down syndrome. The number of cases involving an SLP was limited to thirteen in order to ensure that completion of the survey was not too time consuming. The remaining five cases, which were not within the scope of speech-language pathology, were included as foils. All of the cases were constructed such that more than one professional could potentially be involved in each (e.g., an OT, PT, and SLP). This was done to make the focus on speech-language pathology less obvious. Care was taken, however, to ensure that a particular case didn't involve too many professionals, as respondents were only permitted to choose three. This increased the likelihood that an SLP would be considered as one of the three most critical professionals, given that the participant was knowledgeable about the roles of the SLP. Not choosing SLP as one of the professions should not be considered 'wrong.' Complex cases typically involve a number of professions. However, choosing an SLP for the cases in which SLP involvement was appropriate was assumed to indicate a greater knowledge of, or appreciation of, the roles of the SLP. The survey

was designed to take approximately 15 minutes to complete. A draft of the survey was given to professors at Dalhousie's School of Human Communication Disorders, and they were asked for input regarding the survey's completeness, clarity, and relevance. Changes were made accordingly. An example of a case (the global developmental delay case) is contained in the Appendix.

The survey also included questions regarding the students' personal experiences with an SLP, audiologist, PT, and/or OT in an effort to disguise the focus on speech-language pathology. For those students in their final year of their respective programs, questions were included regarding interactions they may have had with SLPs, audiologists, PTs, and OTs during their clinical experiences, as well as the number of interprofessional modules they had attended.

Procedure

The first author obtained permission from the various departments to enter a class at the conclusion of a lecture and request participation from the students. Students were told that the researcher was a graduate student and that the research was investigating the knowledge of students in health professions about the roles of various health care professionals. The students were not informed that the research was specifically investigating the knowledge of the roles of an SLP in order to obtain as valid results as possible. The participants received a verbal explanation of the research, and were told that participation was voluntary and that the survey would take approximately 15 minutes to complete. Participants were then given copies of a consent form and a survey. Upon completion of the survey, participants were given an information handout on the roles and working environments of the SLP. No signatures or other identifying information was requested.

Results

Initially, the five health cases not within the scope of speech-language pathology were analyzed. With

exception of one first year student for one case, there were no instances of students choosing SLP involvement. For the 13 cases that were within the scope of speech-language pathology, some participants chose more than three professionals for a particular case. These individual cases were considered to be missing values, and were ignored in the analysis. A total of 116 cases were excluded, which represents only 3% of the data (116 invalid cases/3484 total cases). The mean percentages of times that students in each group chose an SLP to be involved are presented in Table 1.

A univariate analysis of variance was conducted, and a significant main effect for year was revealed ($F(1) = 34.07, p < .000$), with final year students choosing an SLP significantly more often than first year students. A significant main effect for program was also found ($F(3) = 22.05, p < .000$). Post hoc *t*-tests revealed that students in OT chose SLP involvement more often than students in nursing ($t(121) = -4.878, p < .000$) and medicine ($t(154) = -7.123, p < .000$). Students in PT also chose SLP involvement more often than both nursing students ($t(110) = -3.257, p < .001$) and medical students ($t(143) = -5.081, p < .000$). The same pattern of differences was also seen when the first and final year students were analyzed separately.

The interaction between program and year was found to be significant ($F(3) = 3.877, p < .010$). Post hoc *t*-tests were conducted and it was found that final year students in the nursing, OT, and PT programs chose an SLP significantly more often than first year students in these programs ($t(51) = -2.017, p = .049$; $t(68) = -6.174, p < .000$; $t(57) = -3.600, p < .001$; respectively). Medical students did not show a significant difference in means between their first and final years of the program.

Interprofessional Modules Attended

To investigate the question of whether students who attended a greater number of Dalhousie University interprofessional modules had more knowledge about the roles of an SLP, the number of modules was recorded

Table 1
Mean percentage of cases for which students appropriately chose an SLP to be involved

| Program | First Year | | Final Year | |
|----------------------|------------|-------|------------|-------|
| | <i>n</i> | % | <i>n</i> | % |
| Medicine | 51 | 41.44 | 35 | 43.99 |
| Nursing | 35 | 42.04 | 18 | 53.36 |
| Occupational Therapy | 35 | 51.20 | 24 | 66.42 |
| Physiotherapy | 36 | 52.31 | 34 | 72.62 |

Table 2
Mean percentage of cases for which final year students who attended a low (0 - 2) or high (3 - 5) number of modules chose an SLP to be involved

| Program | 0 - 2 modules | | 3 - 5 modules | |
|----------------------|---------------|-------|---------------|-------|
| | <i>n</i> | % | <i>n</i> | % |
| Medicine | 17 | 44.95 | 8 | 41.34 |
| Nursing | 1 | 14.29 | 17 | 55.66 |
| Occupational Therapy | 10 | 67.70 | 17 | 74.68 |
| Physiotherapy | 8 | 70.19 | 16 | 64.53 |

such that final year students who had attended zero to two modules were “low” and final year students who had attended three to five modules were “high.” The results are presented in Table 2.

A univariate analysis of variance was conducted, and a significant main effect was found ($F(1) = 4.098, p = .046$) with participants who had attended three to five interprofessional modules choosing an SLP for significantly more cases than participants who had attended zero to two modules. There was also a significant interaction between program and number of modules attended ($F(3) = 2.983, p = .035$). Post hoc *t*-tests revealed that nursing students ($t(16) = -1.799, p = .045$) and OT students ($t(32) = -1.784, p = .042$) who attended more interprofessional modules chose an SLP to be involved significantly more often than those who attended fewer modules. For PT and medicine students, there was no significant difference based on the number of modules attended.

Personal Experience

A *t*-test was conducted to compare the means of students who had a friend, relative, or acquaintance who had had personal experience with an SLP ($M = 59.17, SD = 20.39$) and students who did not ($M = 58.98, SD =$

18.18). There was no significant difference between the means for these two groups. A *t*-test was conducted to compare the means of students who had direct personal experience with an SLP ($M = 46.8, SD = 19.94$) and those who did not ($M = 51.830, SD = 19.60$) and no significant difference was found.

Clinical Experience

The impact of experience with an SLP during a student’s clinical placements was examined by dividing the final year students into those who had contact and those who did not and a univariate analysis of variance revealed no significant differences. The results are presented in Table 3.

Comparison of Cases

In addition to the above statistical analyses addressing the research questions, the individual cases were examined to determine whether students recognized the role of the SLP with regard to some disorders/conditions more than others.

Table 4 shows the percentage of participants who chose an SLP to be involved for each of the thirteen health cases. Many more participants chose an SLP for some cases than for others. The percent difference between the case with the most participants choosing an SLP (global

Table 3
Mean percentage of cases for which students with or without clinical experience with an SLP chose an SLP to be involved

| Program | No clinical experience | | Clinical experience | |
|----------------------|------------------------|-------|---------------------|-------|
| | <i>n</i> | % | <i>n</i> | % |
| Medicine | 16 | 41.43 | 19 | 46.15 |
| Nursing | 10 | 55.27 | 8 | 50.96 |
| Occupational Therapy | 0 | - | 34 | 72.62 |
| Physiotherapy | 4 | 80.77 | 20 | 63.55 |

developmental delay) and the case with the least amount (traumatic brain injury) was 73.7%. Table 4 also shows the percentage of first and final year participants who selected an SLP for each of the 13 health cases, and the percent change that was seen across year. Cerebral palsy was the only case to have a negative percent change, with 10.5% fewer final year participants choosing an SLP than first year participants. The remaining cases saw an increased percentage across year ranging from a negligible change of 0.8% (traumatic brain injury case), to the largest change of 52.4% (swallowing case).

Discussion

The current study examined the knowledge of first and final year students in medicine, nursing, occupational therapy, and physiotherapy programs specific to the roles of an SLP. The analysis of combined cases revealed a significant difference between first and final year students in the percentage of cases for which students appropriately chose an SLP to be involved. This was consistent with the hypothesis that students in the final year of a program would have more knowledge about the role of an SLP than students in their first year. Although the difference across year was evident in the OT, PT, and nursing students, it was not present in medical students. This suggests that students in the other three programs learn more about the roles of an SLP during their academic and clinical experiences than the

medical students. Contact with an SLP during interdisciplinary teamwork may be more common in these three professions than in medicine. In addition, the medical students attended fewer interprofessional modules. Only one third of the medical students had attended more than two modules while in the other professions, the number ranged from 63% (PT) to 95% (nursing).

Another factor that may have contributed to the difference seen across first and final year students is an increased knowledge of the dimensions of the various disorders. During their training, students in each of these programs would have learned about many of these disorders as their professions often are involved. An increase in the selection of an SLP may reflect, in part, increased awareness of the speech, voice, and/or language difficulties associated with a disorder in addition to increased knowledge of the roles of an SLP. However, the participants were presented with case descriptions which described the individuals' skills, not simply diagnostic labels. Thus, although an increased knowledge about the nature of a disorder may have been a contributing factor in the results, it is unlikely to be the primary explanation.

As well as an overall effect of year, there was an overall effect of program, with OT and PT students choosing an SLP for significantly more cases than nursing and medical students. Greater knowledge by OT and PT students may reflect similarities between these professions

Table 4
Percentage of students who selected an SLP for each case and percent change across year

| Case | % of Ss who chose an SLP | % of Ss who chose an SLP | | |
|----------------------------|--------------------------|--------------------------|------------|----------------|
| | | First Year | Final Year | Percent change |
| Global developmental delay | 78.0 | 77.0 | 79.4 | 2.4 |
| Cleft palate | 76.2 | 68.4 | 87.0 | 18.6 |
| Apraxia | 69.3 | 64.2 | 76.4 | 12.2 |
| Cerebral palsy | 68.8 | 73.0 | 62.5 | -10.5 |
| Laryngeal cancer | 67.7 | 60.6 | 78.1 | 17.5 |
| Down syndrome | 66.9 | 64.7 | 70.1 | 5.4 |
| Language delay | 64.6 | 61.4 | 69.2 | 7.8 |
| Voice | 57.6 | 50.0 | 68.2 | 18.2 |
| Alzheimer's | 39.5 | 35.1 | 45.9 | 10.8 |
| Swallowing | 28.0 | 60.6 | 59.0 | 52.4 |
| Autism | 27.1 | 22.6 | 33.0 | 10.4 |
| Right hemisphere stroke | 24.6 | 17.6 | 34.6 | 17.0 |
| Traumatic brain injury | 4.3 | 3.9 | 4.7 | 0.8 |

and speech-language pathology. As all three are rehabilitation professions, exposure to similar populations and conditions, the same work setting, or even the same team may have existed. Thus, they may have more knowledge about the role of the SLP as part of their program and may know more about the nature of the presented disorders. However, this difference was apparent in the first year as well as the final year students, so the difference between programs cannot be explained solely by learning in the programs. It is possible that these students had more initial knowledge of other rehabilitation professions, especially if they volunteered with an OT or PT prior to entering the program. If they spent time investigating the professions of OT and PT, they may have been more likely to encounter an SLP than students interested in nursing or medicine. These students also may have had a greater interest in rehabilitation professions in general.

Interprofessional Modules Attended

It was expected that students who attended a greater number of Dalhousie University interprofessional modules would have more knowledge about the roles of an SLP than those who did not. This was found to be true, with the mean percentage of cases for which a student chose an SLP being significantly higher for students who attended three to five modules than for those who attended only zero to two modules. This suggests that the modules facilitated learning about the roles of an SLP. As well as direct instruction as to the roles of various professionals, the opportunity to interact with one another would contribute to the students' learning.

It is important to take into consideration the interaction between program and number of modules attended. Both OT and nursing students who attended three or more modules chose an SLP significantly more often than those who had attended less than three, but note that only one nursing student had attended fewer than three modules. For PT and medical students, there was no statistically significant difference between students based on number of modules attended. Although it appears that the interprofessional modules were a factor in increasing students' knowledge of the roles of an SLP, it is difficult to separate this from program differences. Furthermore, the impact of interprofessional modules would depend on the content of the modules attended, not simply the number attended. Although two people from different programs may have each attended three modules, these modules may have had a different focus.

In light of the current study and previous research, it seems that interprofessional education would be a valuable addition to all healthcare programs. Despite

the fact that interdisciplinary teamwork is in practice in a variety of health care settings, there are few health education programs that provide interprofessional experiences as part of their training (Stumpf & Clark, 1999). Johnston and Banks (2000) found that, with the exception of Dalhousie University and the University of Alberta, interprofessional education was not a formal component of health care programs in Canada, although some interprofessional courses did exist which were topic-specific. The paucity of interprofessional education opportunities may be due in part to the fact that design and implementation of such programs is fraught with barriers, many of which have been described in the literature (Carpenter, 1995; Horsburgh, Lamdin, & Williamson, 2001; Parsell, Spalding, & Bligh, 1998; Reubling et al., 2000; Stumpf & Clark, 1999). Additional research is needed to determine the impact of interprofessional learning on teamwork and effective client service, and to develop the most effective educational programs. Future studies examining the impact of interprofessional learning should take factors such as program and qualitative differences into consideration.

Personal Experience

There was no apparent effect of personal experience of whether the participant had directly received the services of an SLP or was acquainted with someone who had. Perhaps the knowledge gained by personal experience was not sufficiently more detailed than the knowledge that the general population possesses about the role of an SLP. Furthermore, cases resembling the participants' personal experiences may not have been represented on the survey (e.g., stuttering or an articulation disorder). It should also be noted that only 5.6% (15/268) of the participants reported having personal experience as the client of an SLP.

Clinical Experience

The fact that no significant differences were found between students who had clinical experience with an SLP and those who did not was a surprising finding. However, there were significant differences among the programs regarding which students had experienced clinical interaction with an SLP during their program. All of the OT students had had contact with an SLP during their clinical placements. This was the group which selected SLP most often. Thus, the impact of clinical experience could not be determined in the most knowledgeable group.

Clinical experiences are an integral part of the learning during professional programs and the effects of individual components of professional training are

difficult to separate. It is likely that clinical experiences differ not only quantitatively between programs, but also qualitatively. In this study, clinical experience was divided into two categories — any amount of exposure versus no exposure. There was no attempt to qualitatively assess the nature of the clinical experience. Research regarding differences between programs in the nature of clinical experiences and the resulting effect on knowledge of professional roles is needed. The finding that clinical experience did not make a difference suggests that as clinical educators we need to be thinking not only about the learning experience of our speech-language pathology students, but also our ability to impact the learning of students in other professions, especially for medical students.

Comparison of Cases

The results from the individual cases were assessed to address the question of whether students recognize the role of the SLP in some disorders/conditions relative to others. This appeared to be true with participants displaying a wide range of knowledge about the roles of the SLP with regard to various conditions. It should be noted that the labels used to identify each case were not necessarily present in the written case description. The cases for cleft palate, cerebral palsy, traumatic brain injury, laryngeal cancer, right hemisphere stroke, and Down syndrome used these labels in the description. Case descriptions for autism, voice disorder, swallowing, language delay, Alzheimer's, global developmental delay, and apraxia described the patient without labels. It is also important to note that each case described a particular client, and thus, the participants' knowledge of the role of the SLP is relative to a particular description. For example, one case involved a man with traumatic brain injury. Such an injury could result in a wide array of difficulties. In the case presented, the traumatic brain injury resulted in cognitive communication difficulties including memory problems, impaired reasoning and judgement, and difficulties with attention and concentration. Had the case described classic symptoms of aphasia instead, it is possible that the results would be different.

The cases in which an SLP was chosen most frequently almost invariably involved conditions where the patient had difficulties with speech production. This was true in seven of the eight cases in which greater than 50% of participants selected an SLP. In four of these cases (i.e., global developmental delay, cleft palate, apraxia, and cerebral palsy), the words 'speech' or 'speak' were used in the descriptions (i.e., referring to the speech of the patient). For instance, the child with cerebral palsy was 'unable to speak' whereas the man with apraxia had

'slow and effortful speech.' It is unlikely that use of these words simply indicated to the participants that the patient would require the services of a *speech*-language pathologist because the word 'speak' was also used in the autism and Alzheimer's cases to describe the patients' difficulty understanding others, and in such cases an SLP was infrequently chosen to be involved.

The child language disorder case was the sole case that did not involve speech production problems for which an SLP was chosen by more than half the participants. There were other 'language' cases; for example, the Alzheimer's, right hemisphere stroke, and traumatic brain injury cases all described difficulties with cognitive communication, while the autism and right hemisphere stroke cases described social communication problems. These four cases were among those where the fewest participants chose involvement of an SLP. Thus, it appears that participants recognized the role of the SLP in relation to difficulties with speech more easily than they did difficulties with language, especially when language difficulties were cognitive or social.

Another case in which few participants chose an SLP to be involved was related to swallowing. It is not especially surprising that little is known about the role of the SLP with swallowing disorders. This is a relatively new addition to the scope of practice and the SLP's role cannot be inferred from the name of the profession (swallowing is neither a speech nor a language disorder). However, for participants who selected an SLP in their first year compared to those in their final year, the swallowing case had the largest percent change (52.4%). This increased knowledge was evident for students of all four programs.

While students appeared to learn about the role of an SLP with regard to swallowing disorders over the course of their programs, the same was not true for traumatic brain injury, which saw only a slight percent change. The cerebral palsy case was the only one for which a negative percent change was noticed. One explanation for a reduction is increased knowledge of the disorder itself. It may be that final year participants were more aware of the vast array of professionals who may become involved with this population, and thus, an SLP may have been their fourth or fifth choice if they had been allowed to choose more professions.

Although the medical students did not display a significant overall difference between first and final years, analysis of individual cases reveals that final year medical students chose an SLP significantly more often than first year medical students for the cleft palate, swallowing, and laryngeal cancer cases. Our results suggest that medical students learn less about the roles of the SLP

than students in the other three programs; however, their knowledge of the SLP's role with regard to these three conditions did indeed increase. The cleft palate and laryngeal cancer cases each involved a patient with a structural abnormality of the mouth or throat which affected their ability to speak; thus, both conditions caused speech-related difficulties. It may be that these three conditions in particular are more frequently encountered by medical students during their academic learning, and therefore they are more aware of the SLP's role.

Conclusions

The results of this study suggest that students in other health professions are learning about the roles of an SLP during their educational programs, particularly OT and PT students. The role of the SLP was most readily identified with respect to speech difficulties. Yet there are still some significant gaps in their knowledge, especially with respect to the cognitive and social aspects of language. In the present study, participants were provided specific case descriptions. Different case descriptions would undoubtedly produce different results. In addition, the number of professionals that participants could choose for each health case was limited to three. Participants who did not choose an SLP were not considered to be "incorrect," as the survey involved prioritizing services, which is debatable. There may have been some cases for which a participant may have chosen an SLP as a fourth or fifth choice, especially if the case was perceived to be more complex. If the limit had been four or five professionals, then the participants may have chosen an SLP more often, and accordingly the results would indicate that the participants were more knowledgeable about the roles of an SLP. Nevertheless, differences were identified among professional programs, between first and final years, and between speech and language cases. Furthermore, there was only one instance in which SLP involvement was chosen for the foil cases. This indicated that the respondents were selecting SLP in a principled way. The authors would, however, caution against over-generalization of these results, as it cannot be assumed that these findings are representative of students at other educational institutions.

If students in other health professions lack knowledge about speech-language pathology or have inaccurate perceptions about the SLP's roles, then they may enter their professional careers with such misperceptions. This will hinder interprofessional efforts, and thus, limit the SLP's effectiveness in serving the public. In order to provide maximally effective service, it is important that others are aware of services available. If other professionals are unaware of when to refer their patients

to speech-language pathology services, these patients may not receive beneficial attention.

In order to increase other professionals' awareness of the roles of the SLP, there are a number of measures that can be taken. In addition to the need for interprofessional education within academic programs, students in speech-language pathology programs need to increase their visibility and interaction with the other professions. This may be done by inviting other health professional students to an open house, or holding a speech-language pathology awareness day. As well, speech-language pathology programs may sponsor speakers who are relevant to a cross section of disciplines, such that students from multiple programs are interested in attending. Interaction that extends beyond organized interprofessional education needs to be encouraged. Furthermore, the profession of speech-language pathology needs to advocate for itself with public relation campaigns that target health professional students, as well as practising health professionals and the general public. Finally, clinical educators need to make an effort to impact the learning of students in other health professions in addition to those in speech-language pathology.

Although it is important that other health professionals are aware of the roles of the SLP, it is equally important that SLPs are aware of the roles of other health professionals. Although the present study focused on the knowledge of speech-language pathology, it is likely that SLP students and professionals lack knowledge about other professions. It is essential that we take an interest in the roles of others, as well as promoting our own contributions to healthcare. Interprofessional team work is necessary if we are to provide the most effective services to our clients and knowledge of the roles of various professions is an important foundation for that teamwork.

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APPENDIX

Global Developmental Delay Case

Jenny is a 3-year-old child. She rarely speaks, and when she does she is hard to understand. She did not sit up until she was nine months old, and she began walking at two years. She is not toilet trained, and does not feed herself. When people see Jenny with her parents, they think that she is much younger than she really is.