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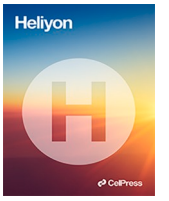

Review article

Treatment gaps in the care of amyotrophic lateral sclerosis in the Philippines: A scoping review

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ABSTRACT

Amyotrophic lateral sclerosis (ALS) is a progressive disease affecting both the upper and lower motor neurons. Much of the management of ALS is supportive with the goal of maximizing patient quality of life. While the Philippines was participative in the "Ice Bucket Challenge" in 2014, it is up for investigation whether substantial changes occurred to improve healthcare for ALS patients. This study aims to evaluate the treatment gaps in the management of ALS in the Philippines through a scoping review. Data on epidemiology, health systems, and pharmacotherapy available regarding ALS in the local setting were synthesized. Nine articles were included. As of July 2023, there were only four indexed studies on ALS from the Philippines. Five of the included articles investigated ALS in Filipino populations but were not authored by Filipinos nor affiliated with Philippine institutions. The available literature showed a distinct lack of local ALS epidemiologic data, as well as limited availability in diagnostic centers, medications, health financing options, and digestible information for Filipinos. The limitations in managing ALS in the country are multifactorial – from political, medical, and social. It is imperative to establish a national database, financing systems, support groups, and accessible diagnostic centers for ALS patients.

1. Introduction

Among the motor neuron diseases (MND), amyotrophic lateral sclerosis (ALS) is the most common entity in adults and presents as a painless progressive disease affecting both the upper and lower motor neurons [1]. Across Europe, the crude incidence of ALS ranges from 0.5 to 3.6 per 100 000, with similar numbers across North America at 1.7 to 2.2 per 100 000, and Asia Pacific at 0.4 to 3.3 per 100 000 [2]. Globally, the disability adjusted life-years for MNDs is at 12.6 per 100 000, and at 3.01 per 100 000 in Southeast Asia [3].

ALS is ultimately a fatal disease, with no available curative drug. In 1995, riluzole was the first United States Food and Drug Administration (US-FDA) approved drug for clinical use, shown to increase the survival of ALS patients [4]. It has been licensed globally for use and remains the only drug available in oral preparation. Since then, only two other drugs, edaravone and sodium phenylbutyrate + taurursodiol (relyvrio), have been US-FDA approved for the treatment of ALS. Edaravone is currently only licensed for use in Japan and the USA, while sodium phenylbutyrate + taurursodiol has only been recently approved based on recent

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multicentral trial showing improved ALFRS-R score versus placebo over a period of 24 weeks [4,5]. Much of the management of ALS is supportive and requires multidisciplinary care, usually with the goal of maximizing patient quality of life and addressing common motor concerns such as dysphagia, dysarthria, weakness, spasticity, cramps, sialorrhea, dyspnea, as well as the nonmotor manifestations of the disease such as pain, depression, anxiety, cognitive and behavioral disturbances, autonomic disturbances and sensory disturbances [1,6–8].

In 2014, the Philippines was ranked eighth in the list of top 10 countries which participated in the ALS Ice Bucket Challenge, based on the data collected by Facebook (now known as Meta) during that year. While that challenge brought ALS into regular parlance at the time, it is up for investigation whether substantial changes have happened to improve healthcare for patients with ALS in the country. Our study aims to identify and evaluate the treatment gaps in the management of ALS in the Philippines through a scoping literature search and review of relevant Philippine websites.

2. Material and methods

Our study adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for this scoping review [9].

Published and unpublished systematic reviews, meta-analyses, scoping reviews, randomized control trials, cohort studies, case reports/series, abstracts, editorials, and textbooks that studied Filipinos, were set in the Philippines, or had primary authors with affiliation to institutions in the Philippines were considered in this study. Only articles in English and Filipino were included. No restriction in terms of the date of publication was implemented.

International databases such as PubMed, Scopus, Clinicaltrials.gov, Western Pacific Region Index Medicus, Web of Science, and

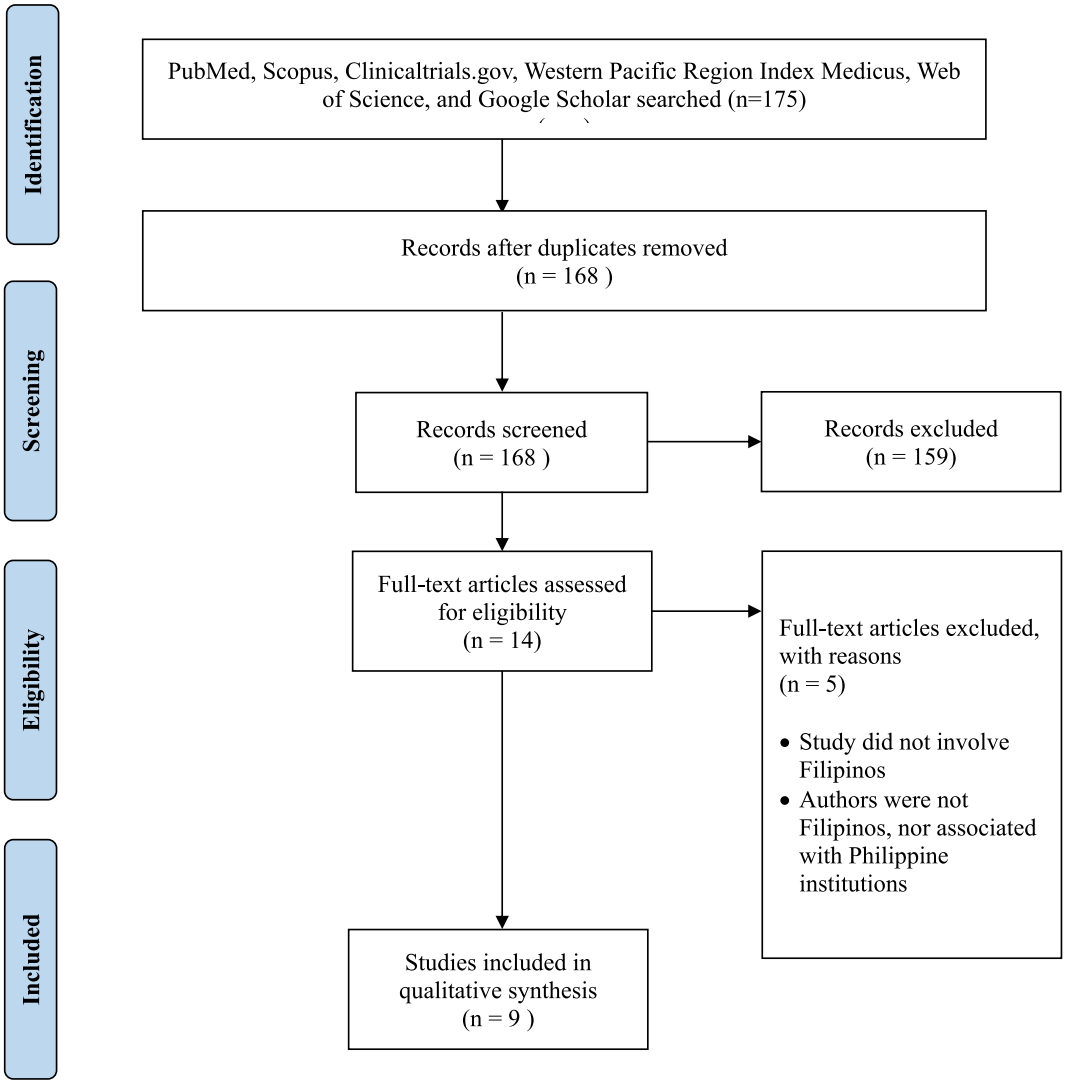

Fig. 1. Flow chart of articles included.

Table 1
Studies with primary data.

Author, year	Title, *Journal*	Purpose	Type of Study	Setting	Data collection method	Major findings	Appraisal criteria
Zinman et al., 2009	A mechanism for low penetrance in an ALS family with a novel SOD1 deletion, *Neurology*	Determine factors responsible for low penetrance of SOD1 mutation	Quantitative	Canada	Experimental	The Δ G27/P28 was not found in 179 normal controls of Filipino origin and was unique to the Filipino family in the study. The extended 1.6 Mb haplotype around SOD1 is common to all carriers of G27/P28.	Investigated a Filipino family
Prado et al., 2023	Characteristic and management motor neuron disease in the largest tertiary hospital in the Philippines: A one-year period cross sectional analytic study, *Journal of Clinical Neuroscience*	Determine the clinical profile and describe the management of MND patients seen in the largest tertiary hospital in the Philippines	Cross-sectional	Philippines	Prospective	The median age of diagnosis was 55 years old, with a median onset to diagnosis of 1.5 years. Majority of patients were diagnosed via the Revised El Escorial and Awaji criteria. Only one patient was on riluzole. Only one patient was on oxygen support. Despite complications of ALS, no patient was on tube feeding. Seventy-five percent were on unguided physical therapy, and none were on occupational or speech therapy.	Study was set in the Philippines

Table 2
Studies with secondary data.

Author, year	Title, Journal	Review question	Outcome measures	Review scope	Appraisal criteria	Findings/syntheses
Matsumoto et al., 1975	Epidemiologic study of amyotrophic lateral sclerosis in Hawaii, *Neurology*	Determine the incidence and mortality statistics of ALS in Hawaii	• Incidence of MND • Mortality of MND	Review of clinical records of the five largest hospitals in Honolulu or Oahu	Investigated Filipino population	Average annual incidence of MND in Hawaii was 1.04 per 100 000 from 1952 to 1969. The annual incidence was higher for Filipinos at 3.38 per 100 000. Average annual mortality rate of MND was 0.69 per 100 000. For Filipinos, the annual mortality rate was higher at 2.21 per 100 000.
Reed et al., 1975	Amyotrophic lateral sclerosis and parkinsonism-dementia, 1945–1972, *American Journal of Epidemiology*	Describe the changing epidemiologic patterns of occurrences of ALS and PD from 1972 to 1945	• Patterns of incidence in time • Geographic patterns • Host characteristics	Review of case registries and hospital records	Investigated Filipino population	There was a notable decline in both incidence and mortality rates of ALS and PD. There was a higher rate of incidence of ALS and PD in one of the noted southern villages (Umatac). For migrant Filipinos in the study, the average annual incidence rate was 8 per 100 000. These Filipinos were noted to migrate to Guam 19–26 years prior to the onset of the disease.
Garruto et al., 1981	Amyotrophic lateral sclerosis and parkinsonism-dementia among Filipino migrants to Guam, *Annals of Neurology*	Provide information whether length of exposure to environmental/ cultural conditions in Guam are related to ALS and PD in Filipino migrants	• Description of epidemiological and demographic profile and clinical histories	Review of case registries	Investigated Filipino population	They described nine cases of ALS and two of PD in full-Filipino migrants to Guam and ten cases of ALS and six cases of PD in part-Filipino patients born in Guam of Filipino and Chamorro parentage. All cases were male. The migrant Filipinos arrived in Guam at ages 30–45 years old and were from northwestern Luzon. The mean number of years of residence in Guam prior to disease onset is 16.8 years, with a mean age of onset at 57 years.
Adiao et al., 2020	Efficacy and safety of mexiletine in amyotrophic lateral sclerosis: A systematic review of randomized controlled trials, *Neurodegenerative Disease Management*	Determine the efficacy and safety of mexiletine in ALS	• Functional limitation in ALS (mean change in ALFRS-R) • ALS impairment (change in SVC, change in MRC scores) • Survival	Systematic review of randomized, placebo-controlled, or active controlled studies	Study was set in the Philippines	Mexiletine had no significant effect in improving functional disability but showed significant reduction in muscle cramp frequency and severity. Adverse events noted

(*continued on next page*)

Table 2 (*continued*)

Author, year	Title, Journal	Review question	Outcome measures	Review scope	Appraisal criteria	Findings/syntheses
			• Muscle cramp severity and frequency • Safety and tolerability			included nausea as the most common, and severe adverse events included respiratory failure and fall leading to multiple fractures.
Turalde et al., 2020	Associations of motor neuron disease research productivity and socioeconomic factors in Southeast Asia: A bibliometric analysis, *Arquivos de Neuro-Psiquiatria*	Investigate the scientific productivity of Southeast Asian countries on MND and the associations between research metric indices and various country-specific socioeconomic parameters	• Bibliometric indices (total number of publications in journals with IF, Scopus citations) • Altmetric indices (PlumX citations, PlumX usage, PlumX captures, PlumX mentions, PlumX social media) • Socioeconomic indices in Southeast Asian countries	Systematic review of all published articles that used any study design	Authors were Filipinos and had affiliations with Filipino institutions	Singapore, Malaysia, and Thailand had the highest numbers of publications in journals with IF and number of Scopus citations. Singapore leads in altmetric indices (PlumX citations, PlumX captures, PlumX mentions and PlumX social media posts), while Malaysia had the highest aggregate PlumX usage. There is a positive correlation between GDP per capita and % GDP per capita for research/ development and all bibliometric and altmetric indices. The number of neurologists per one million population had a positive correlation with all bibliometric and altimetric indices, except PlumX usage.
Turalde et al., 2022	Perampanel for amyotrophic lateral sclerosis: A systematic review and meta-analysis, *Neurological Sciences*	Determine the efficacy and safety of perampanel among ALS patients	• Functional status of patients with ALS (mean difference in ALSFRS-R) • Increasing cortical excitability threshold among patients with ALS • Safety of perampanel	Systematic review of randomized, double-blind, parallel group, placebo- and/or active-controlled clinical trials and quasi-experimental, cluster-randomized, cross-over, prospective or retrospective cohort, case-control, and cross-sectional studies	Authors were Filipinos and had affiliations with Filipino institutions	Perampanel had no significant effect on functional status. There is a statistically significant increase in cortical motor threshold from baseline to 2-h post-administration of perampanel.

Google Scholar were searched. Local databases such as Health Research and Development Information Network were also searched. Local government and non-government agencies like the Department of Health and the Philippine Health Insurance Corporation (PhilHealth) as well as medical associations such as the Philippine Neurological Association were searched for available literature via websites and email correspondence.

A scoping review of literature was done from the earliest record of the databases included up to July 2023 using the following medical subject heading (MeSH) search terms: (“Amyotrophic Lateral Sclerosis”[MeSH] OR Motor Neuron Diseases OR Lou Gehrig’s disease) AND “Philippines”[MeSH].

IDD and CRT separately searched and screened all available titles and abstracts based on the determined eligibility criteria. Duplicates were excluded. Full texts of the included articles were retrieved for data extraction.

From the available articles, the authors synthesized data on epidemiology, health financing, pharmacotherapy, and healthcare

Table 3
Publications on theories and concepts, commentaries, and special communications.

Author, year	Title, Journal	Purpose	Credibility	Quality	Content	Coherence	Findings /Recommendations
Roman et al., 1996	Neuroepidemiology of amyotrophic lateral sclerosis: clues to etiology and pathogenesis, *Journal of Neurology, Neurosurgery, and Psychiatry*	This article reviewed the available literature on the epidemiology of ALS and the hypotheses on its etiology at that time.	The author is a professor of neurology at Weill Cornell Medical College, with multiple papers published to his name.	The article is well-written and extensive in its discussion.	It goes over available hypotheses on the etiology of ALS at that time period.	Key points are highlighted, and there is good flow in the ideas discussed.	This review highlights the hypothesis of a genetic predisposition to develop MND after exposure to certain environmental factors.

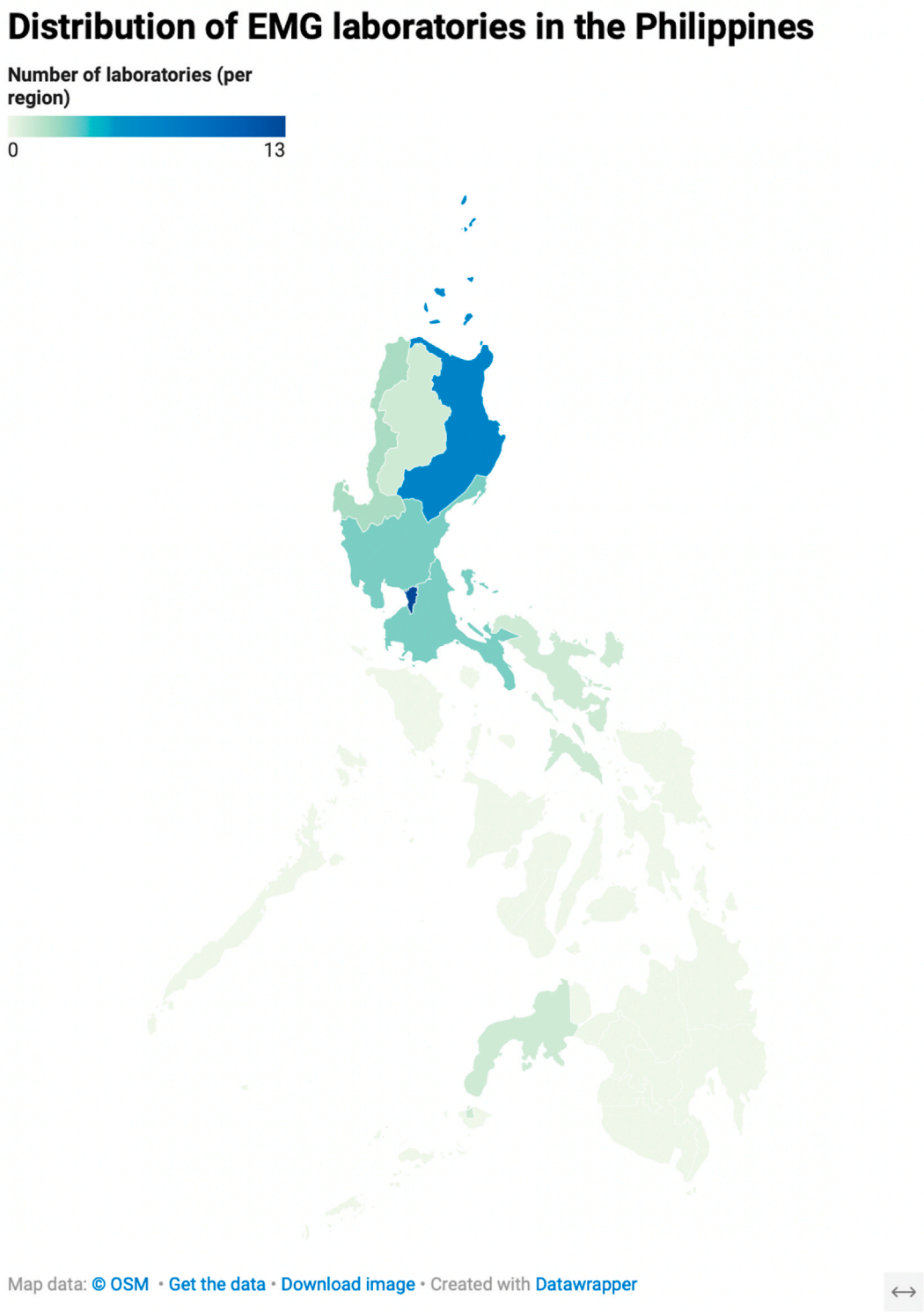

Fig. 2. Distribution of EMG laboratories in the Philippines by region.

services available with regards to ALS in the local setting.

3. Results

Our search revealed a total of 175 articles. Duplicates were removed, leaving 168 articles to screen. After assessing for eligibility, the authors determined nine articles for synthesis. Fig. 1 illustrates the flow of the study selection process. Table 1 summarizes the details of the articles with primary data, Table 2 outlines the articles with secondary data, and Table 3 contains the details of the study on theories and concepts.

3.1. Comparative ALS research productivity among Southeast Asian countries

As of July 2023, there were only four indexed research studies on ALS from the Philippines [10–13]. Five of the included articles in this study investigated ALS in Filipino populations but were not authored by Filipinos nor affiliated with Philippine institutions [14–18]. One of the studies looked at the scientific productivity and research metric indices for MND, including ALS, in Southeast Asia [10]. The proponents were able to analyze 196 studies on MND, majority of which (n = 112) were on ALS. The countries with the highest publications in journals with impact factors and PlumX citations included Singapore, Malaysia, and Thailand. In this study, the Philippines was found to have five publications in journals with impact factors, coming in at 4.2% of the total generated publications from the SEA region, and had a PlumX citation of 1.19%. Turalde and colleagues were able to show that there was positive correlation between the socioeconomic indices of gross domestic product (GDP) per capita (USD) and %GDP for research/development (R&D) and all the bibliometric and altmetric indices.

3.2. Epidemiology of ALS in the Philippines and Filipino migrants

Epidemiologic data for neurological diseases in the Philippines is limited. While there are ongoing efforts to create a unified national database for diseases like stroke and dementia, there are currently no available databases for ALS or MNDs [19]. In our review, there were very few studies that touched on the epidemiology of ALS in the Philippines. Only one study looked at the local incidence of MNDs in the country, while four other studies briefly mention the presence of ALS cases in Filipinos living abroad.

In a one-year cross-sectional study done in the Philippine General Hospital (PGH) to identify the incidence of MNDs, Prado and colleagues identified 28 MND patients, of which 67.9% (n = 19) were ALS patients [12]. Of these 19 patients, 47.5% were male, with a median age of 53.6. These patients were diagnosed with definite ALS via electromyogram and nerve conduction studies, following the Revised El Escorial and Awaji criteria, and had a median duration of onset of symptoms to diagnosis of 1.7 years. On diagnosis, these patients had a median ALSFRS-R of 29.7.

Several studies included in this review looked at Filipinos with ALS that were residing in another country. Even as early as 1965, there were already early studies that identified Filipino populations abroad presenting with ALS. One of the earliest published studies was by Matsumoto and colleagues who identified 118 immigrants in Guam presenting with MND, 42 or 35.6% of which were Filipino [14]. Of these 42 patients, only one case was female. In another study, Garruto and colleagues described the incidence of ALS in full-Filipino migrants to Guam (n = 9) and in part-Filipino patients born on Guam of Filipino and Chamorro parentage [18]. All of these patients were male, with a mean age of onset of 54.9 years old and who have already resided in Guam for an average of 16.8 years. This group of Filipinos emigrated from the Luzon area, primarily for short term contract work. Another study identified four verified and one suspected case of ALS among Filipino migrants, all of whom were also male [15]. One of the more recent studies included looked at 12 Filipino members of a family, recruited from an ALS clinic in Toronto, Canada, to analyze SOD1 mutation as a possible genetic cause of ALS [17]. This family was originally from Cagayan, a province of Luzon, Philippines. Of these Filipino patients, three members were diagnosed with ALS at a mean age of 55.3±5.1 (range 51–61) years.

The age of diagnosis of migrant Filipinos with ALS and those diagnosed in the study done by Prado and colleagues are seemingly comparable. However, the sex distribution of migrant Filipinos with ALS is predominantly male. One hypothesis to explain this is the demographic of Filipinos that migrated were also predominantly male, taking up short term contract work. With the paucity of local data, it is difficult to draw any reliable conclusions from information collected about migrant Filipinos with ALS. It is also important to note that decades have passed since these early studies identifying a high incidence of ALS in Filipino immigrants, and there have been no new studies and no identified new cases [14–17].

3.3. Lack of diagnostic centers and education and training programs

The diagnosis of ALS requires the demonstration of progressive symptoms and clinical or electromyographic evidence of upper motor neuron and lower motor neuron signs by the Revised El Escorial criteria and the Awaji criteria [1]. This means that electromyography (EMG) is an invaluable tool to the diagnosis of ALS. Through networking among local neurologists and neurologists-in-training, known EMG labs in the country were identified. A total of 30 EMG labs were identified, with 13 located in the National Capital region, 2 in Region I, 1 in the Cordillera Administrative Region, 7 in Region II, 3 in Region III, 3 in Region IV, 1 in Region V, and 1 in Region IX. Majority of these laboratories are clustered within the capital and the surrounding regions. Fig. 2 summarizes the distribution of EMG laboratories in the country using a choropleth map. The supplementary material presents a complete list of electrophysiology laboratories in the country as of July 2023. This illustrates the lack of accessible EMG laboratories for patients suspected of ALS in the country. For most patients who live in the country's southern islands, this means that the definitive

diagnosis of ALS would require a visit to the country's capital or surrounding regions, entailing additional expenses in the diagnosis of the disease.

As of writing, there are only 13 institutions in the country offering residency training programs in adult neurology. Nine of which are located within the National Capital Region. The supplementary material lists the training institutions in the country according to region. Clinical training in adult neurology in the Philippines takes three to four years. There is no dedicated clinical rotation on ALS; there is, however, a required three-month rotation in electrodiagnostic neurology that allows trainees to gain competencies in neurophysiologic studies. There are only two institutions that offer subspecialty fellowship training in electrodiagnostic neurology and neurophysiology. Both are located in the National Capital Region. As of writing, there are no other subspecialty fellowship training programs dedicated for ALS in the country. A dedicated learned society – the Philippine Society of Clinical Neurophysiology (PSCN) – was recently established in 2021. The PSCN is the sole representative organization of the country in the International Federation of Clinical Neurophysiology (IFCN).

3.4. Treatment options in ALS

Despite being US-FDA approved for the treatment of ALS, riluzole is not available in the Philippines; while available, edaravone is marketed for the use as a neuroprotectant in acute stroke and comes at a prohibitive cost at almost 53 000 Php (~930 USD) for a treatment cycle [20,21]. The recently approved drug for ALS, sodium phenylbutyrate + taurursodiol, is also not yet available in the country for commercial or compassionate use. The lack of available proven treatment options in the country may be reason why two of the included studies are systematic reviews evaluating the utility of perampanel and mexiletine in treating ALS [11,13]. In the study by Adiao and colleagues, three randomized trials were analyzed on the effect of mexiletene on ALS functional rating scale revised (ALSFRS-R), ALS impairment, survival, muscle cramps, and safety and tolerability. The systematic review showed that mexiletene had no significant effect on improving functional disability but showed significant effect in terms of reducing muscle cramp frequency and severity. The original studies included in the systematic review demonstrated a significant reduction in weekly cramp frequency to as much as 16–31% and a significant reduction in muscle cramp severity ranging from 25 to 45% for the treatment groups compared to placebo [22,23]. In the study by Turalde and colleagues, two randomized trials and one open label study were included to analyze the effect of perampanel on the functional status of patients with ALS, its effectiveness in increasing cortical excitability threshold, and its safety. Pooled evidence from the included studies showed that perampanel also did not improve ALFRS-R; however, it demonstrated a significant increase in cortical motor excitability threshold, to unclear clinical benefit.

3.5. Health financing for ALS

There are no available studies regarding the actual cost of care for patients with ALS in the country. The only available information on the possible cost of healthcare for ALS in the Philippines is from the list of medical case rates provided by the Philippine Health Insurance Corporation [24]. The case rate for ALS is 10 400 Php (~180 USD), of which 3120 Php (~55 USD) is appropriated for physician fees while the rest is for health care institution fees. For patients whose disease progressed that they experience significant respiratory distress and dysphagia, tracheostomy and gastrostomy are procedures that are usually offered. Separately, these procedures are priced by PhilHealth at 12 120 Php (~210 USD) and 37 800 Php (~670 USD), respectively [25]. However, despite coverage by national health insurance, Filipino household out-of-pocket payments still accounted for 41.5% of the current health expenditure in the Philippines [26]. Considering these expenses in context to the annual income of the average Filipino family in 2021 which was 307 190 Php (~5400 USD), almost 16% of the family's annual income would go to tracheostomy and gastrostomy alone [26,27].

4. Discussion

After the Ice Bucket Challenge for ALS went viral in 2014, a senate resolution was passed mandating the University of the Philippines-Philippine General Hospital (UP-PGH) and other state institutions and hospitals to form study groups for ALS [28]. Despite this senate resolution, our review shows that the published literature from the country on ALS has been limited, and no further acts of political will has manifested since then. Several factors may be considered to explain the lack of progress in the management of ALS.

The first, and possibly foremost struggle in the management of ALS is the paucity of information available in the local setting. The lack of local epidemiologic data makes it fundamentally difficult to identify the burden of the disease in the population and to subsequently allocate resources and develop strategies to address these problems. Additionally, the lack of epidemiologic data makes it difficult to interpret, apply locally, and draw reliable conclusions from studies on ALS, even those that are conducted in the Philippines and on Filipinos outside the country [14–17].

This difficulty in establishing epidemiologic data may also stem from a related problem, which is the difficulty in establishing a diagnosis of ALS in the first place. Patients who receive a diagnosis of ALS are often delayed by more than a year, wherein they may receive a slew of diagnostics and treatments, draining their resources. This may be a symptom of the limited number of neurologists in the country. The expertise to recognize the disease entity in the first place is crucial to addressing the concerns of affected patients. This limitation is further worsened by the scarce number of diagnostic centers, located in city centers in the country. Taking these into consideration, the patients who receive a diagnosis of ALS are only those with access to both diagnostic centers and expert care. It is possible that a vast majority of patients are undiagnosed due to the lack of access to these two basic resources.

Another important factor that has limited the progress of healthcare for ALS in the country is the availability of medications and

health financing. As already previously mentioned, most of the medications for ALS are not readily available in the country. Our review also shows that treatment options for ALS in the country are very cost prohibitive. The average Filipino family earned an average of 307 190 Php (~5400 USD) in 2021 [27]. Despite a national health insurance policy, ALS is not an adequately covered disease, and is not listed among those covered by the PhilHealth Z package program, developed to lessen the financial burden of catastrophic diseases [29,30]. The estimated cost of treatment, as well as their relative unavailability especially in more remote areas of the country, make managing ALS truly challenging.

There also exist social limitations to the care of ALS. Outside medical and allied health communities, ALS is still not a familiar disease to the general public. Even on the most popular social media site in the country, Facebook, there are no local support groups for patients or caregivers. The availability of lay-friendly information on the disease translated into Filipino, and the vast other languages in the country, are rare and usually do not reach a wide audience.

Finally, as a symptom of poor funding, research productivity about the topic in the country is also low. As mentioned by Turalde and colleagues, there is a positive correlation between the socioeconomic indices, such as of GDP per capita (USD), %GDP for R&D, and number of neurologists, to research productivity. The same study showed that only 0.16% of the country's GDP is invested in R&D, and that there are only 4.68 neurologists per one million of the population; this lack of capital and manpower may be some of several factors to explain the limited research output on ALS from the country [10]. This may be one reason why there were relatively few studies that could be included in the review.

5. Conclusions

ALS is a devastating disease for patients and their families. It is made doubly hard when the necessary resources for its management are inaccessible to the average Filipino family. The limitations in managing ALS in the country are multifactorial—from political, medical, social, and financial. Improving healthcare in the country for ALS will require political will to push for more capital in this area of study. The establishment of a national database, like those in the works for stroke and dementia, will also prove useful to push for policies that support further financial assistance, support groups, and more accessible diagnostic centers for patients with ALS. Campaigns to make riluzole, edaravone, and sodium-phenylbutyrate + taurursodiol available and accessible for patients should also be made. Lastly, more easily digestible information should be made available to the public to increase meaningful awareness and interest in the disease.

Data availability

The data that support the findings of this review are available in various public and open access repositories as indicated in the formal list of references.

Supplementary Material
List of neurophysiology laboratories in the Philippines

Region	Center	Contact Details
National Capital Region	The Medical City Neurophysiology Laboratory	(02) 89887000 loc 6269
	East Avenue Medical Center Neurophysiology Laboratory	(02) 89280611 loc 761
	Far Eastern University Nicanor Reyes Medical Foundation Neurophysiology Laboratory	+639610587217 8983-8338 local 1439
	Quirino Memorial Medical Center Neurophysiology Laboratory	(02) 53049800 loc 5097
	National Kidney and Transplant Institute Neurophysiology Laboratory	(02) 89810300 loc 2124 or +639285513959
	Cardinal Santos Medical Center Brain and Spine department	(02) 63287270001 loc 5303
	University of the East Ramon Magsaysay Memorial Medical Center	(02) 87158405
	Neurophysiology Laboratory	(02) 87150861 to 71 loc 386
	Our Lady of Lourdes Hospital	(02) 87163901 loc 3264
	Neurophysiology Laboratory	+639218528520
	Commonwealth Hospital and Medical Center (EEG)	(02) 89300000 loc 141
	Lung Center of the Philippines Sleep Center, 3rd floor (EEG)	+639155236775
	Philippine Heart Center Neurology section	(02) 89252401 loc 2456
	St. Luke's Medical Center (Quezon City) 3rd floor (Neurophysiology Laboratory)	(02) 82310101 loc 5426
	UP-Philippine General Hospital EEG-Epilepsy Monitoring Unit	(02) 85548400 loc 3421
Region I	Metro Vigan Hospital (EEG)	+639985857535
Cordillera Administrative Region	Baguio General Hospital ang Medical Center Neurophysiology Laboratory	EEG: +639208382633 EMG: +639167975864
Region II	SIMC (Southern Isabela Medical Center) Santiago, Isabela (EEG)	email: eegsectionsimc2023@gmail.com
	Isabela United Doctors Medical Center, Cauayan City, Isabela	+639278358486
	Santiago Medical City (SMC)	+63919 0674179
	Santiago City	+639206852447
	De Vera Medical Center Santiago City	+639364950342

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Supplementary Material (*continued*)

Region	Center	Contact Details
	St. Paul Hospital Tuguegarao	EEG: 078 8442578 EMG-NCV: +639175783804
	Cagayan Valley Medical Center (CVMC), Tuguegarao	EEG: 078 3020000 EMG-NCV: +639175783804
	Divine Mercy Wellness Center Tuguegarao	EEG: 078 8442925
Region III	Central Luzon Doctor's Hospital, Tarlac City	+639399019173
	Jecson's Medical Center, Tarlac City	EEG Unit: (045) 982-5501 EMG-NCV: +639258151545
	Mariveles Mental Wellness & General Hospital, Mariveles, Bataan	EEG: 09948377565
Region IV	South Imus Specialist Hospital Anabu II-C, Imus, Cavite	+639310264390 (046) 4387745 loc 127
	Mount Carmel Diocesan General Hospital Lucena, Quezon (EEG)	+639336090471
	Lucena United Doctors Hospital, Quezon (EEG)	+639177096253
Region V	Metro Health Specialist Hospital Neurology Unit	+639480450015
Region IX	Zamboanga City Medical Center Brain and Spine Unit Section of Clinical Neurophysiology	+639364080906

Region In the Philippines	Training Institution
National Capital Region	East Avenue Medical Center
	Jose R. Reyes Memorial Medical Center
	Makati Medical Center
	Quirino Memorial Medical Center
	St. Luke's Institute of Neurosciences
	The Medical City
	University of the East – Ramon Magsaysay Memorial Medical Center
	University of the Philippines – Philippine General Hospital
	University of Santo Tomas Hospital
Region IV	Mary Mediatrix Medical Center
Cordillera Administrative Region	Baguio General Hospital Medical Center
Region VII	Chong Hua Hospital

CRediT authorship contribution statement

Iris D. Ditan: Writing – original draft, Formal analysis, Data curation. **Christian Wilson R. Turalde:** Writing – review & editing, Supervision, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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