International Journal of Medical Research and Innovation
2026, Vol. 2, No. 1, pp. 23–29
https://doi.org/10.11648/j.ijmri.20260201.14

Research Article

Neurology Outpatient Demand: Comparison Between a Ministry of Public Health Hospital and the Ecuadorian Institute of Social Security of Ecuador

Sebastian Villate[1, *], Senovia Martinez Matute[2], Mishell Zurita Peña[2], Brigget Buenaño Diaz[1]

[1]Neurology, Riobamba General Hospital of the Ecuadorian Institute of Social Security, Riobamba, Ecuador

[2]Dermatology, Teófilo Dávila General Hospital of the Ministry of Public Health, Machala, Ecuador

Abstract

It is common to compare the reasons of medical consultations between institutions, but there are very few publications that compare specialist consultations between the Ministry of Public Health and private institutions. If we add to that that in Ecuador, there is a clearly defined climatic-territorial division between the highlands, coast, and Amazon region that could influence significantly the types of consultations. Objective: to compare the neurological demand evaluated in outpatient consultations between a hospital of the Ministry of Public Health on the Ecuadorian coast and a hospital of the Ecuadorian Institute of Social Security in the highlands of Ecuador. Results: both institutions present headaches as the main reason for consultation. Epilepsy, the second most frequent etiological group, was the only group that showed a significant difference, with a higher number of patients (p=0.001) as well as consultations (p=0.0001) in the Ministry of Public Health compared to the Ecuadorian Institute of Social Security. Conclusion: Headaches were the main reason why patients went to the neurologist, agreeing with the rest of world publications that describe neurology outpatient consultation. Cases of epilepsy were a controversial point that must be studied in the future to understand why they occur more at the Ministry of Public Health. The analysis of outpatient consultations can be helpful when managing health policies, regardless of the healthcare facility location.

Keywords

Neurology Outpatient Consultation, Ministry of Public Health, Private Institutions

1. Introduction

The reasons for neurological consultation can vary between continents, regions, countries, or even hospitals within the same city. There are multiple biases and diverse causes that lead to this observation [1-3]. One of these is the variability in case presentation within the public health system compared to insured patients or those with some type of private coverage [5]. Additionally, in Ecuador, there is a clearly defined climatic-territorial division between the highlands, coast, and Amazon region that could influence the types of consultations [6].

*Correspondence: Sebastian Villate (sebastianvillate@hotmail.com)

Received: 5 January 2026; **Accepted:** 26 January 2026; **Published:** 9 February 2026

Copyright: © The Author(s), 2026. Published by Science Publishing Group. This is an **Open Access** article, distributed under the terms of the Creative Commons Attribution 4.0 License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

Ecuadorian habitats can receive medical assistance by different ways. On the one hand, the Ministry of Public Health (MPH) offers assistance to the entire population, while the group of salaried people receives coverage through different state institutions, including the Ecuadorian Social Security Institute (ESSI); Finally, around 3% of the population obtains health care in private settings through private insurance or paid for by their own resources [7].

The objective of this study is to compare the neurological demand evaluated in outpatient consultations between a Ministry of Public Health hospital on the Ecuadorian coast and a hospital of the Ecuadorian Institute of Social Security in the highlands of Ecuador.

2. Materials and Methods

Based on the electronic medical records from Teófilo Dávila General Hospital of the Ministry of Public Health (MPH), in Machala, during the period from October 2021 to September 2022, and from the Riobamba General Hospital of the Ecuadorian Institute of Social Security (EISS), during the period from January to December 2023, an observational, descriptive, retrospective, and comparative study was conducted between both institutions.

The analyzes were carried out in different periods of time, and not jointly, because the data collection and review of the patients was carried out by the same neurologist and he was unique in the specialty of neurology in both institutions. It is prohibited In Ecuador to work in 2 hospitals simultaneously.

We identified 3002 patients from both hospitals who attended outpatient consultations for neurological reasons. Both institutions have the same level of complexity, and data collection was carried out over a 12-month period in both hospitals. The patients included met the requirement of being older than 15 years of age, as adult neurology appointments are scheduled from this age onward.

Patients were grouped according to standardized consultation reasons (headaches, abnormal movements, cognitive disorders, spinal disorders, epilepsy, neuromuscular pathologies, vascular diseases, otoneurologic, and other consultation reasons) in order to simplify the analysis. This grouping has been used by other authors [1-4]. Tu simplify we only analyzed patients. Each new patient was classified according to the reason for their visit. If the same patient visited multiple times for the same reason, they were entered into the database only once, and all multiple visits were recorded. In cases where a single patient visited for two different reasons (for example, headache and epilepsy), they were treated as a new patient and added to the corresponding symptom group.

Standard Protocol Approvals, Registrations, and Patient Consent: both institutions are of low complexity so they do not have ethics committees to date, these activities are approved by teaching leadership of the two hospitals. Teófilo Dávila General Hospital and Riobamba General Hospital of the Ecuadorian Institute of Social Security granted the corresponding permissions for data collection. The information delivered to the researchers by the archives department is coded to protect the identity of the patients; we can only view the reason for consultation (coded according to the International Classification of Diseases, 10th edition, ICD-10), sex and age. This descriptive work does not present patient data at any time, it only shows proportions.

For statistical interpretation, comparisons of proportions (N-1 Chi-squared test) were performed using the Medcalc statistical program.

Very few patients consulted for spinal problems (5 patients per year) at the MSP hospital, while 120 were attended at the IESS during the study period. Due to this inequality of proportions, and because this pathology is addressed by other specialties, this reason for consultation was not compared.

3. Results

More patients were seen at the EISS hospital (1901) than at the MSP hospital (1101) in the annual neurology outpatient consultation; in both institutions, female gender predominated significantly (last row of Table 1). When comparing the number of female patients between institutions, as well as males, no substantial difference was found (last column of Table 1), which indicates that the samples are similar in terms of gender proportions despite their differences in size.

Table 1. *Number of patients in both institutions according to gender. The final row shows the comparison between the proportions of men and women in both institutions. The right column shows the statistical inference between women, as well as men, when comparing the 2 hospitals. %: percentage.*

	MPH		**EISS**		**p**
	Patients	**%**	**Patients**	**%**	
Women	595	54.04	1113	58.54	0.08
Men	506	45.95	788	41.45	0.12
p	0.008		0.0001		

The largest number of patients consulted for headaches, and while there was no significant difference between hospitals, it was observed that more women than men consulted in each, particularly at the EISS (Ecuadorian Social Security Institute) (Table 2, Graph 1).

Table 2. *Number of patients and percentages of the total demand grouped the comparison between the two hospitals.%: percentage, N: total number.*

	MPH		EISS		p
	N	%	N	%	
Headache	280	25,4083485	482	25,3550763	0,97
Abnormal movements	140	12,7041742	326	17,148869	0,0012
Cognitive	101	9,16515426	168	8,83745397	0,76
Spine disorders	4	0,45372051	120	6,31246712	
Epilepsy	256	23,23049	218	11,4676486	0,0001
Neuromuscular disorders	40	3,62976407	148	7,78537612	0,0001
Vascular disorders	127	11,5245009	144	7,57496055	0,0003
Otoneurology	25	2,26860254	94	4,94476591	0,0003
Others	128	11,615245	201	10,5733824	0,36
Total	1101		1901		

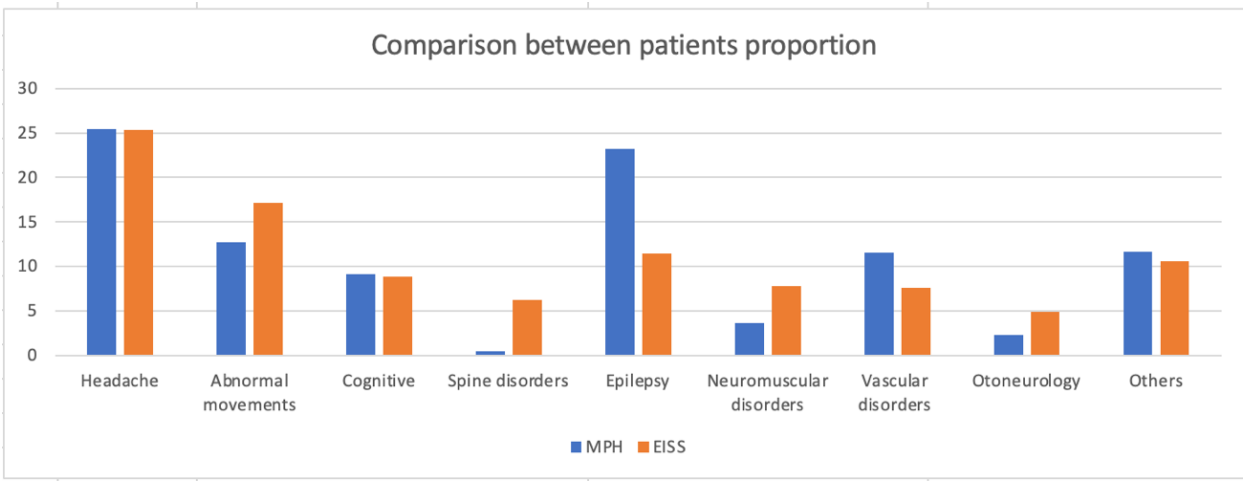

Figure 1. *percentages of the total demand grouped according to the reasons for consultation in the two hospitals (graphic representation of Table 2). *: significant difference.*

Movement disorders, otoneurology, and neuromuscular disorders showed a higher proportion at the IESS during the study period. Patients with movement disorders were mostly male in both institutions; when comparing by gender in the same institution among patients who attended for neuromuscular diseases and otoneurology, no significant differences were observed. When comparing women from the MSP and women from the IESS, and then between men, it can be seen that these three patient groups, with the exception of men with abnormal movements, showed higher rates of care for both men and women at the IESS (note in the discussion that they consulted more at the IESS) (Tables 3-5).

Table 3. *Number of patients and percentages of the total demand grouped according to the reasons for consultation and gender; also, the comparison between proportions according to sex in each hospital.%: percentage, N: total number.*

	MPH					EISS				
	N women	**%**	**N men**	**%**	**p**	**N women**	**%**	**N men**	**%**	**p**
Headache	205	34.45	75	14.82	0.0001	356	31.98	126	15.98	0.0001
Abnormal movements	54	9.07	86	16.99	0.0001	159	14.28	167	21.19	0.0001
Cognitive	51	8.57	50	9.88	0.453	91	8.17	77	9.77	0.226
Epilepsy	133	22.35	123	24.30	0.445	103	9.25	115	14.59	0.0003
Neuromuscular disorders	26	4.36	13	2.56	0.107	92	8.26	56	7.10	0.352
Vascular	52	8.73	75	14.82	0.001	79	7.09	65	8.24	0.350
Otoneurology	15	2.52	10	1.97	0.541	58	5.21	36	4.56	0.515
Others	58	9.74	70	13.83	0.03	94	8.44	107	13.57	0.0005
Total	595		506			1113		788		

Table 4. *Number of patients and percentages of total demand grouped according to reasons for consultation and gender; comparison between proportions by sex between different hospitals.%: percentage, N: total number.*

	Women					Men				
	MPH		**EISS**			**MSP**		**EISS**		
	N	**%**	**N**	**%**	**p**	**N**	**%**	**N**	**%**	**p**
Headache	205	34.45	356	31.98	0.300	75	14.82	126	15.98	0.574
Abnormal movements	54	9.07	159	14.28	0.001	86	16.99	167	21.19	0.063
Cognitive disorders	51	8.57	91	8.17	0.77	50	0.99	77	9.77	0.0001
Epilepsy	133	22.35	103	9.25	0.0001	123	24.30	115	14.59	0.0001
Neuromuscular disorders	26	4.36	92	8.26	0.002	13	2.56	56	7.10	0.0004
Vascular disorders	52	8.73	79	7.09	0.22	75	14.82	65	8.24	0.0002
Otoneurology	15	2.52	58	5.21	0.008	10	1.97	36	4.56	0.01
Others	58	9.74	94	8.44	0.368	70	13.83	107	13.57	0.894
Total	595		1113			506		788		

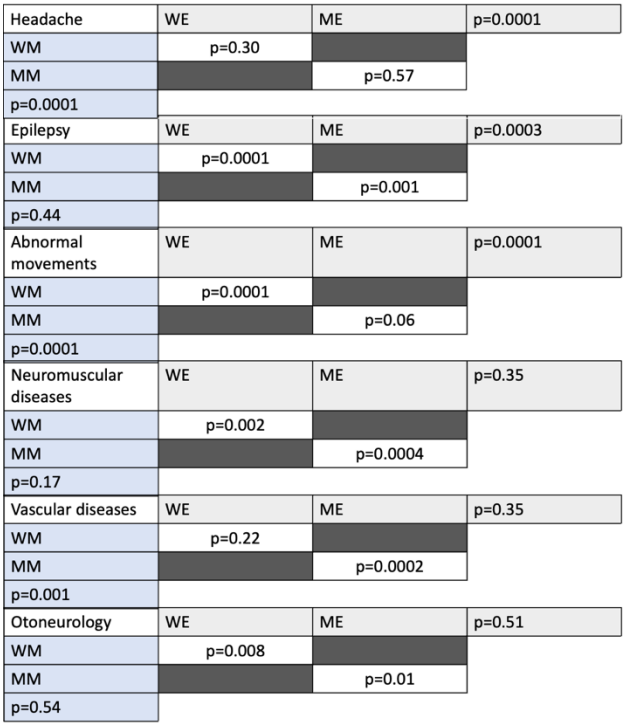

Figure 2. *Comparation between men and woman of the same hospital and interhospital evaluation by gender. WE: EISS women, ME: EISS men, WM: MPH women, MM: MPH men.*

The Ministry of Public Health (MSP) hospital had the highest number of patients with epilepsy and vascular diseases. Patients with epilepsy showed similar proportions between male and female patients at the Ministry of Public Health (MPH), while more men consulted at the EISS. When comparing by gender, significant differences are observed, with both genders consulting more at the MSP.

Finally, male patients with cerebrovascular diseases received more care at the MSP.

4. Discussion

The main question—whether reasons of consultation different at the public health system compared to insured patients—is resolved by showing that patients consult for dissimilar health cared assistance in the two hospitals.

In both institutions, headaches prevail as the main reason for consultation, and the majority of consulting patients are female. This finding has been reported by several authors, which establishes that Ecuador, regardless of the healthcare facility, is consistent with international literature [8, 9]. In contrast, a publication from the Ecuadorian Amazon MHP hospital described epilepsy as the main reason for neurological outpatient consultation. It should be noted that this publication, unlike the presented results, included children in its sample [10]. An English publication also agreed with the Ecuadorian review, having epilepsy as the first reason for consultation [3].

According to the collected data, the second most frequent reason for consultation was epilepsy in the MSP, while in the IESS it was abnormal movements. This discrepancy is shared with the worldwide literature. In the Ecuadorian publication, headaches constitute the second reason for consultation [10]; in Argentina, one study reports epilepsy while another reports cognitive alterations [1, 2]. There are several publications from England with some controversy; one article places epilepsy in second place, a second report establishes functional disorders, Biggin reported that epilepsy and psychogenic disorders share second place in terms of proportions, and finally, a fourth description indicates that miscellaneous neurological disorders were the second most prevalent group in neurological outpatient consultation [3, 11-13].

Epilepsy patients consult in greater numbers at the MSP compared to IESS. This point may be due to multiple factors, but perhaps the most accurate is because it is a disabling disease that significantly impacts patients' quality of life, primarily when seeking employment, which is why they try to undergo treatment to avoid seizures [14-16].

On the other hand, patients who attend the public hospital are generally of low socioeconomic status. Poverty is a risk factor for developing epilepsy and presents higher mortality in this vulnerable group. The foundation of this assumption is based on limited access to health check-ups and primary prevention, leading to the development of diseases that can leave epileptic seizures as a sequela, such as cerebrovascular diseases, traumatic brain injury, congenital malformations, central nervous system infections, alcohol abuse, brain

neoplasms, and Alzheimer's disease [17]. Beghi's article presents these diseases as possible factors linked to the genesis of epilepsy, cerebrovascular diseases and cognitive pathologies and in this work we could see that vascular disease had a greater prevalence in the MSP compared to the IESS; therefore, the prevalence of the other described diseases should be investigated, mainly head trauma, which is strongly linked to epilepsy [18, 19]. Another explanation would be that public hospital people find a free therapeutic option in the MSP and only through appointments do they access this; whereas insured patients can purchase medication in the hypothetical case that they need it.

Neuromuscular diseases (primarily polyneuropathies) and movement disorders (Parkinson's) are prevalent in older adults [20, 21]; it is no coincidence that these two reasons for consultation have a higher proportion of patients at the Ecuadorian Social Security Institute (IESS). The most likely explanation for this is that retirees in Ecuador receive coverage primarily through the IESS [7].

A relevant finding was what happened with people who consulted for spinal alterations. This pathology, depending on the region, is addressed by traumatology or neurosurgery and not by neurology. It is clear that at the MSP level, this concept is incorporated, hence the low rate of evaluated patients, and partly because they have an established first level of care which has supervision and referral regimes. In contrast, in the IESS, there is no first level as such, at least in the city of Riobamba, and this point is covered by non-specialist physicians where patients must attend to be referred to specialists. Also, a percentage of IESS spinal consultations are sent from the emergency department by recently graduated physicians.

The second question, whether the regions of Ecuador have different case presentations, could be evidenced through the comparisons between this research and the one at the Amazon region[9]. In this text they describe a MPH hospital outpatient neurology demand and the two larger reasons for consultation were epilepsy (first) and headaches (second); although none of the institution that we evaluate in this work had this proportion, the two categories were prevalent at our MPH hospital but with an inverted order. It should be noted that for an answer with greater statistical power, more hospitals from the coast, highlands, and Amazon should be evaluated; what has been observed would be introductory data for future research.

5. Conclusion

Consultation reasons were significantly different in between the two hospitals. Epidemiological aspects that can be obtained through the analysis of outpatient consultation could be an objective point to implement changes in the health system regardless of the medical institution patients attend.

Abbreviations

MPH	Ministry of Public Health
EISS	Ecuadorian Institute of Social Security

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Frias I, Buonanotte F. Descriptive analysis of outpatient neurological care demand at the National Hospital of Clinics. Revista de Salud Publica. 2014; 3: 47-54. https://doi.org/10.31052/1853. 1180.v18.n3.11738

[2] Villate S. Prevalence of new cases of migraine in the neurological outpatient demand of El Bolson Program Area Hospital. neuroarg. 2020; 12(4): 233-38. https://doi.org/10.1016/j.neuarg.2020.07.003

[3] Biggin F, Knight J, Dayanandan R, Marson A, Wilson M, Nitkunan A, et al. Outpatient neurology diagnostic coding: a proposed scheme for standardized implementation. Pract Neurol 2023; 23: 317-22. https://doi.org/10.1136/pn-2021-003286

[4] Global status report on neurology. Geneva: World Health Organization; 2025. Licence: CC BY-NC-SA 3.0 IGO.

[5] Chakraborty S, Bandyopadhyay D, Amgai B, Sidhu JS, Paudel R, Koirala S, et al. Does Insurance Effect the Outcome in Patients With Acute Coronary Syndrome?: An Insight from the Most Recent National Inpatient Sample. Curr Probl Cardiol. 2021; 46(1): 100411. https://doi.org/10.1016/j.cpcardiol.2019.02.003

[6] Ch ávez R & Aimaca ña M. Utilization and expenditures in conventional vs traditional medicines in Ecuador: differences between the population of the four natural regions: coast, highlands, Amazon, and insular region. Horizontes de Enfermer á. 2017: (7), 45-53. https://doi.org/10.32645/13906984.152

[7] Lucio Ruth, Villacr és Nilhda, Henr íquez Rodrigo. Ecuador helth sistem. Salud publica Mex. 2011; 53: 177-87. https://pubmed.ncbi.nlm.nih.gov/21877083/

[8] Stovner LJ, Hagen K, Linde M, Steiner TJ. The global prevalence of headache: an update, with analysis of the influences of methodological factors on prevalence estimates. J Headache Pain. 2022; 23(1): 34. https://doi.org/10.1186/s10194-022-01402-2

[9] Friedman D. Continuum (Minneap Minn). 2024; 30(2): 296-324. https://doi.org/10.1212/con.0000000000001413

[10] Zada-Gonz áez M, Scherl é-Matamoros C. Healthcare demand in neurology consultation in the province of Sucumbios, Ecuador. Rev. Ecuat. Neurol. 2024; 33(2): 28-33. https://revecuatneurol.temp.publicknowledgeproject.org/index.php/revecuatneurol/article/view/9793

[11] Biggin F, Howcroft T, Davies Q, Knight J, Emsley HCA. Variation in waiting times by diagnostic category: an observational study of 1,951 referrals to a neurology outpatient clinic. BMJ Neurol Open. 2021; 3(1): e00013. https://doi.org/10.1136/bmjno-2021-000133

[12] Biggin F, Ashcroft Q, Howcroft T, Knight J, Emsley H. Discovering patterns in outpatient neurology appointments using state sequence analysis. BMC Health Serv Res. 2023; 23: 1208. https://doi.org/10.1186/s12913-023-10218-y

[13] Stone J, Carson A, Duncan R, Roberts R, Warlow C, Hibberd C, et al. Who is referred to neurology clinics? the diagnoses made in 3781 new patients. Clin Neurol Neurosurg. 2010 Nov; 112(9): 747-51. https://doi.org/10.1016/j.clineuro.2010.05.011

[14] Yogarajah M, Mula M. Social cognition, psychiatric comorbidities, and quality of life in adults with epilepsy. Epilepsy Behav. 2019; 100: 106321. https://doi.org/10.1016/j.yebeh.2019.05.017

[15] Keezer MR. Epilepsy Comorbidities. Continuum (Minneap Minn). 2025; 31(1): 232-46. https://doi.org/10.1212/cont.0000000000001529

[16] Wirrell E. Evaluation of First Seizure and Newly Diagnosed Epilepsy. Continuum (Minneap Minn). 2022; 28(2): 230-60. https://doi.org/10.1212/CON.0000000000001074

[17] Beghi E, Hesdorffer D. Prevalence of epilepsy an unknown quantity. Epilepsia. 2014; 55(7): 963-7. https://doi.org/10.1111/epi.12579

[18] Ding K, Gupta PK, Diaz-Arrastia R. Epilepsy after Traumatic Brain Injury. In: Laskowitz D, Grant G, editors. Translational Research in Traumatic Brain Injury. Boca Raton (FL): CRC Press/Taylor and Francis Group; 2016. Chapter 14.

[19] Wilson L, Stewart W, Dams-O'Connor K, Diaz-Arrastia R, Horton L, Menon DK et al. The chronic and evolving neurological consequences of traumatic brain injury. Lancet Neurol. 2017; 16(10): 813-25. https://doi.org/10.1016/S1474-4422(17)30279-X Epub 2017 Sep 12.

[20] CONTINUUM (MINNEAP MINN) 2025; 31(5, MUSCLE AND NEUROMUSCULAR JUNCTION DISORDERS): 1244-1269. https://doi.org/10.1212/CON.0000000000000799

[21] CONTINUUM (MINNEAP MINN) 2025; 31(4, MOVEMENT DISORDERS): 930-955. https://doi.org/10.1212/cont.0000000000001593