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Research Article

Awareness of specialists about morbidity and treatment of lupus nephritis in Bulgaria: A feasibility study

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Abstract

A qualitative, non-interventional inquiry study was conducted to evaluate current practices and challenges in the management of systemic lupus erythematosus (SLE) and lupus nephritis (LN). A structured questionnaire consisting of 17 questions was administered to rheumatologists and nephrologists. The survey explored the frequency of LN among patients with SLE, standards and duration of care, treatment protocols, disease characteristics associated with complications and staging, the use of biological therapies, treatment gaps, opportunities for improvement, and the extent of multidisciplinary collaboration. Responses were systematically analyzed using descriptive statistical and narrative synthesis methods.

The findings indicate that approximately 4,050 patients are diagnosed with SLE, corresponding to a relatively low diagnosis rate of 0.72%. Among the specialists surveyed, 35% identified LN as the most common complication affecting patients with SLE. All respondents agreed that delayed initiation of therapy is associated with an increased risk of complications, particularly LN. Considerable variability was reported in the prevalence of advanced LN stages (III–V), although estimates generally ranged between 10% and 70%, suggesting that a substantial proportion of patients progress to severe disease.

Current treatment strategies rely predominantly on immunosuppressive therapies; however, respondents highlighted a significant need for more targeted treatment options. Approximately 25% of patients who are resistant to conventional therapies may be candidates for biological treatments, which are generally well tolerated. Rheumatologists primarily manage the early and systemic manifestations of SLE, while nephrologists play a central role in advanced LN management and kidney biopsy procedures. The study identified unmet needs related to delayed diagnosis, limited access to biologic therapies, and a lack of novel therapeutic options. Strengthening multidisciplinary collaboration and establishing specialized centers may improve patient outcomes and support more personalized, patient-centered care.

Keywords

Bulgaria, feasibility study, lupus nephritis, morbidity, treatment

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PENSOFT

Introduction

Systemic lupus erythematosus (SLE) is an autoimmune disease characterized by heterogeneous manifestations and the involvement of multiple organs (Cervera et al. 1993). The incidence varies between 3.7 and 49 per 100,000 person-years in the US, and the prevalence ranges from 48 to 366.6 per 100,000 individuals (Fatoye et al. 2018; Li et al. 2020). Regional incidence and prevalence differ markedly, ranging from 0.9 to 9 per 100,000 for incidence and from 13 to 94.7 per 100,000 for prevalence, and depend on factors such as ethnicity and sex (Barber et al. 2021).

SLE is characterized by various clinical symptoms that do not always occur simultaneously and develop over time at different disease stages (Fischer-Betz et al. 2005). This has led to the development of various complications of SLE. Studies show that, in addition to joint and muscle involvement in approximately 90% of patients with SLE, the second most common complication is nephritis, occurring in approximately 50% of patients with SLE (Weening et al. 2004; Bertsias et al. 2012; Kyttaris 2024). Other common complications include cardiovascular manifestations of SLE, such as endocarditis, pericarditis, or myocarditis; pulmonary diseases; central nervous system diseases; and neuropsychiatric manifestations (Weening et al. 2004; Fischer-Betz et al. 2005).

LN causes inflammation of the kidneys, resulting in reduced renal function and increased protein loss in the urine. Research indicates that patients who experience diagnostic delays are at greater risk of developing renal complications, with studies reporting a higher prevalence of LN among those diagnosed later. If left untreated, LN can lead to chronic kidney disease, hypertension, and kidney failure, often requiring dialysis or kidney transplantation (Mitchell 2024).

Due to its different presentations and variety of complications, the SLE treatment strategy is based on the treat-to-target principle, which aims to achieve a defined state of remission or low disease activity (van Vollenhoven et al. 2014). The treat-to-target strategy involves immunosuppressants and biologics, preferably without the need for glucocorticosteroids.

The EULAR recommendations for LN combine hydroxychloroquine, lower-dose steroids, and immunosuppressants, such as mycophenolate or cyclophosphamide, with "triple therapy" involving the addition of calcineurin inhibitors or belimumab (Bertsias et al. 2010).

Different studies have attempted to identify barriers to healthcare faced by patients with SLE and LN and challenges that limit access to care and hinder effective disease management, particularly among underserved populations. Most published findings emphasize the need for targeted strategies to improve healthcare access and outcomes for those living with SLE and LN (Bruce 2023; Englund et al. 2025).

Recent collaborative efforts among researchers, clinicians, patients, and industry have advanced the understanding and management of LN. Improvements in disease classification, predictive modelling for disease onset and flare risk, and innovative clinical trial designs are enhancing the development of targeted treatment strategies. In addition, advanced technologies have enabled detailed analysis of biological samples, facilitating the discovery of novel biomarkers and pathogenic mechanisms. These developments support the move toward more personalized care and hold promise for improving outcomes in patients with LN (Davidson et al. 2019).

Information about the morbidity, physicians' awareness, and treatment approaches to LN in Bulgaria is scarce, which prompted interest in this study (Miteva-Katrandzhieva et al. 2018).

This survey aims to collect insights and perspectives from specialists on LN morbidity and pharmacotherapy and to identify disease-related treatment gaps in real-world clinical practice in Bulgaria.

Methodology

Design of the study

A qualitative, non-interventional inquiry study was performed based on the open-ended questions described in Appendix 1. The 17 questions aimed to characterize the frequency of LN among patients with SLE, standards and duration of care, current treatment protocols, specific disease characteristics related to complications and staging, the use of biological therapies, treatment gaps and opportunities for improvement, and multidisciplinary collaboration. The questionnaire was tested with one of the respondents and corrected for minor linguistic errors. Before starting the inquiry, participants confirmed their willingness to participate, which was considered informed consent.

Selection of respondents

Specialists were selected from major hospitals in Sofia (two hospitals), Plovdiv, and Varna that were authorized by the National Health Insurance Fund (NHIF) to treat LN. These hospitals had biological therapy committees and were included in the NHIF list of referral hospitals for biological therapy approval. Heads of rheumatology or nephrology clinics were approached and interviewed by the study researchers. The researchers sent the selected participants an electronic link to the questionnaire and, when clarification was needed, contacted them via telephone. The interviews took place between 25 March and 1 April 2026.

Data processing and data analysis

The interview responses were recorded and systematized in an Excel table. Two researchers reviewed the transcripts to familiarize themselves with the data, and in cases of discrepancies, a third researcher contacted the interviewed specialists. The data were aggregated using narrative synthesis. Descriptive statistics were used to evaluate quantitative information.

Table 1. Answers to the quantitative questions.

Question	Average value	SD
How many patients with SLE have you diagnosed in the last year?	29	30.6
What do you think is the total number of patients in the country?	4050	3357
In what percentage of cases does LN develop as a complication?	35%	5%–60%
What proportion of patients (as a percentage) are in stages III, IV, and V of LN?	44%	10%–70%
What proportion (percentage) of patients are treated, and with what, according to their stage?	100%	
What proportion of them are treated with biological therapy?	25%	5%–67%

Results

In total, 10 leading national specialists were approached and answered the questions; of these, seven were rheumatologists and three were nephrologists. Four specialists were from Sofia, four from Varna, and two from Plovdiv. All leading national specialists contacted responded to the questionnaire. Geographical coverage was also achieved through the inclusion of all referral hospitals. Responses to the quantitative questions are presented in Table 1.

The current diagnosis rate of SLE is 0.72%, according to specialists, because 29 out of approximately 4,050 patients are diagnosed with SLE annually. Complications are common and account for 35%. Most patients are diagnosed at advanced stages (III–V), when most of the symptoms and complications are already progressing. All diagnosed patients are treated, but the proportion of those receiving biological therapy is low (25%) (Table 1).

In addition to LN, various other complications of SLE commonly develop, according to the responses (Fig. 1), including cardiovascular diseases (CVDs), neurological, dermatological, and joint complications.

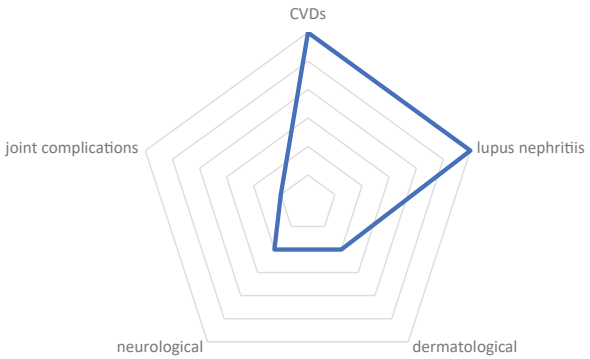

Figure 1. Most common complications.

Experts agreed that timely treatment is essential not only to delay the development of complications but also to prevent them. They pointed out that with contemporary medication strategies, approximately 70%–80% of complications could be avoided.

According to specialists, there is a specific therapy for LN, although it is quite similar to that for SLE. Immunosuppressants and corticosteroids are primarily used, including azathioprine, mycophenolate, cyclophosphamide, cyclosporine, antimalarial medicines, methotrexate, anticoagulants, and corticosteroids. Among biological therapies, belimumab, rituximab, and immunoglobulins were mentioned. All respondents agreed that treatment guidelines are the main standards for patient therapy and that the current therapy is well tolerated.

The study also found great variability in the reported percentages of patients with advanced stages III, IV, and V of LN, ranging from 10% to 70%, with a high percentage of patients reaching stages III, IV, or V. The results also indicate that rheumatologists manage the early and systemic aspects, while nephrologists intervene at advanced stages (III–V) and perform high-risk procedures such as biopsies.

Physicians noted wide variation in the use of biological treatments for LN, ranging from 10% to 67%. However, the focus is primarily on patients who are resistant to other therapies.

The duration of therapy depends on patient response and is relatively long, ranging from 2 months to at least 5 years, but the general rule is to continue treatment until patients achieve remission. When patients are in remission, therapy is reduced until the next recurrence of symptoms. Similar rules apply to biological therapy, although its duration may be shorter, at approximately 2 years until patient remission.

The last two questions refer to possible improvements in patient treatment and physicians' work. LN therapy requires input from rheumatologists because it is a complication of SLE, as well as from nephrologists because of kidney involvement. Therefore, timely collaboration is needed. In Bulgaria, only rheumatologists can prescribe biological therapy, but patient monitoring is the responsibility of both groups of specialists. As potential areas for collaboration, specialists identified the creation of a unified system for diagnosis and therapy, the establishment of coordinated medical centers with sufficient capacity for follow-up of patients with LN, the development of standardized therapeutic regimens, including biopsy when needed, and the prescription of biological therapy through joint committees.

As major unmet needs, specialists identified the lack of plasmapheresis, which is no longer subsidized by the National Health Insurance Fund (NHIF), and the need for new, more specific LN therapies, potentially of biological origin.

Discussion

This study attempted to assess physicians' awareness of LN treatment and unmet needs in Bulgaria by surveying rheumatologists and nephrologists. To the best of the

authors' knowledge, this is the first national study in the country. The study reveals discrepancies in the epidemiological data on SLE and LN.

The first Bulgarian study in 2018 found an LN prevalence of 7.68 per 100,000 people, depending on age and sex (Miteva-Katrandzhieva et al. 2018). Other authors have estimated that SLE accounts for 0.06%–0.08% of autoimmune diseases, or approximately 1,000 people diagnosed with SLE (Rashkov 2009; Yoneva 2025). It is necessary to identify and target disease-specific metabolic pathways to reduce long-term glucocorticoid use and avoid their adverse effects. LN is a severe complication that frequently leads to end-stage renal failure and requires regular monitoring (Hoover and Costenbader 2016). The discrepancies between rheumatologists and nephrologists are probably due to their involvement at different stages of disease treatment. Rheumatologists manage the early and systemic aspects, while nephrologists intervene at advanced stages (III–V) and perform high-risk procedures such as biopsies (Mihaylova et al. 2024; Reshkova and Rashkov 2024).

Physicians reported that biological therapy in Bulgaria is well tolerated. This suggests that the addition of new targeted therapies has the potential to improve clinical outcomes and reduce overall toxicity (Zhu et al. 2026). Although recognized as a severe disease with a high risk of kidney damage, LN has limited specific treatment options and relies on standard anti-inflammatory therapy, such as corticosteroids and immunosuppressants. The only specific biological therapies recommended by the NHIF are belimumab and immunoglobulins (NHIF 2026). Therefore, it is reasonable that physicians consider the need for specific biological treatments to be high. In addition, collaborative efforts in disease management should be made not only at the hospital level, where specialists cooperate, but also at the national level through the creation of a unified system for diagnosis and therapy, coordinated medical centers, and standardized therapeutic regimens.

Bulgarian physicians confirmed, as reported in a previous study, the need to involve rheumatologists, nephrologists, social workers, and other health professionals to control both immune and non-immune risk factors for progressive kidney disease (Parodis et al. 2025).

The study has several limitations, including the limited number of physicians surveyed. However, it should be noted that these physicians are specialists at highly experienced national centers for LN treatment and key national consultants in both specialties. There may be differences in treatment practices and physicians' awareness at the regional level. This feasibility study aimed to establish a broad overview of the current situation. Further studies are needed to increase the number of respondents and identify areas for improving coordination of care.

Conclusion

The management of SLE and LN faces significant clinical challenges and persistent barriers to biological and specialized therapies, such as plasmapheresis. Addressing these unmet needs requires the implementation of early identification protocols and formalized multidisciplinary coordination between rheumatology and nephrology to optimize patient-centered care.

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Appendix 1

1. What is your speciality?
2. How many patients with SLE have you diagnosed in the last year?
3. What do you think is the total number of patients in the country?
4. What are the most common complications of SLE in your practice?
5. In what percentage of cases does LN develop as a complication?
6. Is there a correlation between the time of treatment initiation and the likelihood of developing complications such as LN?
7. To what extent can timely treatment delay the development of complications?
8. What proportion of patients (as a percentage) are in stages III, IV, and V of LN?
9. Can these patients be treated with SLE therapies, or is specific treatment for LN necessary?
10. What treatments are patients with LN currently receiving, and are there specific requirements for the individual stages?
11. What proportion (percentage) of patients are treated, and with what, according to their stage?
12. What proportion of them are treated with biological therapy?
13. How well is the current therapy tolerated?
14. How long does the treatment of these patients last?
15. How long does treatment with biological therapies last before discontinuation is considered, and what criteria are used to make this decision?
16. What can be improved in the collaboration between nephrologists and rheumatologists in the diagnosis, treatment, and follow-up of patients with LN?
17. Are there unmet needs in terms of the diagnosis and treatment of complications?

Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statements

The authors declared that no clinical trials were used in the present study.

The authors declared that no experiments on humans or human tissues were performed for the present study.

The authors declared that no informed consent was obtained from the humans, donors or donors' representatives participating in the study.

The authors declared that no experiments on animals were performed for the present study.

The authors declared that no commercially available immortalised human and animal cell lines were used in the present study.

Artificial Intelligence (AI) use

The authors accept full responsibility for the content of the manuscript, including the disclosure of any use of AI.
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Author contributions

MD: Study design, survey administration, data analysis, and manuscript writing; MP: study design, survey administration, and manuscript writing; ZM: data collection, data processing and analysis, and manuscript writing; AC: data collection, data processing, and analysis; SG: data collection, data processing, and analysis; VB: data collection, data processing, and analysis; NS: data collection, data processing, and analysis; GP: study design, data collection, data processing and analysis, and manuscript writing. All authors read and approved the final manuscript.

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Data availability

All of the data that support the findings of this study are available in the main text.