



A survey-based approach on restless legs syndrome: practices and perspectives among Italian neurologists

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Abstract

Introduction Restless Legs Syndrome (RLS) is a widely prevalent and complex neurological disorder. Despite notable advancements in managing RLS, the disorder continues to face challenges related to its recognition and management.

Objective This study seeks to gain comprehensive insights into the knowledge and clinical practices among Italian neurologists regarding RLS diagnosis, management, and treatment, comparing approaches among general neurologists, movement disorder specialists, and sleep experts.

Methods Members of the Italian Society of Neurology, the Italian Society of Parkinson and Movement Disorders, and the Italian Association of Sleep Medicine were invited to participate in a 19-question online survey.

Results Among the 343 surveyed neurologists, 60% categorized RLS as a “sleep-related movement disorder.” Forty% indicated managing 5–15 RLS patients annually, with sleep specialists handling the highest patient volume. Of note, only 34% adhered strictly to all five essential diagnostic criteria. The majority (69%) favored low-dosage dopamine agonists as their first-line treatment, with movement disorder specialists predominantly endorsing this approach, while sleep experts preferred iron supplementation. Regular screening for iron levels was widespread (91%), with supplementation typically guided by serum iron alterations. In cases of ineffective initial treatments, escalating dopamine agonist dosage was the preferred strategy (40%).

Conclusions These findings underscore a lack of a clear conceptualization of RLS, with a widespread misconception of the disorder as solely a movement disorder significantly influencing treatment approaches. Disparities in RLS understanding across neurology subspecialties underscore the necessity for improved diagnostic accuracy, targeted educational initiatives, and management guidelines to ensure consistent and effective RLS management.

Keywords Restless legs syndrome · Sensorimotor disorder · Neurologists · Survey · Education

Introduction

Restless Legs Syndrome (RLS) is a common sensorimotor disorder characterized by an irresistible urge to move the legs, typically accompanied by uncomfortable or distressing sensations. These symptoms predominantly occur during periods of rest or inactivity, particularly at night, being temporarily relieved by movement [1–4]. RLS affects approximately 5–10% of individuals in European and North

American populations [5], with a bimodal age distribution, showing peaks in early adulthood and midlife [6]. The condition is more common in women, particularly during pregnancy [7, 8].

Diagnosis of RLS is mainly clinical, categorized as primary (idiopathic) or secondary to other medical conditions, including kidney diseases, iron deficiency, neuropathy, multiple sclerosis, and Parkinson’s disease (PD) [1, 9]. In managing RLS, both non-pharmacological measures, such as lifestyle adjustments and sleep hygiene, and pharmacological treatments, including dopaminergic agents, $\alpha 2\delta$ ligands, iron supplementation, and opioids, are tailored to the severity and frequency of symptoms [10, 11]. Certain pharmacological agents, such as antidepressants, antiemetics, and

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antihistamines, are instead known to precipitate or exacerbate RLS symptoms [10].

The pathophysiology of primary RLS is complex and not fully elucidated yet. Recent advances propose a multifactorial etiology involving brain iron deficiency, dopaminergic dysregulation, genetic factors, altered homeostasis and neural plasticity, among others [12–14].

In the last decade, RLS treatment has seen significant progress, including new clinical trials and studies that have led to updated management algorithms [10, 15]. However, under-recognition and misdiagnosis are common [16], partly due to its variable clinical presentations and lack of definite biomarkers [17–19]. To the best of our knowledge, there are no studies that have comprehensively explored how neurologists manage RLS patients. There is only a recent survey among Indian medical graduate trainees that revealed a significant knowledge gap among clinicians, especially non-neurology trainees, in recognizing and managing RLS [20]. The survey also revealed a low clinical detection rate of RLS and a prevalent misconception of it as a primarily movement disorder, despite clinical and neuroimaging evidence suggesting significant sensory components [21, 22]. This aligns with the critical yet complex role of neurologists, given RLS variable symptoms and the complex treatment approaches required. Consequently, evaluating the current state of knowledge and expertise among neurologists is a priority, specifically focusing on their clinical experience and challenges in managing RLS. Identifying these gaps is also essential for developing targeted educational interventions and for implementing clinical practice to better reach the patients' needs.

Based on these considerations, here we conducted an online survey among members of the Italian Society of Neurology (SIN), the Italian Society of Parkinson and Movement Disorders (LIMPE-DISMOV), and the Italian Association of Sleep Medicine (AIMS) to investigate their knowledge, diagnostic approaches, and treatment experiences with RLS.

Methods

Questionnaire

The survey was specifically designed for this study and developed by a focused committee of experts in movement disorders and sleep medicine. The development process involved iterative revisions, guided by feedback from a diverse group of neurologists to ensure content relevance and clarity. The final questionnaire comprised 19 questions, aimed at gathering both quantitative and qualitative data.

The survey was organized into four key areas: (1) Demographic Information and Professional Background;

(2) Knowledge and Clinical Practices; (3) Referrals and Consultations; (4) Diagnosis and Treatment.

The first section included five questions addressing demographic details (age and gender) and professional characteristics, including primary workplace setting, neurology subspecialties, and years of experience post-specialization.

In the second section, two questions were posed to assess the respondents' knowledge and clinical practices in managing RLS. The first was a multiple-choice question about the definition of RLS, while the second question examined the number of RLS patients seen annually.

The third section, consisting of two questions, focused on referrals and consultations in the context of RLS care. The first question explored referral patterns for RLS patients, asking to identify referral sources (general practitioners (GPs), neurology specialists, non-neurology specialists, or self-referrals) and their frequencies (i.e., “never”, “occasionally”, “often”, or “always”). In the second multiple-choice question, respondents were asked to describe common reasons for patients to seek neurologist consultation.

The final section of the survey included ten questions on the diagnosis and treatment strategies. The first question focused on the criteria neurologists consider essential for diagnosing RLS. The second was a multiple-choice question aimed at identifying the differential diagnoses considered for RLS. The third question examined the investigation of family history in RLS cases. The fourth multiple-choice question focused on the steps taken following the diagnosis. The fifth question addressed the criteria for initiating treatment. The sixth question explored the first-line medication choices, with options covering a broad spectrum of pharmacological and non-pharmacological treatments. The seventh and eighth questions focused on the approach to altered iron levels, inquiring about screening practices and supplementation methods. Finally, the last two questions explored the management strategies if patients do not respond to initial treatment or worsen under dopaminergic therapy.

Procedure

Data were collected using a Google Forms-based online survey over a span of 24 weeks (27 March 2023–13 September 2023). The survey targeted neurologists among 3633 SIN members, 846 LIMPE-DISMOV members, and 444 AIMS members. An invitation to participate was sent via email from each collaborating society. Considering the membership overlap among the societies, with numerous members belonging to two or, in some cases, all three organizations, the survey platform was configured to prevent duplicate responses from the same participant, and the invitation email specifically requested members to

disregard the invitation if they had already completed the survey. The email specified that the purpose of the survey was to gain insights into neurologists' experiences and challenges in diagnosing and managing RLS, as well as in identifying knowledge gaps for future educational and research directions. The email contained an embedded link that provided direct access to the questionnaire. The first page of the survey included a consent form, assurance of data anonymity, and an estimated completion time of approximately 10 min. Informed consent was required before participants could proceed with the questionnaire. Follow-up reminders were sent regularly over the survey period. All survey questions were mandatory, with prompts for completion if any item was skipped. Ethical approval for this study was obtained from the University of Verona (Italy), and it adhered to the principles of the Declaration of Helsinki. The results are presented according to the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) [23].

Data analyses

Data were transferred from Google Forms to Excel spreadsheets and subsequently examined to perform statistical analysis. Participant demographics and responses were analyzed using descriptive statistics, with categorical variables shown as frequencies and percentages, and continuous variables expressed as mean values and standard deviation. An open-ended response option was available for certain questions; responses that did not fit the predefined categories were recorded separately and classified as missing data. Responses from Sect. “[Knowledge and clinical practices](#)” and Sect. “[Diagnosis and treatment](#)” were analyzed according to the neurology subspecialties using the Chi-squared test. Statistical significance was set at $p < 0.05$. All analyses were carried out with SPSS 29 for Windows.

Results

Section 1: Demographic information and professional background

The survey was completed by a total of 343 respondents (response rate 7.0%), with a nearly equal distribution between females and males. The mean age was 51.0 years ($SD \pm 13.7$) and the average years of practice was 20.6 ($SD \pm 14.6$) (Table 1). The participants answered to predominantly deal with general neurology ($n=200$, 59.2%, response rate 5.5%), followed by movement disorders ($n=92$, 27.2%, response rate 10.9%), and sleep disorders ($n=46$, 13.6%, response rate 10.4%).

Table 1 Sample demographic and professional characteristics

	Responses-no. (%)
Sex	
Male	172 (50.1)
Female	171 (49.9)
Age (years)	
≤ 40	89 (26.0)
41–50	81 (23.7)
51–60	70 (20.5)
≥ 61	102 (29.8)
Years of practice (post-specialization)	
≤ 5	72 (21.0)
6–10	42 (12.2)
11–30	121 (35.3)
≥ 31	108 (31.5)
Workplace Setting ^a	
Hospital	99 (34.5)
Local Health Authority	73 (25.7)
University Hospital	47 (16.5)
Private Practice	25 (8.8)
Private Company	23 (8.1)
University	17 (6.0)

^aMissed responses ($n=59$, not specified)

Section 2: Knowledge and clinical practices

Terminology

Most respondents used a single definition to describe RLS ($n=268$, 79.3%), with the majority identifying it as a “sleep-related movement disorder” ($n=202$, 59.8%). Sleep specialists, in contrast, were more inclined to employ multiple definitions than the other subspecialties ($\chi^2=6.44$, $p=0.040$). Other definitions included “sleep disorder” ($n=107$, 31.7%) and “sensorimotor disorder” ($n=90$, 26.6%). Fewer respondents selected “sensory disorder in sleep” ($n=19$, 5.6%) and even less “functional neurological disorder” ($n=16$, 4.7%); movement disorder specialists less likely chose this latter classification ($\chi^2=6.85$, $p=0.033$) (Fig. 1). No one defined RLS as a “psychiatric disorder”.

Personal experience

In managing RLS patients, the majority ($n=137$, 39.9%) assessed between 5 and 15 patients annually. A significant portion ($n=92$, 26.8%) managed fewer than 5 patients annually. Additionally, 17.5% ($n=60$) of the respondents treated between 15 and 30 patients, with 16% ($n=54$) handling more than 30 patients annually in their practice. Sleep disorder specialists demonstrated a higher tendency

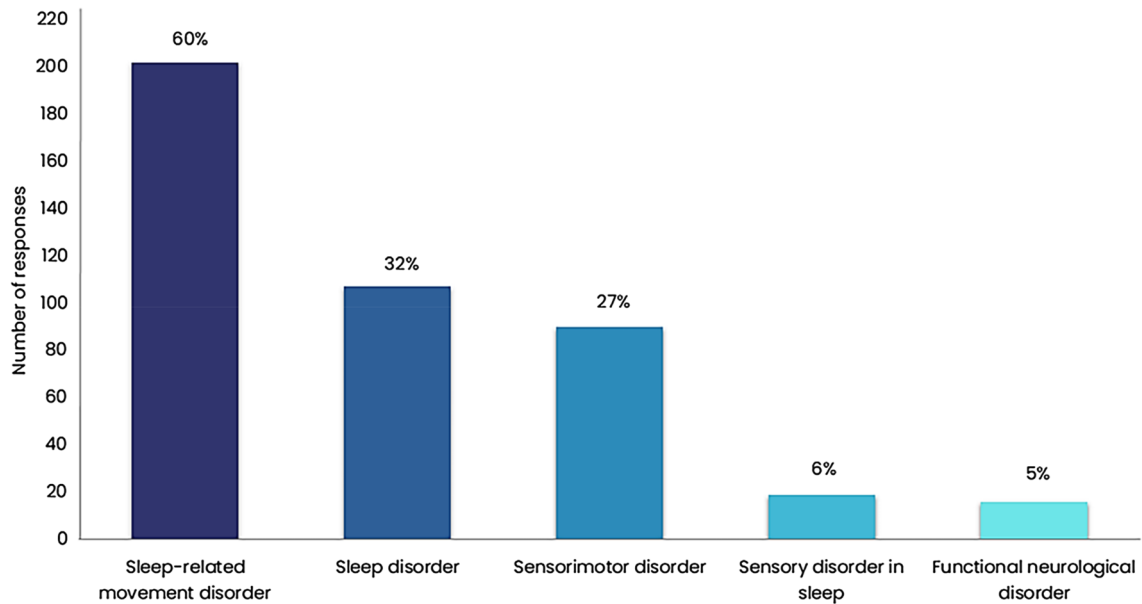


Fig. 1 Frequencies and percentages of terms used to define RLS

to manage over 30 RLS patients annually compared to their peers in other subspecialties ($\chi^2 = 65.83$, $p < 0.001$).

Section 3: Referrals and consultations

By considering the categories “often/always” for patient referral sources to the participants, the data revealed the following ranking: self-referrals ($n = 194$, 56.6%) and GPs ($n = 185$, 53.9%) were the primary sources, followed by

non-neurology specialists ($n = 86$, 25.1%), with neurology specialists ($n = 54$, 15.7%) being the least common (Fig. 2).

Most respondents ($n = 228$, 66.5%) provided multiple answers in reporting the reasons that patients seek for a neurological consultation. The “presence of bothersome or unspecified disorders in the lower limbs” ($n = 275$, 80.2%) emerged as the most prevalent, followed by “inability to maintain a good sleep quality” ($n = 187$, 54.5%), and “difficulty in relaxing in the evening or before going to bed” ($n = 142$, 41.4%). A smaller group highlighted “challenges

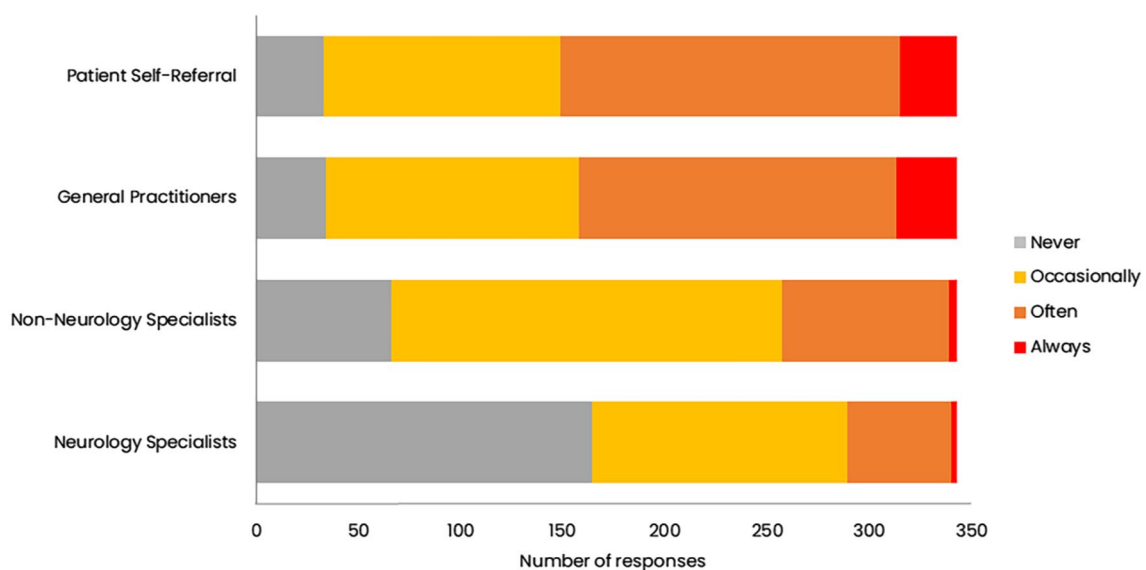


Fig. 2 Distribution of referral patterns of RLS patients to neurologists

in carrying out daily activities due to excessive daytime sleepiness” (n = 46, 13.4%).

Section 4: Diagnosis and treatment

Diagnostic criteria

When assessing the essential criteria for diagnosing RLS, 34.1% of respondents (n = 117) indicated that all five criteria were pivotal. Another group (n = 101, 29.4%) typically based their diagnosis on criteria (1) (urge to move the legs, typically associated with uncomfortable sensations) and (5) (symptoms are not explained by other medical conditions), combined with at least one other criterion. Furthermore, criteria (1) and (4) (symptoms intensify during evening and night hours) were also selected for diagnosis (n = 75, 21.9%). Some participants considered only a single criterion for diagnosing RLS: criterion (1) (n = 30, 8.7%); criterion (3), (symptom relief with movement) (n = 9, 2.6%); criterion (4) (n = 7, 2%); criterion (5) (n = 3, 0.9%); and criterion (2) (symptoms initiated or worsened by rest) (n = 1, 0.3%). There were no differences in the rate of use and the various combinations of diagnostic criteria between the neurology subspecialties.

Differential diagnosis

When neurologists were asked about the differential diagnoses they typically consider, the majority indicated multiple selections (n = 306, 90%). “Sensory symptoms associated with peripheral neuropathies” emerged as the predominant choice (n = 301, 88.5%), followed by “periodic limb movements of sleep (PLMS) (n = 162, 47.6%). Equally prevalent were “akathisia” and “vascular diseases (thrombophlebitis, venous thrombosis, venous insufficiency, etc.)” (n = 107, 31.5%). Other mentions included “functional neurological disorder” (n = 102, 30.0%), “anxiety and/or depression” (n = 94, 27.6%), “REM sleep behaviour disorder (RBD)” (n = 63, 18.5%), and “non-REM parasomnias” (n = 36, 10.6%). A few participants identified nocturnal leg cramps as a differential diagnosis in the open-ended response field (n = 9, 2.6%). A very small minority (n = 3, 0.9%) did not consider differential diagnoses. Movement disorder specialists were more likely to consider RBD ($\chi^2 = 7.83$, $p = 0.020$) and PLMS ($\chi^2 = 8.65$, $p = 0.013$), and less inclined to include vascular diseases in their differential diagnosis of RLS ($\chi^2 = 7.17$, $p = 0.028$), compared to sleep experts and general neurologists.

Initial assessment and treatment

In exploring the practice of investigating family history among RLS patients, most respondents (n = 253, 73.8%)

reported routinely inquiring about family history in most cases. A smaller group (n = 60, 17.5%) indicated that they do not typically investigate family history, while a subset (n = 30, 8.7%) considered it only if RLS onset occurs in youth. There were no differences in the rate of family history inquiry between the neurology subspecialties.

When asked about the diagnostic procedures followed after the diagnosis, respondents opted for multiple procedures (n = 241, 70.3%). The most common procedure was “requesting blood tests: complete blood count, ferritin, serum iron, transferrin, kidney and liver function tests, thyroid hormones, vitamin levels” (n = 288, 84%). The “electrophysiological tests (nerve conduction studies/EMG, evoked potentials)” were also frequently selected (n = 176, 51.3%). Some respondents indicated that they “initiate treatment without requesting diagnostic tests” (n = 65, 19%), while others preferred “requesting polysomnography (PSG)” (n = 49, 14.3%) or “requesting cerebral MRI” (n = 30, 8.7%). Sleep specialists were significantly more likely to request PSG after the diagnosis than other specialties ($\chi^2 = 14.85$, $p < 0.001$). Only few respondents referred patients to sleep specialists (n = 17, 5%) or movement disorder specialists (n = 15, 4.4%); only one selected a cerebral computed tomography scan (0.3%) (Table 2).

In determining when to initiate treatment, most respondents (n = 222, 65.3%) based their decision on the “severity/frequency of symptoms and their impact on sleep and overall quality of life”, with sleep specialists more likely to follow this approach ($\chi^2 = 12.87$, $p = 0.045$). A quarter (n = 85,

Table 2 Post-diagnosis diagnostic and first-line treatment approaches for RLS patients

	Responses-no. (%)
Diagnostic procedures post-diagnosis ^a	
Blood tests	288 (84.0)
Electrophysiological tests	176 (51.3)
PSG	49 (14.3)
MRI	30 (8.7)
Referral to a sleep specialist	17 (5.0)
Referral to a movement disorder specialist	15 (4.4)
CT scan	1 (0.3)
First-line treatment	
DAs	234 (68.8)
Iron supplementation	62 (18.2)
$\alpha 2\delta$ ligands	35 (10.3)
Clonazepam	26 (7.6)
Behavioral norms	23 (6.8)
Physical therapy	2 (0.6)

PSG polysomnography; MRI magnetic resonance imaging; CT computed tomography; DAs dopamine-agonists

^aRespondents who initiate treatment without conducting diagnostic tests are not included (n = 65)

25%) would “start therapy even if symptoms are mild, as long as the patient perceives a detrimental effect on their quality of life”. Fewer practitioners stated that they “initiate treatment for all RLS patients” (n=24, 7.1%) or “for every referred patient, mainly because they typically see only those with severe symptoms” (n=9, 2.6%).

Most respondents selected “low-dosage dopamine agonists (DAs)” (n=234, 68.8%) as their first-line treatment for RLS, followed by “ $\alpha 2\delta$ ligands targeting neuropathic pain (e.g., Gabapentin, Pregabalin)” (n=35, 10.3%), and “Clonazepam” (n=26, 7.6%). Only 18.2% of respondents (n=62) opted for iron supplementation, with a subset choosing it “only if anemia is confirmed through tests” (n=38, 11.2%). Movement disorder specialists preferred DAs ($\chi^2=9.52$, $p=0.009$), while sleep experts tended towards iron supplementation ($\chi^2=17.44$, $p<0.001$). A minority considered “behavioral norms such as daytime walking or evening activities like crosswords” (n=23, 6.8%) and “physical therapy” (n=2, 0.6%) (Table 2).

Iron supplementation strategies

Most respondents indicated that they routinely screen for iron profile alterations (n=311, 90.7%). When abnormalities are detected, respondents most frequently opted for “supplementation based on serum iron alterations” (n=147, 47.3%), followed by “supplementation based on transferrin and ferritin” (n=114, 36.7%), and “supplementation based on serum and transferrin” (n=50, 16.1%).

In managing alterations in the iron profile, the majority preferred “oral iron supplementation for medium to long

durations” (n=211, 67.8%), followed by “ferrous sulfate orally for similar durations” (n=85, 27.3%). A minority opted for “intravenous iron supplementation with a single dose of 1000/1500 mg” (n=8, 2.6%) or “500 mg for 5 days” (n=7, 2.3%). No significant statistical differences were observed in iron supplementation strategies between different neurology subspecialties.

Treatment strategies for non-responsive or worsening cases

In managing RLS patients unresponsive to initial treatment, the most prevalent approach was to “increase the dosage of DAs” (n=122, 39.7%), whereas 32.9% (n=101) of respondents mentioned “switch drugs” as their primary strategy. Further strategies included continuing treatment in “add-on with other drugs” (n=42, 13.7%), referring to a sleep specialist (n=19, 6.2%), or a movement disorder specialist (n=11, 5.5%). A minority (n=6, 2%) considered initiating physiotherapy or other non-pharmacological therapies (Fig. 3). 36 responses (10.5%) were missing for this question.

When dealing with patients experiencing augmentation on dopaminergic therapy, the most frequent response was to “switch drugs” (n=172, 58.1%). Other less common strategies were continuing the current treatment with “add-on drugs” (n=33, 11.1%) and “increasing the dosage of DAs” (n=32, 10.8%), the former being more common among sleep specialists ($\chi^2=23.11$, $p=0.0104$). Referrals to sleep specialists (n=29, 9.8%) or movement disorder specialists (n=25, 8.4%) were also considered, with a minority favoring non-drug interventions (n=5, 1.7%)

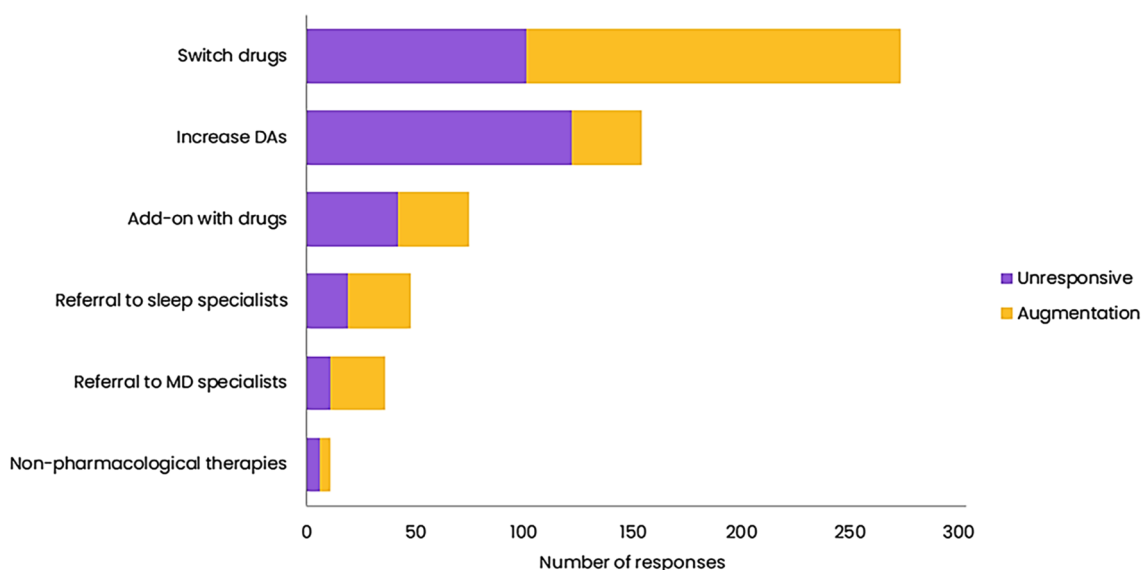


Fig. 3 Distribution of responses for treatment strategies in non-responsive or augmentation cases of RLS. DAs dopamine-agonists; MD movement disorder

(Fig. 3). There were 47 (13.7%) missing responses for this question.

Discussion

This is the first interdisciplinary and multidimensional survey investigating the knowledge and practices among Italian neurologists in diagnosing, managing, and treating RLS, also examining the different approaches across movement disorders specialists, sleep experts, and general neurologists.

The overall finding is a lack of a clear conceptualization of RLS, with a prevalent definition and detection of RLS among the different subspecialties, also influencing treatment approaches. This indicates the need for a better diagnostic clarity to reach a more unanimous conceptualization and, therefore, diagnosis of the disease, but also highlights the need for educational intervention to ensure more adherence to the RLS guidelines for accurate identification and appropriate management.

In our sample, most neurologists (60%) classified RLS as a “sleep-related movement disorder”, in accordance with the third edition of the International Classification of Sleep Disorders (ICSD-3) [24]. However, more recent electrophysiological and neuroimaging studies provided compelling evidence supporting the importance of considering the sensory component in RLS and this concept has already been adopted within the scientific community of sleep specialists to the point that in the last criteria by the International RLS Study Group (IRLSSG), RLS has been conceptualized as a sensorimotor disorder [1]. As a matter of fact, electrophysiological and neuroimaging studies [22, 25–29] collectively illustrate a complex interplay of sensory and motor components involved in RLS, challenging its traditional view as primarily a movement disorder. This aligns with findings from a recent survey in India involving medical, pediatric, and neurology trainees, which also identified RLS predominantly as a movement disorder [20], in accordance with the ICSD-3. In our sample, around 27% defined RLS as a sensorimotor disorder, and notably, sleep specialists tended to use a broader range of definitions compared to both movement disorders specialists and general neurologists, potentially indicating a more holistic approach in conceiving the multifaceted nature of RLS among sleep experts.

The comparable rates in self-referrals and referrals by GPs for RLS patients in our sample raise significant concerns about the awareness and recognition of RLS in primary healthcare settings. Despite being a relatively common neurological disorder, indeed, RLS often remains under-recognized in primary care settings [30–32]. Most neurologists (66%) reported that patients seeking

neurological consultation provided multiple reasons, reflecting the challenges patients themselves face in articulating their symptoms [22, 33]. This issue, combined with the lack of specific biomarkers and the fact that RLS symptoms can often mimic or overlap with other conditions [34], further complicates the diagnosis, underscoring the challenges faced in accurately identifying and managing this disorder. Additionally, in our survey, most respondents (66%) did not consider all five essential criteria for diagnosing RLS. Given its complexity and the fact that each criterion addresses a different aspect of the disorder, using fewer or just one criterion could potentially increase the risk of misdiagnosis and, therefore, improper treatment. The latest RLS guidelines introduced the fifth criterion to increase diagnostic specificity and to help differential diagnoses [1]. Movement disorder specialists tended to consider RBD as a differential diagnosis for RLS significantly more compared to other subspecialties. However, RBD and RLS significantly differ in terms of clinical presentations and timing of symptoms, with the former involving active dream enacting behavior during REM sleep, along with involuntary movements confined to the sleep period. (i.e., mainly occurring in the second half of the night, when RLS instead tends to settle-down) [35]. Given this, the inclusion of RBD as a differential diagnosis of RLS (both comorbid in patients with parkinsonian disorders) in our survey may indicate a misunderstanding or a knowledge gap among practitioners, which further highlights the need for increased educational efforts to clarify the distinct diagnostic criteria and clinical features of these distinct sleep disorders.

A notable proportion of sleep specialists identified PSG as a crucial tool in the clinical evaluation of RLS. This preference for PSG could be reflective of the patient demographic predominantly seen by these specialists, which likely includes patients with comorbid sleep-related disorders. In such scenarios, the primary clinical concern may not be RLS per se, but rather an array of sleep disturbances. Furthermore, it is worth noting that the familiarity with, and reliance on, PSG among sleep experts could inherently bias their perspective towards its use.

When investigating the first-line therapy, most neurologists (69%) opted for low-dosage DAs, followed by a minority (10%) selecting $\alpha 2\delta$ ligands. This contrasts with current guidelines, which recommend $\alpha 2\delta$ ligands as the first-line agents for chronic RLS to prevent augmentation, whereas DAs remain as first-line drugs in cases of severe symptoms or concurrent severe PLMS [10, 36]. A recent retrospective study investigating the use of DAs in 670,404 US RLS patients revealed that nearly 60% of patients were prescribed DAs, with neurologists being more likely to prescribe them at doses exceeding FDA-approved or guideline-recommended levels, compared to sleep experts and other specialists [37]. A distinct preference among

movement disorder specialists for DAs emerged in our survey, whereas sleep experts predominantly favored iron supplementation as their initial treatment strategy. Sleep experts might be more prone to opt for iron supplementation likely targeting underlying iron deficiency, which is a well-established factor in the pathophysiology of the condition [13]; therefore, this should be assessed in all RLS patients according to current guidelines [38]. Conversely, movement disorder specialists' preference for DAs may be attributed to their clinical experience with these drugs in treating other movement disorders, such as PD, thus possibly influencing their inclination towards these medications for RLS treatment. While these interpretations remain speculative, they highlight the need for a deeper understanding of the clinical decision-making in RLS treatment across different neurological subspecialties in order to harmonize care for RLS patients.

Responses related to iron supplementation revealed other interesting trends. While 37% of respondents adhered to the recommendation of supplementing iron based on ferritin and transferrin levels, a larger group (47%) focused primarily on serum iron alterations. Additionally, most respondents opted for oral iron supplementation compared to intravenous supplementation, although the latter strategy should be considered as a first option when a faster response is needed, oral iron absorption is compromised or not tolerated, or if symptoms persist despite an adequate oral iron intake [10].

Although the insights provided, the present survey has some limitations. The relatively small sample size may limit the representativeness of the findings across the broader spectrum of neurology practitioners in Italy, thus meaning that conclusions drawn may not fully encompass the diverse practices and opinions within the entire neurology community. Moreover, the complexity of RLS as a disorder was reflected in the survey design, which incorporated multiple response options for certain questions. While this approach aimed for comprehensiveness, it might have led to a dispersion of responses, complicating data interpretation. Finally, the survey did not specifically evaluate how clinicians assess the severity of RLS symptoms, such as whether standardized Patient-Reported Outcomes are used to guide treatment decisions, a limitation that could have provided additional insights into their treatment practices.

Despite these limitations, the study offers new perspectives on the diverse approaches that Italian neurologists employ in diagnosing, managing, and treating RLS. It revealed a predominant view of RLS as a movement disorder, also influencing treatment strategies, and highlighted the different approaches adopted between sleep experts, movement disorder specialists, and general neurologists. Intriguingly, our findings also underscore the absence of a national Italian guideline on RLS, which could serve as a standardized operating procedure (SOP) for Italian

neurologists and sleep specialists. This gap emphasizes the need for establishing such guidelines to unify the therapeutic approaches, ensuring consistency and effectiveness in RLS management across Italy. Translationally, the survey underscores the need for targeted educational programs to enhance neurologists' understanding of RLS, particularly in terms of its complex nature and adherence to treatment guidelines, being both aspects crucial for effective and up-to-date patient care. The lack of a national SOP further highlights the importance of these educational initiatives. Concurrently, there is also a significant need to increase awareness and education among GPs to improve referral rates to neurologists. This dual approach in education and practice will lead to a more comprehensive and effective management of RLS patients.

Author contributions Conceptualization: EA and MT; methodology: EA, GPM, MPM, RF, GL, FM, CB, AC, LFS, GP, AB, and MT; formal analysis: GPM and CB; investigation: EA, GPM, MPM, RF, GL, FM, CB, AC, LFS, GP, AB, and MT; writing—original draft preparation: EA and GPM; writing—review and editing: EA, GPM, MPM, RF, GL, FM, CB, AC, LFS, GP, AB, and MT. All authors have read and agreed to the published version of the manuscript.

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Data availability The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflicts of interest The authors have no relevant financial or non-financial interests to disclose.

Ethical approval This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of University of Verona (No. RESENS-Prog. 3049CESC).

Consent to participate Informed consent was obtained from all individual participants included in the study.

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