

Reason for referrals to neurology: a community-based study in Brazil

Motivos de derivación a neurología: un estudio de base comunitaria en Brasil

Motivos de encaminhamentos para neurologia: um estudo de base comunitária no Brasil

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ABSTRACT

Objective: to quantify the reasons for referrals of primary care physicians to neurology in Belo Horizonte, Brazil. **Method:** cross-sectional study evaluating referrals from Primary Care to the specialty of Neurology in Belo Horizonte, registered in the NOVO SISREG regulatory system, from March 2019 to July 2020. Neurologists or family physicians from the Regula Mais Brasil project, with experience in referral protocols for neurology, carried out the evaluation of the main diagnoses. **Results:** 13,844 referrals to neurology were identified, with an average of 814.35 referrals per month. Headache, epilepsy and cerebrovascular disorders were the most common reasons, accounting for 55.5% of referrals. Other neurological conditions identified less frequently were parkinsonism, tremor, syncope and vertigo, responsible for 10.9% of referrals. **Conclusion:** most referrals did not prioritize only neurology expertise. It is possible that cultural aspects and the routine of physicians, health services and the community itself determined these referrals, raising awareness about the high demand, waiting time and possible clinical conditions that are soon ceasing to be managed by other specialties that also share these skills.

Descriptors: Neurology; Referral and Consultation; Effective Access to Health Services; Public Health.

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RESUMEN

Objetivo: *cuantificar los motivos de derivación de médicos de atención primaria a neurología en Belo Horizonte, Brasil. Método:* estudio transversal que evaluó las derivaciones de la Atención Primaria a la especialidad de Neurología en Belo Horizonte, registradas en el sistema regulatorio NOVO SISREG, de marzo de 2019 a julio de 2020. *Neurólogos o médicos de familia del proyecto Regula Mais Brasil, con experiencia en protocolos de derivación para neurología, realizó la evaluación de los principales diagnósticos. Resultados:* se identificaron 13.844 derivaciones a neurología, con una media de 814,35 derivaciones al mes. La cefalea, la epilepsia y los trastornos cerebrovasculares fueron los motivos más frecuentes, representando el 55,5% de las derivaciones. Otras condiciones neurológicas identificadas con menor frecuencia fueron parkinsonismo, temblor, síncope y vértigo, responsables del 10,9% de las derivaciones. **Conclusión:** la mayoría de las referencias no priorizaron solo la experiencia en neurología. Es posible que los aspectos culturales y la rutina de los médicos, los servicios de salud y la propia comunidad determinaran estas derivaciones, concientizando sobre la alta demanda, tiempo de espera y posibles cuadros clínicos que pronto están dejando de ser manejados por otras especialidades que también comparten estas habilidades.

Descriptor: Neurología; Derivación y Consulta; Acceso Efectivo a los Servicios de Salud; Salud Pública.

RESUMO

Objetivo: *quantificar os motivos de encaminhamentos de médicos da Atenção Primária para neurologia em Belo Horizonte, Brasil. Método:* estudo transversal com avaliação de encaminhamentos da Atenção Básica para especialidade de Neurologia em Belo Horizonte, registrados no sistema de regulação NOVO SISREG, no período de março de 2019 a julho de 2020. *Neurologistas ou médicos de família do projeto Regula Mais Brasil, com experiência em protocolos de encaminhamentos para neurologia, realizaram a avaliação dos principais diagnósticos. Resultados:* foram identificados 13.844 encaminhamentos para neurologia, com uma média de 814,35 encaminhamentos por mês. Cefaleia, epilepsia e distúrbios cerebrovasculares foram os motivos mais comuns, representando 55,5% dos encaminhamentos. Outras condições neurológicas identificadas em menor frequência foram o parkinsonismo, tremor, síncope e vertigem, responsáveis por 10,9% dos encaminhamentos. **Conclusão:** a maioria dos encaminhamentos não priorizou somente a expertise da neurologia. É possível que aspectos culturais e a rotina de médicos, serviços de saúde e da própria comunidade determinaram esses encaminhamentos, ascendendo alerta quanto a alta demanda, tempo de espera e possíveis condições clínicas que estão deixando de ser brevemente manejadas por outras especialidades que também compartilham dessas competências.

Descritores: Neurologia; Encaminhamento e Consulta; Acesso Efetivo aos Serviços de Saúde; Saúde Pública.

INTRODUCTION

Primary care was defined as the main form of access to the Brazilian health service, the Unified Health System (Sistema Único de Saúde - SUS),

in order to guarantee a structured and coordinated system, respecting the principles of universality, integrality and longitudinality of health care¹. Despite the resoluteness of primary care related to the main clinical conditions of the

population, referrals for evaluation of medical specialties can occur in the patient care process¹.

Due to the geographic heterogeneity of the care network, there are regions with a long waiting list for consultations in secondary and tertiary care in some medical specialties, such as neurology. We do not have specific data for the city of Belo Horizonte regarding waiting times for neurology queue, but in the city of Porto Alegre, in southern Brazil, the average waiting time for neurology consultation was 342 days in December 2018². In Chile as of June 30, 2019, 56,614 patients were waiting for their first appointment, and Neurology ranks 7th among Chilean medical specialties with patients awaiting your first query³.

Regarding the availability of neurologist specialists, in Brazil there are 5,779 neurologists, which represents 2.75 neurologists per 100,000 inhabitants and there are proportionally many more doctors available to users in the capitals compared to the interior, according to data from the Federal Council of Medicine (CFM) in 2020⁴.

In different scenarios, many referrals of patients to specialized care have no adequate information, there is no definition of priority level and no counter referral. As a consequence, referral processes frequently result in

lack of continuity of care and delays in health assistance^{5,6}. In Belo Horizonte, access to the specialized neurology consultation through the Unified Health System (SUS) occurs through the regulation of access on the NOVOSISREG platform with the request of the primary care physician for specialized follow-up. The referrals are carried out through the SISREG platform, SISREG - Sistema de Regulação e Marcação de Consultas, available at <https://novosisreg.pbh.gov.br/>, with a brief description of the clinical condition and definition of which specialty required. After this process of inclusion of the request, the referral request was evaluated by the local Regulatory Complex and relevant cases are scheduled for consultation. Consultations are offered on a regional basis, in specialty centers closer to the Unidade Básica de Saúde (UBS), allowing easy access to the patient.

Few studies, usually with a single neurological center sample, addressed the reason for referral to neurologists in Brazil. This study aimed to quantify the reasons for referrals of primary care physicians (PCP) to neurology in Belo Horizonte, Brazil.

METHOD

This is a cross-sectional *study* with data on referrals from Primary Care to the specialty of neurology available in SISREG platform and evaluated by the Regula Mais Brasil Project (RMB), a public project by Hospital Sirio-Libanês. It is financed through the Institutional Development Support Program of the Unified Health System (PROADI-SUS), which is a support program from some expertise hospitals to improve public health policies. The Ministry of Health and local public health authorities selected the project's operating regions. The physicians who answer the PCP demands are all employees of Hospital Sirio-Libanês, and the team physicians are composed of specialists and Family Physicians trained to referrals Primary Health Care (PHC) to Secondary Healthy Care.

According to the descriptive study by Mantese et al⁷ to referral a patient, the PCP must submit the case description via the online referral platform for reading and evaluation by a physician of the project. RMB has a service for PCPs to discuss cases with specialist support to decide whether referrals are appropriate and make a shared decision. Furthermore, they may discuss the management of the clinical cases in the primary care setting, being the patient referred for the specialist or not. The PCP has a final decision on

referrals, and all referrals to neurology are in non-emergency settings.

Among the cities where the project works, Belo Horizonte (BH) was selected because the regulatory medical team must fill a questionnaire with information about the reason for requesting a neurologist and classify the referral by grouping of syndromes or topography. All the referrals in the public sector must pass through this process. In the BH system, some follow-up consults pass through this process, however they were not analyzed. If a patient has two referrals to a neurologist, it was counted as two only if the reason were different. As an exclusion criterion in the study referrals from the supplementary health were not analyzed by our project. Referrals of patients under 12 years of age were referring to pediatric neurology according to the Belo Horizonte classification. If there were no information on referrals, it was not analyzed.

As inclusion criteria in the study all records of referrals from Primary Care in the Municipality of Belo Horizonte to the neurology specialty of the SUS were evaluated to classify the reason for referral according to clinical condition and, the reasons for referrals between March 2019 and July 2020 were grouping by syndrome or topography.

Some superposition could occur, so to minimize we set it as the main reason in referral or the basic cause. Some causes could not be addressed in the system, so it was classified as a symptom. If there was information on investigation it could be addressed as were its points. It was considered peripheral from anterior horn disorder to muscular plate. However, radiculopathy was classified as a spinal disorder if the referral contained cervical or lumbar pain or an image exam showing spinal disorder, if not, it was peripheral. If there was only mention of muscular pain or a direct muscular disorder, it was classified as muscular. Tremor and Parkinson disease had some over position, however some referrals were hard to distinguish among DP or essential tremor, so they were grouped. The incidence was calculated by the mean between two estimated total BH populations in 2019⁸ and 2020⁹, it was 2,516,848 residents.

Informed consent was waived because the ethics committee judges that the project has as intervention the modification in the regulation process and does not harm the patient's autonomy. The RMB project has been approved by Hospital Sírio-Libanês

ethical committee, under the identifier CAAE 28453420.5.0000.5461.

RESULTS

Thirteen thousand eight hundred forty-four unique referrals, from 13.756 patients, were analyzed between March 2019 and August 2020. There were 8207 (59.3%) female patients referrals and 5637 (40.7%) male patients referrals. Mean age was 50 (± 19.45) years old. There was a mean of 814.35 referrals per month.

The reasons for referrals were demonstrated in Table 1, and headache, epilepsy and cerebrovascular disorder were the most common reasons, representing 55,5% of referrals. Other neurological conditions identified less frequently were parkinsonism, tremor, syncope and vertigo, responsible for 10.9% of referrals. The incidence is also demonstrated in Table 1.

Splitting by gender, a greater imbalance can be noted in headache (Table 2). There were 88 repeated referrals, being the most common seizure (32), headache (31), memory (27), cerebrovascular (25), peripheral (16).

Table 1 - Reasons for referrals between March 2019 and July 2020 of SISREG. Belo Horizonte - MG, Brazil.

Types	N (%)	Incidence referrals/year/1.000,000
Headache and craniofacial pain	3524 (25.5)	988.36
Seizure and epilepsy	2862 (20.7)	802.69
Cerebrovascular	1284 (9.3)	360.11
Peripheral*	1036 (7.5)	290.56
Cognitive and memory complains	1032 (7.5)	289.44
Parkinsonism and tremor	677 (4.9)	189.87
Syncope	441 (3.2)	123.68
Vertigo	385 (2.8)	107.97
Spinal cord disorders	380 (2.7)	106.57
No useful information	340 (2.5)	95.35
Cranial nerve	245 (1.8)	68.71
Bell	125 (0.9)	35.05
Others	120 (0.9)	33.65
Intellectual disability and other static encephalopathy	380 (2.7)	106.57
Trauma	205 (1.5)	57.49
Wrong specialty	187 (1.4)	52.44
Tumors	155 (1.1)	43.47
Movement disorders (except tremor)	123 (0.9)	33.36
Demyelinating disorders	83 (0.6)	23.27
Sleep disorder	60 (0.4)	16.82
Attention deficit	53 (0.4)	14.86
Legal issues	44 (0.3)	12.34
Hydrocephalus	45 (0.3)	12.62
Tinnitus	39 (0.3)	10.93
Neuroinfection	35 (0.3)	9.81
Myopathy	24 (0.2)	6.73
Pain (except headache)	15 (0.1)	4.20
Others	190 (1.4)	53.27
Total	13844 **	3882.72

Data presented in absolute numbers and %

*From anterior horn disorder to muscular plate were classified as peripheral. Radiculopathy, if the referral contains cervical or lumbar pain or image exam showing spinal disorder we classified as spinal disorder. If not, peripheral. If there was only mention of muscular pain or a direct muscular disorder, it was classified as myopathy.

**It does not match 100% because rounded number.

Table 2 - Top five reasons to referrals by gender between March 2019 and July 2020 of SISREG. Belo Horizonte - MG, Brazil.

Types	Female (Absolute numbers)	Male (Absolute numbers)
Headache and craniofacial pain	2759	765
Seizure and epilepsy	1320	1542
Cerebrovascular	694	590
Peripheral*	574	462
Cognitive and memory complains	599	433

*From anterior horn disorder to muscular plate were classified as peripheral. Radiculopathy, if the referral contains cervical or lumbar pain or image exam showing spinal disorder we classified as spinal disorder. If not, peripheral. If there was only mention of muscular pain or a direct muscular disorder, it was classified as myopathy.

DISCUSSION

This is the first report from Brazil where the sample can be

considered a parameter from public health care for incidence of referrals. We reported all the requests by PCP to neurology, which must have included all of them, and it could be considered a community-based study. It must have a pivotal role on decision-makers in healthcare. Besides, some educational aspects must be covered in medicine school, residency and continuous education for physicians.

In our sample, the main reasons for a neurology consultation are headache, followed by epilepsy, neurovascular, peripheral and cognitive disorders. These results are similar to those published. Previous studies have shown that headache is the main reason for referral to neurologists in different Brazilian cities. Epilepsy, neurovascular and cognitive disorders are often included among the five most common reasons for referral¹⁰⁻¹⁵. All of those studies are from neurological clinics, which seems to be a sample of convenience.

Since 15.2% of people in Brazil have migraine¹⁶, and 6.9% have headache disorders characterized by headaches occurring on 15 or more days per month¹⁷, we can imagine it would be very often the cause of referrals. When our results are compared to Scotland they have headache, psychological and epilepsy as more often reasons¹⁴. Some

cultural aspects of what neurologist do or an improved acute stroke care must have happened, since strokes were only 3%.

This study can highlight some inference in the prevalence of Neurological diseases in Brazil. Even though it was not the aim neither it is designed as a prevalence study, referrals may reflect the prevalence and complexities of disease, physicians' backgrounds and mainly the resources available to manage the patients¹⁵. As an example, the incidence of referrals of epilepsy, which is culturally in Brazil managed by neurologists, must have some correlation with the incidence of the disease, since the patients usually keep their follow-up. Other diseases, which can be managed by other specialties, such as stroke or dementia, might not reflect. Also, some patients with stroke after the management in an acute setting, are not referred to neurologists. BH has well-designed stroke acute care, which might reflect fewer referrals, because the patients are discharged from hospital with the whole investigations done and with secondary prevention prescription.

In Nigeria a community-based study with door- to -door questionnaire filling found headache and epilepsy the main neurologic problems¹⁶. In Benin a similar questionnaire found tension-type

headaches (26.9%), migraine (14.3%); peripheral neuropathies (5.6%); epilepsy (1.9%); stroke (1.3%)¹⁷. In South America, in Colombia, a cultural and geographical area next to Brazil found insomnia, headache and dementia or peripheral neuropathy as the most frequent disease¹⁸. And in some cases, referral occurs due to needs identified by the family members themselves, such as in cases of memory loss and cognitive impairment¹⁹.

This study does not present all referrals to neurology in Belo Horizonte, which represents a risk of bias, since, were not included, supplementary health information. Likewise, PCP can have differences in knowledge and disposal to manage some cases. Therefore, there may be some variation in referrals based on the primary care physician's history, confidence, and experience to manage some illnesses while others would refer. One of the diseases with an unexpected prevalence is the paralysis of the bell. It is responsible for about 1% of referrals. Being an acute, benign disease is quite a surprise. It might reflect some cultural aspects. Another special issue of our paper is it relies only on information provided by PCP.

Sometimes this information is poor and lack of expertise in neurological exams drives different

diagnoses. We believe this bias was minimized with topographic or syndromic classification, which could at least direct the possible disease to be properly grouped. As well, this is an ongoing project that targets improvements in neurology access to patients who need neurologists. So temporal trends could have shown an effect to lessen the referrals from PCP.

Which will be addressed in a future analysis as a clinic trial. Moreover, some public services of referrals in Brazil use the International Diseases Code sometimes fielded by administrative clerks in referrals and in our experience it is not usually well described as the information provided by PCP referrals. Belo Horizonte was selected because all referrals were graded by a neurologist or primary care physician with knowledge of the neurology specialty referral protocol. Still, we had to delete about 3000 reviews because the referrals were blank. This fact occurred because before the project some referrals were not analyzed, all referrals were authorized without the need for a minimum description.

Another important issue to the data is related to the retrospective study, the information was registered in the Belo Horizonte regulation system in the flow of standard referrals and not in

a standardized form of data for research. Furthermore, even when all fields were filled in, we were unable to recognize the reason for the referral in about 3% of cases, and 2% were not suitable for neurology.

Our study only presents data from the public system of a Brazilian capital, which has limitations for external data validation, mainly for the supplementary health sector. As we do not have access to information related to the professional profile of physicians in relation to training, experience, it was not possible to assess the influence of these variables on referrals.

CONCLUSION

Our study carried out a survey of the main reasons for referrals from Primary Care to Specialized Care in the specialty of neurology in the SUS of Belo Horizonte, making it possible to identify that most referrals involved three clinical conditions: headache, epilepsy and cerebrovascular disorders. It was observed that most of these referrals did not prioritize only the expertise of the neurology specialty. It is possible that cultural aspects and the clinical routine of doctors, health services and the community itself determined these referrals, raising an alert regarding the high demand, waiting time for care and

possible clinical conditions that are no longer managed by other specialties who also share these skills.

This work is important because it can be considered as a parameter in the routing since all pass through the RMB. Policy makers must be aware of the demands here, and medical education must at least focus on the most prevalent diseases for neurologist support, as well as thinking about the gender issue, as health needs and a guide for health education activities in Primary Care units.

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