

Psychiatry Resident and Program Director Perceptions of Neuroscience

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Abstract The goal of this survey was to gain an understanding of perceptions and experiences of neuroscience for psychiatry residents. We administered a 30-item online survey. One hundred and nineteen participants responded, allowing for a margin of error of 8.4% at a 95% confidence interval. Half of respondents felt they were receiving adequate training in neuroscience (48%), with most reporting opportunities to participate in neuroscientific research (64.6%). However, few felt prepared to translate neuroscientific findings into practice (33%). Almost half of the participants indicated that the Royal College should develop a specific neuroscience curriculum (46%). These findings are subject to limitations inherent in survey studies, including possible bias of who responds and how responses are based off the participant's perception of their own training environment, and the intent of the questions in the survey. Overall, findings support the idea that changes are needed to improve neuroscience literacy among residents in psychiatry.

Keywords Curriculum · Neuroscience Research · Residents · Survey

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Introduction

Neuroscience and psychiatry are becoming increasingly intertwined. Efforts to bring neuroscience to bear require that training prepare residents in psychiatry to understand, evaluate, and apply neuroscientific findings and methods [1]. While enthusiasm for neuroscience is present among residents and other stakeholders [2, 3], concerns regarding the capacity of training programs to deliver quality neuroscience instruction on translating future neuroscience research findings into clinical practice exist [4]. In the USA, many chief residents felt that the Accreditation Council for Graduate Medical Education (ACGME) should require a specific neuroscience curriculum [4]. A recent survey of the USA of psychiatry residency program directors found concerns regarding the capacity to institute a rigorous neuroscience training program, due to a lack of neuropsychiatry and neuroscience faculty, despite believing that neuroscientific knowledge was critical to the provision of clinical care [5].

To improve neuroscience literacy and begin to change the culture of psychiatry, we must understand the local context and current understanding and perceptions of neuroscience among residents and program directors in psychiatry. Building off the study of chief residents by Bennett et al. [4], the goal of this survey was to gain an understanding of what the standard of practice is for neuroscience training for psychiatry residents across Canada.

Materials and Methods

The survey was adapted from previous studies [4] and uploaded on Survey Monkey in English and French. Requests to participate were sent to program directors ($N = 17$ for general psychiatry and $N = 12$ for subspecialty

Table 1 Demographics of sample

| | | | | | | |
|-----------------------------|------------|----------------------|------------|------------|------------|-----|
| Number of program directors | | | | | | 16 |
| Number of residents | | | | | | 103 |
| Year in training | First | Second | Third | Fourth | Fifth | |
| Residents | 25 (24.3%) | 21 (20.4%) | 15 (14.6%) | 24 (23.3%) | 18 (17.5%) | |
| Subspecialty if applicable | General | Child and adolescent | Geriatric | Forensic | Undecided | |
| Respondents | 54 (46.2%) | 27 (23.1%) | 5 (4.3%) | 8 (6.8%) | 23 (19.7%) | |

in child and adolescent psychiatry) and residents ($N \sim 893$) across Canada. Program directors passed along the survey link to their residents, and residents also passed the link to their peers. Responses were collected over 3 months. Program directors were determined from the Royal College of Physicians and Surgeons of Canada website ($N = 17$ and 12; as of June 2016—<http://www.royalcollege.ca/portal/page/portal/rc/credentials/accreditation/arps/specialty/psychiatry>). The Royal College is the official overseer for residency training programs in Canada, and as such, the list is comprehensive.

Participants logged onto the survey site and after presentation of the study information sheet decided to participate (or not). Participation assumed consent. The survey took less than 20 min. Subjects provided their email for a gift card draw (\$25). The Conjoint Health Research Ethics Board (CHREB) of the University of Calgary provided ethical approval for this study.

When possible, program directors and residents are compared directly using a non-parametric independent sample median test. To correct for multiple comparisons, significance was set at $p < 0.002$. Missing cells were excluded from percentage calculation (six surveys had incomplete data).

Results

One hundred and nineteen participants answered the survey (16 program directors, 103 residents). With an overall population of $N \sim 922$, that allows for a margin of error of 8.4% at a 95% confidence interval. Among the residents, 24.3% were in first year, 20.4% in second, 14.6% in third, 23.3% in fourth, and 17.5% in fifth. Almost half of respondents indicated they were not pursuing a subspecialty, followed by child and adolescent, forensic, and geriatric, with 23 residents undecided at the time of the survey. See Table 1.

Almost half of the respondents felt that they were receiving adequate training in neuroscience. Only a third of respondents felt their program prepared them for translating future neuroscience findings into clinical practice. Responses to these questions did not differ between program directors and residents. See Table 2.

Two thirds of respondents felt they had opportunities to participate in neuroscientific research. Most residents felt their training program prepared them for the evaluation and management of neuropsychiatric conditions (69.3%). Similar numbers reported access to specialized neuropsychiatric clinics in their programs (63.2%). However, a majority reported not having joint interdisciplinary case conferences between psychiatry and neurology (34.2%), though most respondents felt they were trained in integrating concepts of psychiatry and neurology (53.5%). Almost half (45.1%) felt they received training in the neurobiological formulation of cases. Most felt trained in how stress can affect physical health and psychological function (86.6%), in the underlying neurobiology of psychiatric disorders (83.9%), and in the complexity of the brain (73.2%). When asked if their training prepared them to understand advances in molecular genetics in psychiatry, most felt it did not (47.4%); see Table 3. Responses to these questions did not differ between program directors and residents.

Slightly less than half reported that the Royal College should require specific neuroscience curriculum for psychiatry training programs (46.0%). In a similar question, 46.9% felt that their program needed to change its clinical curriculum to conform to the future needs of trainees and the field of psychiatry, incorporating the findings of neuroscience research. Of participants, 40.2% felt the culture of psychiatry needs to change to one based more in neuroscience. See Fig. 1. Responses to these questions did not differ between program directors and residents.

Adequate training in imaging was also rare. A majority of participants (65.2%) indicated no training in principles and

Table 2 Training and translation in neuroscience

| Query | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|--|-------------------|------------|------------|------------|----------------|
| Does your program have adequate training in neuroscience? | 3 (2.6%) | 16 (14.0%) | 40 (35.1%) | 45 (39.5%) | 10 (8.8%) |
| Does your program adequately prepare you for translating future neuroscience research findings into clinical practice? | 2 (1.8%) | 24 (21.2%) | 50 (43.9%) | 29 (25.4%) | 9 (7.9%) |

Table 3 Training in neuroscience

| Query | Yes | No | Do not know |
|---|------------|------------|-------------|
| Do you have opportunities to participate in neuroscience research? | 73 (64.6%) | 15 (13.3%) | 25 (22.1%) |
| Does your program train you in evaluation and management of neuropsychiatric conditions? | 79 (69.3%) | 17 (14.9%) | 18 (15.8%) |
| Does your program have specialized clinics for patients with neuropsychiatric conditions | 72 (63.2%) | 25 (21.9%) | 17 (14.9%) |
| Does your program provide interdisciplinary case conferences in Psychiatry and Neurology? | 37 (34.2%) | 51 (45.1%) | 25 (20.7%) |
| Does your program education prepare you to integrate concepts of neurology and psychiatry? | 61 (53.5%) | 35 (30.7%) | 18 (15.8%) |
| Does your program provide training in neurobiological formulations of cases? | 50 (45.1%) | 23 (20.7%) | 38 (34.2%) |
| Does the program teach how stress can affect physical health and psychological function? | 97 (86.6%) | 11 (9.8%) | 4 (3.6%) |
| Is the underlying neurobiology of psychiatry disorders taught? | 94 (83.9%) | 12 (10.7%) | 6 (5.4%) |
| Is the complexity of the brain explored (i.e., brain development, are residents taught that there may be multiple pathways to disease and treatment)? | 82 (73.2%) | 17 (15.2%) | 13 (11.6%) |
| Does your program prepare you to understand advances in molecular genetics in psychiatry? | 26 (22.8%) | 54 (47.4%) | 34 (29.8%) |

interpretation of position emission tomography (PET). A majority of respondents reported no training in principles and interpretation of single-photon emission computed tomography (SPECT) (75.2%). Magnetic resonance imaging (MRI) fared best with 56.0% indicating training in principles and interpretation of MRI data. Functional MRI was next with 40.9% reporting training. For magnetic resonance spectroscopy and diffusion tensor imaging, 82.0 and 81.8% of participants, respectively, reported no training. See Table 4. Only 11.6% indicated being educated on the research domain criteria, while 35.7% reported they had not heard of it before. Responses to these questions did not differ between program directors and residents. See Table 4.

An overwhelming majority of participants indicated training in electroconvulsive therapy (94.6%). This was followed with over a third indicating training in transcranial magnetic stimulation (38.7%). Finally, 28.2% indicated familiarity with deep brain stimulation and 16.2% indicated experience with vagal nerve stimulation. Responses to these questions did not differ between program directors and residents. See Table 5.

Discussion

Canadian residents and program directors in psychiatry were less confident about the adequacy of training in neuroscience

Fig. 1 Percent (%) responses to the questions: (1) Should the Royal College require a specific neuroscience curriculum for psychiatry training programs?, (2) Do you feel that your program needs to change its curriculum to conform to the future needs of trainees—incorporating the findings of neuroscience research?, and (3) Does the culture of psychiatry need to change to one more based in neuroscience?

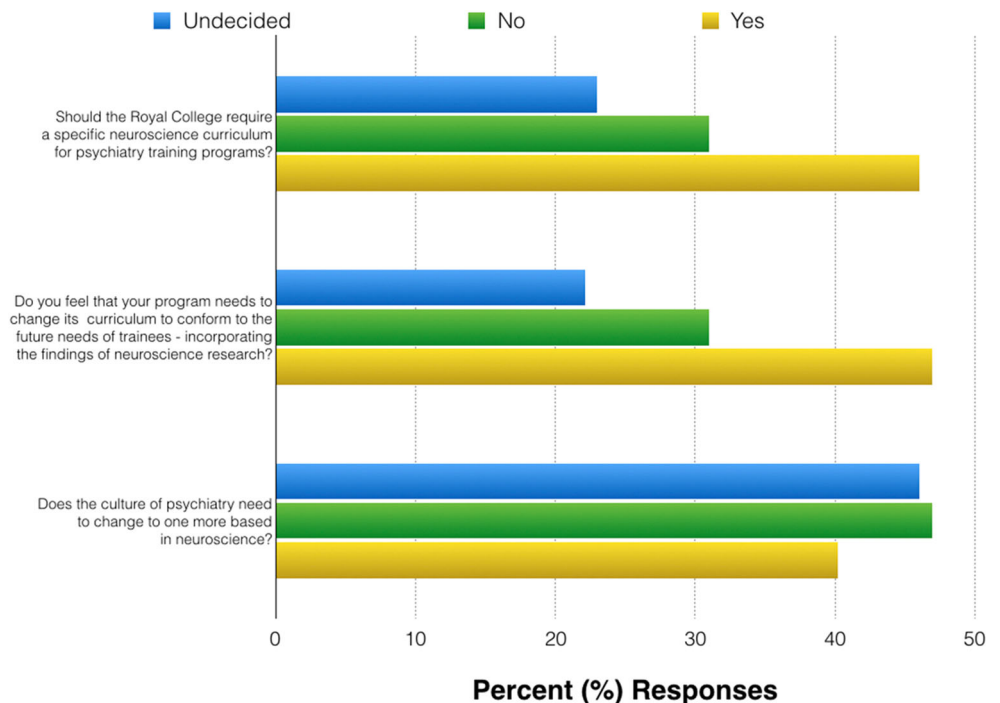


Table 4 Training in specific neuroscientific techniques

| Query | Yes | No |
|---|------------|------------|
| Does your program train you in the principles and interpretation of positron emission tomography (PET)? | 39 (34.8%) | 73 (65.2%) |
| Does your program train you in the principles and interpretation of single photon emission computed tomography (SPECT)? | 27 (24.8%) | 82 (75.2%) |
| Does your program train you in the principles and interpretation of magnetic resonance imaging (MRI)? | 61 (56.0%) | 48 (44.0%) |
| Does your program train you in the principles and interpretation of magnetic resonance spectroscopy (MRS)? | 20 (18.0%) | 91 (82.0%) |
| Does your program train you in the principles and interpretation of functional magnetic resonance imaging (fMRI)? | 45 (40.9%) | 65 (59.1%) |
| Does your program train you in the principles and interpretation of diffusion tensor imaging (DTI)? | 20 (18.2%) | 90 (81.8%) |

as compared to their counterparts in the USA (48 vs. 61.8% positive) [4]. Like the findings in the Bennett et al. [4] study, a similar percentage of Canadian residents felt the Royal College should require a specific neuroscience curriculum. Akin to Bennett et al. [4], only a minority of Canadian residents will be adequately educated in areas where translation of neuroscientific research into practice is likely (i.e., molecular genetics, transcranial magnetic stimulation, deep brain stimulation, and vagus nerve stimulation). Aside from basic MR imaging, only a minority reported adequate training in neuroimaging methods. Most participants felt their training and access to neuropsychiatric clinics were adequate, but fewer reported true integration with neurology. The division between neurology and psychiatry has been called “arbitrary and counterproductive” [6]. Research in neurology and psychiatry are converging in the tools they use (i.e., imaging and genetics), the questions they ask, and the theoretical frameworks they employ under the overall construct of neuroscience [6]. This may be considered controversial by some, but the convergence is occurring nonetheless.

Changes in research approaches in psychiatry have not translated into educational practice. The lack of knowledge regarding the “research domain criteria” effort by the National Institutes of Mental Health (NIMH) [7] is a concern because research takes up this framework, and therefore, interpreting studies will become increasingly difficult for clinicians.

Limitations include that as a survey responses are based off the participant’s perception of their training environment and the intent of the questions. In addition, the low response rate for residents and program directors can introduce bias. However, our margin of error of 8.4% at a 95% confidence interval is in keeping with similar surveys. Comparing program directors directly to residents is of great interest and has

been done previously [8]; our study did not demonstrate any significant differences between these two groups.

Programs are needed to improve neuroscience literacy among residents in psychiatry. The NIMH has developed programs like the Outstanding Resident Award Program and NIMH Brain Camp to address these shortcomings in the USA [9]. A significant obstacle is that the residency program is already congested. Model programs aimed at increasing neuroscience literacy in residents need to be developed and tested for efficacy and ease of use. Specific curriculum changes have been drafted but not tested in the field to date [10]. In addition to programs, current faculty would potentially require additional training to deliver new content.

Conclusions

We feel that this study provides a vital window into how residents and program directors perceive neuroscience and its current status in their training. Given the findings detailed above, the field of psychiatry is in danger of creating consumers of neuroscience and not clinician scientists who can provide the advances the field requires [11, 12]. Curriculum reform is needed to improve neuroscience literacy to allow trainees to evolve in tandem with the field of psychiatry as a whole. While the impact of neuroscience on clinical psychiatry to date is limited, the clinical impact of current therapies has been restricted as well. Effective treatments are needed, and novel approaches need to be employed to develop them [13–16]. A sound neuroscientific approach—as it does not exclude the foundation on which current psychiatry has been built—offers such a path forward.

Table 5 Training in brain stimulation techniques

| Query | Yes | No |
|---|-------------|------------|
| Does your program train you in electroconvulsive therapy (ECT)? | 106 (94.6%) | 6 (5.4%) |
| Does your program train you in transcranial magnetic stimulation (TMS)? | 43 (38.7%) | 68 (61.3%) |
| Does your program train you in vagal nerve stimulation? | 18 (16.2%) | 93 (83.8%) |
| Does your program train you in deep brain stimulation (DBS)? | 31 (28.2%) | 79 (71.8%) |

Compliance with ethical standards The Conjoint Health Research Ethics Board (CHREB) of the University of Calgary provided ethical approval for this study.

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