

## How Much Education and Training Do Residents Across Specialties Receive in Neuropsychology?

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### ABSTRACT

**Introduction.** Neuropsychologists play an important role on multidisciplinary teams with physicians from multiple specialties. The extent of residency training on the use of neuropsychological services is unclear. Medical residents across multiple specialties throughout the United States were surveyed to assess resident education, training, and understanding of neuropsychological services, along with their intent to consult neuropsychologists in the future.

**Methods.** A survey was sent to residents in accredited psychiatry, neurology, family medicine, and internal medicine programs. After data were collected, chi-square group level analyses with post-hoc pairwise comparisons were used to analyze the data.

**Results.** A total of 434 residents took the survey. The proportion of residents exposed to neuropsychology during residency varied significantly according to specialty ( $\chi^2$  (3, N = 419) = 51.4,  $p < 0.001$ ), with more psychiatry and neurology residents reporting exposure than residents in family medicine or internal medicine. Similarly, the proportion of psychiatry and neurology residents who ‘agree’ or ‘strongly agree’ that they understand the nature of neuropsychological services differed significantly from family medicine and internal medicine residents ( $\chi^2$  (3, N = 415) = 40.4,  $p < 0.001$ ). The majority of residents across all specialties (85.7%) reported they are likely to consult/order neuropsychological services in future practice.

**Conclusions.** The majority of residents in all specialties reported exposure to neuropsychological services in some manner, but forms of exposure varied. Results indicated a need for increased education and training in neuropsychological services, especially within family medicine and internal medicine programs. *Kans J Med* 2021;14:197-200

### INTRODUCTION

Clinical neuropsychology is a sub-specialty of clinical psychology that applies an understanding of brain-behavior relationships to the evaluation of cognitive, behavioral, and emotional disorders, typically by use of standardized assessments.<sup>1</sup> According to Schoenberg and Scott, patients typically are referred for neuropsychological evaluations for (1) diagnostic clarification, (2) description of neuropsychological status, (3) treatment planning/program placement (e.g., nursing home

placement), (4) monitoring effects of treatment, (5) identification of underlying processes for cognition and/or effects of treatments/other agents, and (6) forensic applications.<sup>2</sup>

Physicians from multiple specialties refer patients to neuropsychologists, with neuropsychologists receiving most of their referrals from neurologists, psychiatrists, and primary care physicians.<sup>3</sup> In a survey of physicians, the majority of respondents (89%) reported that they had referred patients for neuropsychological evaluations.<sup>4</sup> When broken down by physician specialty type, anywhere from 99% (neurologists) to 70% (primary care physicians) of responding physicians indicated they had referred patients to neuropsychologists. Previous surveys also documented that neuropsychological services are viewed positively by physicians and that neuropsychological evaluation results, when available, often are incorporated into patient treatment plans. For example, one study examining the use of neuropsychology services in inpatient hospital care showed that 78% of discharge summaries included information regarding the neuropsychological evaluation and that placement outcomes coincided with neuropsychology recommendations 80% of the time.<sup>5</sup>

Although past research has examined physician’s attitudes and practices regarding utilization of neuropsychological services, no such studies have been conducted with medical residents. Additionally, it is unknown to what degree medical residents are exposed to neuropsychology during residency or whether residents’ exposure to and understanding of neuropsychology differs according to specialty. Therefore, the objective of this study was to assess resident exposure to and understanding of neuropsychological services across residency specialties. By doing so, the study aimed to identify avenues for further development in current residency training curriculum.

### METHODS

A survey study was developed, which included multiple questions including those related to demographic information (i.e., degree, residency year, residency specialty, and region), type of exposure to neuropsychology, understanding of neuropsychological services, and likelihood of utilizing neuropsychology services in future practice. With regard to demographic information and items about exposure to neuropsychology, questions were asked in a “select all that apply” format. With regard to questions relating to understanding of neuropsychological services and likelihood of utilizing neuropsychological services, Likert scales were utilized, allowing survey respondents to select “Strongly Agree”, “Agree”, “Disagree”, and “Strongly Disagree”.<sup>6</sup> Responses to the survey were collected and managed using Research Electronic Data Capture (REDCap<sup>®</sup>) tools hosted at the author’s institution. REDCap<sup>®</sup> is a secure, web-based application designed to support data capture for research studies.<sup>7</sup> No identifying information was asked in the questionnaire. Survey data was stored on REDCap<sup>®</sup> and data analyses were conducted in IBM SPSS Statistics Version 23.

Coordinators of accredited residency training programs were identified using the lists available at the Accreditation Council for Graduate Medical Education (ACGME) website. The initial invitation to participate in the study was emailed to 1,420 residency program coordinators across residency programs training in psychiatry, neurology, internal medicine, and family medicine, and they were asked to distribute the

survey to residents in their program. Those coordinators not wishing to participate were allowed to opt out without consequence. The survey originally was sent to coordinators on February 1, 2019. Upon receiving the email, residents were self-selected by clicking “yes” or “no” in providing consent, which was the opening screen on the e-survey. The survey instructions stated that responses were anonymous, that participation was optional, and that the survey would take about three to five minutes. Access to the survey was only granted to those residents who consented to participate. Participants were encouraged to fill out the survey completely, but were not required to answer all questions to complete the survey. Two subsequent reminder emails were sent approximately one week apart, and data collection ended February 28, 2019. The study utilized a convenience sample comprised of residents who both opened the survey and decided to respond.

Based on a prior survey conducted using a similar format, a power analysis conducted in IBM® SPSS Sample Power, found that a minimum of 328 resident responses would be required to have power at 90%.<sup>8</sup> In total, 434 residents ultimately completed the survey. Data were not collected regarding the number of residency programs who elected to disseminate the survey to their residents or the number of residents who ultimately received the survey email. Of the residents who received the survey, there was no way of knowing how many opened the email and were aware of the survey. As such, neither a program participation rate nor a survey response rate could be calculated.

Consenting respondents’ data were summarized and reported as frequency and percentages. Descriptive statistics overall and by medical subspecialty were conducted on all responses. To allow for easier comparison and given that some cells contained very few participants, Likert scale-based response sets were collapsed into the binary categories of agree/strongly agree and disagree/strongly disagree. Comparisons were made between the four medical specialties using Chi-square tests at  $p < 0.01$ , using this more stringent critical value to account for inflated familywise error rate in the context of multiple comparisons. The local Institutional Review Board approved the design and conduct of the study.

## RESULTS

A total of 434 residents consented: 70% MDs, 27.7% DOs, 2.3% other; 35.1% were first year residents, 31.4% second year residents, 23.6% third year residents, 9.0% fourth year residents, and 0.9% did not indicate their year of training. By specialty, 22.4% were from psychiatry programs ( $n = 97$ ), 32.8% were from family medicine programs ( $n = 142$ ), 30.0% were from internal medicine programs ( $n = 130$ ), 11.5% were from neurology programs ( $n = 50$ ), and 3.2% ( $n = 14$ ) did not indicate their specialty. By region, 27.1% ( $n = 117$ ) were from the Northeast, 21.8% ( $n = 94$ ) were from the Southeast, 36.4% ( $n = 157$ ) were from the Midwest, 5.8% ( $n = 25$ ) were from the Southwest, and 8.8% ( $n = 38$ ) were from the West.

The proportion of residents exposed to neuropsychology during residency varied significantly according to resident specialty ( $\chi^2 (3, N = 419) = 51.4, p < 0.001$ ). Psychiatry (96.9%) and neurology (90.0%) residents did not differ significantly regarding exposure to neuropsychology; however, more psychiatry and neurology residents reported

exposure to neuropsychology during residency than residents in family medicine (71.8%) or internal medicine (58.8%;  $p < 0.01$ ). As noted in Table 1, common avenues for exposure, irrespective of specialty, included clinical experiences where neuropsychological services were utilized (32.5%), didactics (31.8%), writing orders for neuropsychological evaluations (30.9%), and reading of the medical literature (28.8%).

**Table 1. Exposure to neuropsychology during residency by specialty\*.**

Forms of exposure	Neuro	Psych	FM	IM	Total
Any exposure	90%	97%	72%	59%	76%
Multiple lectures, seminars, or other didactic teaching	48%	59%	28%	9%	32%
A clinical rotation or other clinical experience in which neuropsychological services were ordered or utilized	40%	57%	24%	18%	33%
Writing orders/consultations for neuropsychological evaluations	36%	56%	23%	19%	31%
Reading of medical literature	30%	49%	21%	21%	29%
A single lecture, seminar, or other didactic teaching	12%	11%	20%	11%	14%
A clinical rotation or other clinical experience in which shadowing of a neuropsychologist occurred	16%	23%	8%	4%	11%
Other	2%	2%	0%	1%	1%

\*Neurology, Psychiatry, Family Medicine, Internal Medicine

Differences between specialties were found regarding the proportion of residents who ‘agree’ or ‘strongly agree’ that they understand the nature of services provided by a neuropsychologist ( $\chi^2 (3, N = 415) = 40.4, p < 0.001$ ). Pairwise comparisons found psychiatry (76.3%) and neurology (71.4%) residents more commonly agree or strongly agree that they “understand the nature of the services provided by a neuropsychologist” than family medicine (48.6%) and internal medicine (38.0%) residents ( $p < 0.01$ ), with the overall proportion of residents (55.0%) reporting they understand the nature and services provided by neuropsychology. Regardless, the majority of residents across specialties (85.7%) reported that they are likely to consult/order neuropsychological services when they practice independently, with psychiatry (95.9%), neurology (87.8%), family medicine (85.7%), and internal medicine (78.3%) agreeing, by specialty. Psychiatry residents indicated being more likely to consult neuropsychology than internal medicine residents ( $\chi^2 (1, N = 226) = 14.1, p < 0.001$ ), with other group differences being non-significant.

## DISCUSSION

The majority of residents from neurology, psychiatry, family medicine, and internal medicine residency programs were exposed to neuropsychology during residency through some combination of clinical experiences, didactics, writing orders/referring patients, and/or reading medical literature. That said, some residents reported having

no exposure to neuropsychology, with residents in internal medicine and family medicine, particularly, being less likely to be exposed than residents in psychiatry and neurology. This disparity in training experience is likely due to various factors. For one, psychiatry and neurology specialties are more likely to consult neuropsychology due to overlapping patient populations: both psychiatry and neurology specialties commonly evaluate and treat patients with dementia, mild cognitive impairment, stroke, traumatic brain injury, psychiatric disturbance, and delirium/encephalopathy. Patients with such conditions are more likely to be referred to neuropsychology to clarify diagnoses, identify salient personality and emotional features, assess capacity to make decisions, aid in treatment strategies, and provide guidance in potential placement. A previous study revealed that physicians in the acute inpatient hospital setting documented specific neuropsychological evaluation recommendations 68% of the time in discharge summaries, with placement outcomes consistent with explicit recommendations 80% of the time.<sup>5</sup> Second, academic medical centers are more likely to have neuropsychologists on faculty within neurology or psychiatry departments than other departments (e.g., family medicine). Thus, residents in psychiatry and neurology departments are more likely to interact both clinically and academically with neuropsychology faculty.

Unsurprisingly, the results indicated that residents within those specialties with more exposure to neuropsychology (i.e., neurology and psychiatry) were more likely to report understanding neuropsychological services than those residents within specialties reporting less exposure (i.e., family medicine and internal medicine). These findings would suggest that increasing exposure to neuropsychology via formal education or clinical practice might enhance residents' understanding of neuropsychological services.

An interesting finding of this study was that a greater proportion of residents indicated that they likely would refer to neuropsychologists than those who indicated that they understood the services provided by neuropsychologists. This was true both of the overall sample and for each specialty. This finding appeared to signify a couple of points: first, that the neuropsychology field is regarded positively even if not fully understood; and second, that residents across these four specialties believe they would have a need to utilize neuropsychology services in practice. Despite this finding, successful utilization of any clinical diagnostic service, including neuropsychology, likely requires some understanding of how that service can enhance patient care and for which patient groups the service is appropriate. Thus, the finding that less than 50% of internal medicine and family medicine residents reported that they understand the nature of the services provided by neuropsychology could portend poor utilization of neuropsychological services despite residents indicating that they would likely refer.

When combined, the findings suggested a need and potential opportunity to increase knowledge of neuropsychological services

in residencies within family medicine and internal medicine by increasing exposure. It is likely important that family medicine and internal medicine residents understand neuropsychological services given that primary care physicians are commonly first-line providers when patients first experience cognitive and psychiatric symptoms.<sup>1</sup> Further, previous research indicated that when primary care physicians refer patients for neuropsychological services, the vast majority find the evaluations to be helpful.<sup>3,4</sup> Given the demonstrated significance of neuropsychological services in family medicine and internal medicine care, the current findings suggested that exposure to neuropsychology should be increased in family medicine and internal medicine residencies. The various formats of exposure noted in this survey study could serve as a guide for residency programs for how further education regarding neuropsychological services might be provided.

There are several limitations in this survey study. Although we sought to determine and contact an inclusive list of residency program directors, there was no means of determining how many program directors forwarded the survey to their residents. Of the residents who received the survey, there was no way of knowing how many opened the email and were aware of the survey. This approach was utilized to increase the overall number of respondents; however, the number of residents who saw the survey email but neglected to respond is unknown, which precludes calculation of a response rate. Additionally, the possibility that the results were impacted by selection bias cannot be excluded. For example, program directors more familiar with neuropsychology or with specific perceptions of neuropsychology might have been more likely to forward the survey and encourage residents to complete it. Similarly, it is possible that residents already familiar with neuropsychological services were more likely to complete the survey than those with less experience or with less favorable opinions.

## CONCLUSIONS

While the majority of residents in all specialties reported being exposed to neuropsychological services in some manner, specific types of exposure varied. Results indicated an increased need for specific types of education and training in neuropsychological services, especially within family medicine and internal medicine programs where residents less clearly understand the use of neuropsychological services. Interestingly, despite not having a clear understanding of neuropsychological services, the majority of these residents still agreed that they would utilize them in future practice.

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