

# Interest in and exposure to headache disorders among neurology residents in Denmark: A nationwide cross-sectional survey

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**Objective:** Headache disorders constitute a leading cause of disability worldwide, but there is a consistent absence of awareness and educational activities for healthcare providers across regions. Thus, we found it timely to identify potential structural challenges and factors that may affect acquisition of knowledge of headache disorders and their management during their 4-year residency.

**Materials & Methods:** We conducted a nationwide cross-sectional survey of residents in neurology in Denmark including, but not limited to, questions on interest in neurological subspecialties and disorders, adequacy of training in headache disorders, exposure to headache disorders during training including time spent on headache disorders, exposure to specialist outpatient clinics, whether their hospital have a tertiary headache clinic, training in specific procedures (anesthetic blockade, e.g., greater occipital nerve blockade, and onabotulinumtoxinA for headache), and an estimate of proportion of cases with headache among patients managed in the last week.

**Results:** The survey was distributed to 127 residents in Denmark between March 2022 and April 2022. Of these, 59 (47%) completed all questions of the survey. Headache disorders were the fourth most popular subspecialties among respondents ( $n = 15$  [25%]) following movement disorders ( $n = 27$  [46%]), vascular neurology ( $n = 26$  [44%]), and neuromuscular disorders ( $n = 25$  [42%]). The mean number of hours spent in a course or a structured educational activity in headache disorders during residency was 12.1 h. Half of respondents ( $n = 27$  [46%]) reported that they perceived their training in headache disorders to be inadequate.

**Conclusions:** Even in Denmark, a country with excellent headache services, half of residents in neurology report an inadequate training despite a higher-than-average number of hours of structured educational activities. These findings should incentivize stakeholders to make structural changes to improve education in headache disorders during the most fundamental years of training.

## KEYWORDS

barrier, education, headache, medication overuse, migraine, residency, tension-type headache, training

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## 1 | INTRODUCTION

Headache disorders constitute a leading cause of disability worldwide.<sup>1</sup> Regardless, there is a consistent absence of awareness and educational activities for healthcare providers across regions.<sup>2</sup> In fact, the shortage of formal education of healthcare providers is considered one of the largest barriers to adequate care in both wealthy nations and low- and middle-income countries.<sup>2,3</sup> On average, only 4 h are dedicated to headache disorders in undergraduate medical education and postgraduate educational activities do not fare better.<sup>3</sup>

Denmark is considered to have one of the longest traditions of headache care in the world, but even here, barriers and gaps in headache education are identified among residents in neurology with several of these being at a structural level.<sup>4</sup> These challenges are most likely structural. Indeed, residents are expected to acquire expertise about headache disorders through clinical experience and self-study without any dedicated or formalized requirement of hours in specialist outpatient clinics,<sup>5</sup> which allows for knowledge and experience gaps during fundamental training years. Deficiencies related to headache disorders during residency are generally not corrected post-graduation,<sup>6</sup> which underlines the need for structural educational activities during early training. Thus, we found it timely to identify potential structural challenges and factors that may affect acquisition of knowledge of headache disorders and their management during 4-year residency.

## 2 | METHODS

### 2.1 | Overview

We conducted a nationwide cross-sectional survey of residents in neurology in Denmark. Conducting surveys is subject to exemption from processing at the National Committee on Health Research Ethics in Denmark. All methods were carried out in accordance with the Declaration of Helsinki. We handled survey data confidentially and maintained anonymity of respondents throughout the study.

### 2.2 | Questionnaire

The questionnaire was a modified translation of a Spanish survey conducted in 2016.<sup>7</sup> The survey was designed by the Executive Board of the Headache Study Group of the Spanish Neurological Society. Two authors (M.G.H.K. and F.M.A.) carried out the translation with support

by the senior author of the original Spanish survey (P.P.-R.). The original survey consisted of 15 items; in the modified translation, we included 21 items covering demographical information (year of graduation, year of start of residency, region of education), interest in neurological subspecialties and disorders, interest in headache disorders, interest in headache research, prior participation in headache research, and whether they perceived headache disorders to be underestimated. Furthermore, we inquired on adequacy of training in headache disorders, exposure to headache disorders during training including time spent on headache disorders, exposure to specialist outpatient clinics, whether their hospital have a tertiary headache clinic, training in specific procedures (anesthetic blockade, e.g., greater occipital nerve blockade, and onabotulinumtoxinA for headache), and an estimate of proportion of cases with headache among patients managed in the last week. A full overview of questions is provided in Appendix S1.

### 2.3 | Surveys

Training in neurology is categorized into a 1-year introduction program and a 4-year residency program (1st, 2nd, 3rd, and 4th year). Surveys were circulated to residents in the main program to three regions in Denmark (North, South, and East). In East, one author (M.G.H.K.) distributed the questionnaire. In North and South, the organization *Lægelig Videreuddannelse (Medical Further Education)*, an organization that deals with all matters relating to postgraduate educational activities, distributed the survey directly to residents in neurology in their respective regions.

### 2.4 | Statistical analysis

We performed descriptive analyses of the data in Microsoft Excel, version 2103 (16.0.13901.20400)/April 13, 2021. We present data as frequencies, means with standard deviations (SD) or medians with interquartile range (IQR).

## 3 | RESULTS

### 3.1 | Study population

The survey was distributed to 127 residents in Denmark between March 2022 and April 2022. Of these, 59 (47%) completed all questions of the survey (Table 1); 27 (46%) were in the 1st year, 13 (22%)

TABLE 1 Respondent demographics

|       | All residents,<br>n = 127 | Respondents,<br>n = 59 (46%) | 1st year,<br>n = 27 | 2nd year,<br>n = 13 | 3rd year,<br>n = 8 | 4th year,<br>n = 11 | Median (IQR) time between<br>graduation and start of residency |
|-------|---------------------------|------------------------------|---------------------|---------------------|--------------------|---------------------|--|
| East  | 62 (49%)                  | 37 (60%)                     | 18                  | 8                   | 3                  | 8                   | 57 (45-97) months  |
| North | 37 (29%)                  | 11 (30%)                     | 4                   | 2                   | 3                  | 2                   | 68 (53-117) months   |
| South | 28 (22%)                  | 11 (39%)                     | 5                   | 3                   | 2                  | 1                   | 38 (35-86) months  |

were in the 2nd year, 8 (14%) were in the 3rd year, and 11 (19%) were in the 4th year of their residency. The distribution of respondents was 37 (60%) in Region East, 11 (30%) in Region North, and 11 (39%) in Region South. Mean time between graduation year and start of residency was 79.6 ( $\pm 62.4$ ) (median: 58, IQR: 43-98) months.

### 3.2 | Interest in neurological sub-specializations and headache disorders

Respondents were mostly interested in movement disorders ( $n = 27$  [46%]), vascular neurology ( $n = 26$  [44%]), and neuromuscular disorders ( $n = 25$  [42%]) (Table 2). Headache disorders were the fourth most popular sub-specialization among respondents ( $n = 15$  [25%]). The overall interest was consistent across year of residency (Table 2). The number of respondents interested in headache disorders was 9 (24%) of those in Region East, 2 (18%) of those in Region North, and 4 (36%) of those in Region South.

Of the 15 respondents who reported an interest in headache disorders, the primary reasons for interest were the prevalence ( $n = 11$  [73%]) and treatment options ( $n = 11$  [73%]) followed by research ( $n = 8$  [53%]) and diagnosis ( $n = 8$  [53%]). No residents chose the option "Other reasons."

### 3.3 | Perception of and participation in headache research

Two-thirds of respondents ( $n = 35$  [59%]) believed that a sufficient amount of headache research is being conducted,  $n = 10$  (17%) reported that not enough headache research is being conducted, and  $n = 14$  (24%) reported too much headache research is being conducted.

Half of respondents had no ( $n = 18$  [31%]) or only very little interest ( $n = 12$  [20%]) in headache research, 13 (22%) were indifferent

towards headache research, and 10 (17%) had some interest or were very interested ( $n = 6$  [10%]) in headache research. Most of respondents ( $n = 53$  [90%]) had never presented headache-related data at a scientific conference; likewise, most respondents ( $n = 53$  [90%]) did not have any prior headache research publications. A minority of respondents ( $n = 10$  [17%]) were involved in a research project related to headache.

### 3.4 | Undervaluation of headache

Half of respondents ( $n = 28$  [48%]) reported that they believed the field of headache disorders to be undervalued (not valued or appreciated highly enough).

### 3.5 | Training in headache disorders and exposure to patients

The mean number of hours spent in a course or a structured educational activity in headache disorders during residency was 12.1 ( $\pm 12.9$ ) h (median: 8, IQR: 5-16).

Half of respondents ( $n = 27$  [46%]) reported that they perceived their training in headache disorders to be inadequate. The remaining respondents ( $n = 32$  [54%]) considered their training in headache disorders to be adequate; reasons reported, 7 (22%) because they had participated in the mandatory course in headache disorders in the main residency program, 15 (47%) because there is a headache unit at their training hospital, and 10 (31%) due to self-education.

Two-thirds of respondents ( $n = 39$  [66%]) were currently enrolled in a program at a hospital with specialized headache units or outpatient clinics. One-third reported ( $n = 22$  [37%]) that a rotation in headache units/clinics was mandatory during their stay, 8 (14%) reported there was an elective option for a clinical rotation, and half

|                            | All respondents<br>( $n = 59$ ) | 1st year<br>( $n = 27$ ) | 2nd year<br>( $n = 13$ ) | 3rd year<br>( $n = 8$ ) | 4th year<br>( $n = 11$ ) |
|----------------------------|---------------------------------|--------------------------|--------------------------|-------------------------|--------------------------|
| Movement disorders         | 27 (46%)                        | 15 (56%)                 | 5 (39%)                  | 4 (50%)                 | 3 (27%)                  |
| Vascular neurology         | 26 (44%)                        | 11 (41%)                 | 8 (62%)                  | 2 (25%)                 | 5 (46%)                  |
| Dementia                   | 11 (19%)                        | 4 (15%)                  | 3 (23%)                  | 1 (13%)                 | 3 (27%)                  |
| Multiple sclerosis         | 9 (15%)                         | 5 (19%)                  | 3 (23%)                  | 1 (13%)                 | 0                        |
| Headache                   | 15 (25%)                        | 8 (30%)                  | 6 (46%)                  | 0                       | 1 (9%)                   |
| Epilepsy                   | 12 (20%)                        | 5 (19%)                  | 2 (15%)                  | 3 (38%)                 | 2 (18%)                  |
| Peripheral nerve disorders | 9 (15%)                         | 2 (7%)                   | 3 (23%)                  | 2 (25%)                 | 2 (18%)                  |
| Neuromuscular disorders    | 25 (42%)                        | 10 (37%)                 | 5 (39%)                  | 6 (75%)                 | 4 (36%)                  |
| Other                      | 8 (14%)                         | 3 (11%)                  | 0                        | 3 (38%)                 | 2 (18%)                  |
| Undecided                  | 2 (3%)                          | 1 (4%)                   | 0                        | 0                       | 1 (9%)                   |

TABLE 2 Respondents in neurological subspecialties

Note: An overview of number and proportion of respondents who found specific subspecialties interesting.

( $n = 29$  [49%]) reported there was no designated rotational scheme involving these units/clinics. Of those respondents who did not have an elective option or mandatory stay, 8 (14%) had tried to actively request hours in these units/clinics.

One-third of respondents ( $n = 22$  [37%]) did not have the option to be trained in anesthetic blocks or onabotulinumtoxinA injections for headache treatment, one-fourth ( $n = 16$  [27%]) had the option to be trained in both procedures, four (6.8%) had the option to be trained in only onabotulinumtoxinA injections, none reported that they had the option to be trained in only anesthetic blocks, and one-fourth ( $n = 16$  [27%]) reported that they did not know whether their department offered training in either options.

The mean number of consultations for headache were 5.3 ( $\pm 6.3$ ) (median: 4, IQR: 1-7) visits in the past 7 days prior to inquiry and constituted a mean proportion of 15.4% ( $\pm 17.7$ ) (median: 10, IQR: 5-20) of all consultations.

## 4 | DISCUSSION

In this nationwide cross-sectional survey of neurology residents in Denmark, half of respondents reported that they found their training in headache disorders inadequate. *The European Union of Medical Specialists* recommended that trainees should be confident in and able to make a complete diagnosis and optimize treatment within the first 2 years of training,<sup>8</sup> yet this does not appear to be the case here. Unfortunately, these findings are not unique.<sup>9</sup>

There is a limited number of training hours during residency, which emphasizes the need for a structured educational program. Our findings are despite an average of ~12 h spent on structured training in headache disorders, which is higher than the international average.<sup>3</sup> This suggests that the time spent on structural educational activities for headache disorders should be higher—perhaps much higher—than what is the national and international norm. While this cannot be concluded on the basis of our data, the overall lack of interest in headache disorders (only one-fourth found headache disorders interesting) and lack of participation in headache research activities may contribute to these findings. Surveys conducted in other parts of Scandinavia and Europe report similar findings, which suggests that an overall lack of interest in headache disorders is not an isolated Danish phenomenon, but extends to other regions.<sup>7,10,11</sup> Of note, while the Danish Headache Center (a global leading institute in the field) is located in Region East, the proportion of respondents with an interest in headache disorders appeared to be similar here compared with other regions.

The finding that half of respondents reported their training in headache disorders to be inadequate is in line with reports from departmental chairs. Two-thirds of neurology chairs and resident directors in a survey conducted in the United States reported that they found headache education inadequate or did not have an opinion.<sup>9</sup> As such, the perception of inadequacy is not only abundant among residents, but also an opinion shared among those responsible for

their training. For those respondents who reported adequate training, in most cases, it was either because they had attended the only mandatory course in headache disorders during residency or because there was a headache unit in their training hospital. This emphasizes that exposure to headache disorders is important. Interestingly, implementation of a mandatory rotation in a specialized outpatient headache clinic has previously been shown to improve deficiencies.<sup>12,13</sup> While one-third of respondents reported that such a rotation was mandatory at their training hospital, these findings should incentivize a rotation in a headache unit to be a mandatory part of all residency programs in neurology. Assumingly, such an intervention would improve the overall knowledge of headache disorders which would benefit patients and improve clinical care. This is especially important considering emerging disease-specific treatments, which requires appropriate diagnosis and adequate follow-up.

## 5 | STRENGTHS AND LIMITATIONS

About half of potential respondents accepted the invitation and completed the survey; this sampling method most likely introduced a selection bias towards residents who were more interested in headache disorders, and presumably, most likely to report a higher knowledge level. In turn, this means the knowledge level among the general population of residents in neurology is more likely lower than in our sample. The number of hours of structural educational activities related to headache through the course of a residency in neurology may be underestimated due to our sampling method; several respondents were not in the last part of their residency and may first participate in these activities at a later stage.

## 6 | CONCLUSIONS

Even in Denmark, a country with a tradition and history of excellent headache services, half of residents in neurology report lack of knowledge, an inadequate training despite a higher-than-average number of hours of structured educational activities, and a latent interest in this neurological subspeciality. These findings should incentivize stakeholders to make structural changes to improve education in headache disorders during the most fundamental years of training to improve clinical care.

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None.

## CONFLICT OF INTEREST


Malene Glavind Holmsted Kristensen reports no conflicts of interest. Thien Phu Do reports no conflicts of interest. Patricia Pozo-Rosich has received honoraria as a consultant and speaker for AbbVie, Amgen, Biohaven, Chiesi, Eli Lilly, Lundbeck, Medscape, Novartis, and Teva. Her research group has received research grants from AbbVie, Novartis, Teva, AGAUR, FEDER RIS3CAT,

la Caixa Foundation, Migraine Research Foundation, Instituto Investigación Carlos III, EraNet Neuron, International Headache Society, MICINN, PERIS; and has received funding for clinical trials from Alder, Biohaven, Electrocore, Eli Lilly, Lundbeck, Novartis, and Teva. She is the Honorary Secretary of the Executive Board of the International Headache Society. She is in the editorial board of *Revista de Neurologia*. She is an associate editor for *Cephalalgia*, *Frontiers of Neurology*, *Headache*, *Neurologia* and a scientific advisor of *The Journal of Headache and Pain*. She is a member of the Clinical Trials Guidelines Committee of the International Headache Society. She has edited the Guidelines for the Diagnosis and Treatment of Headache of the Spanish Neurological Society. She was the Coordinator of the Headache Study Group of the Spanish Neurological Society from 2014–2018. She is the founder of [www.midolordecabeza.org](http://www.midolordecabeza.org). PPR does not own stocks from any pharmaceutical company. Faisal Mohammad Amin has received honoraria and personal fees from Teva, Lundbeck, Novartis, Eli Lilly for lecturing or participating in advisory boards.

#### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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#### SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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