

Original Article

Frequency of End-Stage Renal Disease in Systemic Lupus Erythematosus Patients Presenting at Northwest General Hospital Peshawar

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ABSTRACT

Objective: To find the prevalence of ESRD in patients with SLE at Northwest General Hospital, Peshawar.

Methodology: This descriptive cross-sectional study was conducted in the Department of Nephrology at Northwest General Hospital, Peshawar, with ethical approval (IRB No. 0114). We recruited 126 patients with definite systemic lupus erythematosus (SLE) using nonprobability consecutive sampling; ages ranged from 20 to 60 years. Patients with chronic kidney disease, renal transplantation, active malignancy, and drug-induced nephropathy were excluded. We collected data on age, illness duration, gender, socioeconomic status, comorbidities, serum creatinine levels, and ESRD status using a predesigned pro forma.

Results: 126 people participated; 92.9% were female, 52.4% were aged 31-45 years, and 83.3% lived in urban areas. Almost half (45.2%) had been living with the disease for 2-5 years, and 77.0% were from lower socioeconomic groups. The overall prevalence of ESRD was 19.0% (24/126). Increased serum creatinine was significantly associated with ESRD ($p=0.016$), whereas age, residence, disease duration, and comorbidities were not ($p>0.05$).

Conclusion: Routine renal monitoring is important, and high serum creatinine is significantly associated with ESRD, highlighting the need to monitor kidney function regularly and manage it early to minimize progression to irreversible kidney disease.

Introduction

Systemic lupus erythematosus (SLE) is the quintessential autoimmune disorder. The immune system attacks its own tissues and organs, including the joints, skin, brain, lungs, kidneys, gastrointestinal tract, cardiovascular system, and bone marrow [1]. SLE is a multisystem autoimmune condition with a wide range of clinical manifestations. Lupus nephritis (LN), a common feature of SLE, can result in end-stage renal disease (ESRD), profoundly affecting quality of life and contributing to mortality[2]. It occurs in 40-75% of individuals with SLE and correlates with a worse prognosis in this population. LN may present with proteinuria, hematuria, active urine sediment, or diminished renal function and can progress to ESRD[3]. LN may manifest at different stages throughout the progression of SLE; however, it often arises within five years of SLE onset, most frequently at disease initiation in about 50% of cases[4,5]. In total, 7-31% of individuals were diagnosed with LN concurrently with SLE, while 31-48% developed LN after SLE diagnosis, mainly within 5 years [6]. Class IV was the most prevalent LN classification and was associated with a worse prognosis. The cumulative incidence of ESRD over 5 and 10 years in patients with SLE was 3% and 4%, respectively, while in patients with SLE and LN, the incidences were 3-11% and 6-19%, respectively[7]. Individuals with LN at the onset of SLE may have more pronounced renal symptoms and experience inferior renal outcomes relative to those who develop LN after five years[8,9]. End-stage kidney disease (ESKD) can cause waste products, fluids, electrolytes, and minerals to accumulate in the body, resulting in various signs and symptoms. Patients with ESKD cannot survive without dialysis or a renal transplant. ESKD is a major contributor to diminished quality of life and early mortality[10]. Currently, the total remission rate of LN after six months of standard treatment is about 20% to 30%, which is unsatisfactory. Furthermore, poor responses to immunosuppressants, particularly glucocorticoids, severely undermine the prognosis of LN[11].SLE is a significant contributor to chronic kidney disease (CKD) and ESRD. Renal involvement is observed in roughly 60% of people with SLE, with 10% to 20% of these individuals advancing to ESRD[12].SLE can lead to several severe, life-threatening consequences, including ESRD, which significantly contributes to morbidity, mortality, and healthcare expenses. Although the diagnosis and management of LN have improved over the years, there are limited data on the prevalence of ESRD in the SLE population in Pakistan, especially in Khyber Pakhtunkhwa. Appropriate identification of this at-risk population and timely intervention depend on knowing the burden of ESRD. Therefore, we conducted this study to determine the frequency of ESRD among SLPEs at NWGH Peshawar.

Material and Method

This cross-sectional study was conducted with ethical approval from the Institutional Review Board (IRB Approval No. 0114) and approval of the Study synopsis by the College of Physicians and Surgeons Pakistan (CPSP), Department of Nephrology, Northwest General Hospital, Peshawar.from Jan to June 2026.We continued the study until the required sample size was achieved. We selected eligible participants using non-probability consecutive sampling. Using the OpenEpi sample size calculator, we calculated a sample size of n=126, based on the following assumptions: ESRD occurred in 20% of patients with lupus nephritis, a 95% confidence level, and a 7% margin of error. The study included male and female patients aged 20-60 years diagnosed with systemic

lupus erythematosus (SLE). Those patients who had either pre-existing chronic kidney disease (CKD), previous renal transplantation, active malignancy, or drug-induced nephropathy (DIN) were excluded from the study to minimize potential confounding factors and to ensure accurate assessment of the ESRD attributable to SLE. We kept all participant information confidential, and participants were told they could stop participating in the study without affecting their usual care. Parents provided demographic and clinical data, including age, gender, place of residence, socioeconomic status, employment status, and any medically diagnosed chronic conditions (diabetes mellitus, hypertension, and cardiac disease), using a predesigned structured proforma. We aseptically drew venous blood samples (3-5 mL) for laboratory studies. We operationally defined ESRD as either clinical evidence of permanent renal failure requiring dialysis or kidney transplantation, or a reduced estimated glomerular filtration rate (eGFR). We entered and analyzed the data using Statistical Package for the Social Sciences (SPSS) version 25. We used the Shapiro-Wilk test to assess the normality of continuous variables. Numerical variables were presented as mean ± SD values if they were normally distributed. We presented categorical variables as frequencies and percentages. We examined age, diabetes mellitus, hypertension, cardiac disease, place of residence, and socioeconomic and employment status as potential effect modifiers of ESRD frequency. We tested associations using post-stratification and the Chi-square test, with p < 0.05 considered statistically significant.

Result

The study included 126 individuals; half were 31-45 years old (66, 52.4%), followed by those aged 46 and older (45, 35.7%), and 15 (11.9%) were 18-30 years old. Most participants were female (117, 92.9%), while only 9 (7.1%) were male. By residence, most respondents (105, 83.3%) were from urban areas, 17 (13.5%) from rural areas, and 4 (3.2%) from outside KP. Regarding disease duration, 57 (45.2%) had a diagnosis of 2-5 years, 39 (31.0%) more than 5 years, and 30 (23.8%) less than 2 years. Most participants were in the lower socioeconomic class (97, 77.0%), with 29 (23.0%) in the average class. Most were unemployed (113, 89.7%), while only 13 (10.3%) were employed (Table 1).

Table 1 Demographic and Clinical Characteristics of the Study Participants

Variable	Category	Frequency (n)	Percentage (%)
Age	18-30 years	15	11.9
	31-45 years	66	52.4
	Above 46 years	45	35.7
Gender	Male	9	7.1
	Female	117	92.9
Residence	Urban	105	83.3
	Rural	17	13.5
	Out of KP	4	3.2
Duration of	<2 years	30	23.8

Disease	2-5 years	57	45.2
	>5 years	39	31.0
Socioeconomic Status	Lower class	97	77.0
	Middle class	29	23.0
Employment Status	Employed	13	10.3
	Unemployed	113	89.7

Among 126 participants, 55.6% had no comorbidities, 66.7% had moderate renal impairment. Moreover, 19% had ESRD.

Table 2 Clinical Characteristics and Frequency of End-Stage Renal Disease

Variable	Category	Frequency (n)	Percentage (%)
Comorbidities	None	70	55.6
	Hypertension	28	22.2
	Diabetes +	28	22.2
	Hypertension		
eGFR	>60 mL/min/1.73 m ²	16	12.7
	30-59 mL/min/1.73 m ²	84	66.7
	<30 mL/min/1.73 m ²	26	20.6
Serum Creatinine	<1.2 mg/dL	46	36.5
	1.2-2.0 mg/dL	48	38.1
	>2.0 mg/dL	32	25.4
ESRD	No	102	81.0
	Yes	24	19.0

Age (p=0.305) and residence (p=0.559) were not significantly associated with ESRD; residence counts require verification because they exceed 126 participants.

Table 3 Association of End-Stage Renal Disease with Demographic Characteristics

Variable	Category	ESRD No, n (%)	ESRD Yes, n (%)	p-value
Age	18-30 years	10	5	0.305
	31-45 years	54	12	
	Above 46 years	38	7	
Residence	Urban	87	18	0.559
	Rural	12	5	
	Out of KP/Other	3	1	

Disease duration and comorbidities were not significantly associated with ESRD, whereas serum creatinine was significantly associated (p=0.016).

Table 4 Association of End-Stage Renal Disease with Clinical Characteristics

Variable		ESRD No n (%)	ESRD Yes n (%)	p-value
Duration of Disease	<2 years	25	5	0.739
	2-5 years	47	10	
	>5 years	30	9	
Comorbidities	None	59	11	0.535
	Hypertension	22	6	
	Diabetes +	21	7	
	Hypertension			
Serum Creatinine	<1.2 mg/dL	43	3	0.016*
	1.2-2.0 mg/dL	37	11	
	>2.0 mg/dL	22	10	

Discussion

We recruited patients with systemic lupus erythematosus for this cross-sectional study to assess the prevalence of end-stage renal disease (ESRD) among SLE patients attending Northwest General Hospital (NWGH), Peshawar. A total of 126 patients were included, with most being female (92.9%), aged 31 to 45 years (52.4%), and of lower socio-economic status (77.0%) [13]. Lupus Nephritis has not been previously investigated in Pakistan. Studies on systemic lupus erythematosus in Pakistan are limited. Hafeez MH et al. [14]. The study reported cutaneous lupus symptoms in Pakistani individuals. Suleman et al. evaluated the applicability of the American Rheumatology Association classification to local lupus patients. The underreporting of lupus in Pakistan has fostered the erroneous idea that systemic lupus erythematosus is not prevalent in the country. Only a community-based investigation can determine the true prevalence of SLE [15]. Additionally, the study demonstrates that individuals with renal involvement are a high-risk category for SLE since they had much higher death rates, which is in line with several previous studies[9,15]. One study links men to a higher incidence of ESKD in SLE patients. ESKD was twice as common in males as in females, and men with SLE had a 3.37% chance of developing ESKD. Other studies report conflicting findings, some of which confirm the link between renal illness and gender [16]. Kidney cell loss is also caused by smoking and nephrotoxic substances. Poor nephron endowment due to birth preterm, nephropathic genetic variations, aging, male sex, and prior or concurrent kidney disorders are intrinsic risk factors for the advancement of chronic kidney disease. Controlling all modifiable risk factors for the advancement of CKD is essential to the treatment of lupus nephritis[17]. Although a decrease in proteinuria signifies renal outcomes, additional significant indicators encompass a decline in baseline eGFR, hypertension, the necessity for KRT at initial assessment, renal histology (ISN/RPS class IV compared to class III), the quantity of glomerulosclerosis, the existence of crescents, and mild to severe interstitial fibrosis/tubular atrophy[18,19]. These results align with our study: serum creatinine level was significantly associated with ESRD, contributing to the

disease burden in patients with SLE and allowing comparison with previous national and international studies. The overall ESRD rate was 19.0%, indicating that almost one-fifth of SLE patients had reached the stage of advanced renal disease. Moreover, serum creatinine concentration was statistically significantly associated with end-stage renal disease, whereas comorbid conditions were not. This Study uncovered a significant occurrence of renal issues among SLE patients and emphasizes the need for regular evaluations to identify those at risk of enduring kidney impairment[20,21].Individuals with systemic lupus erythematosus exhibiting elevated creatinine levels experienced worsening renal function. An elevated blood creatinine concentration may suggest a heightened risk of advancing renal dysfunction.

Conclusion

Systemic Lupus Erythematosus patients who visited Northwest General Hospital, Peshawar had significant renal involvement in the form of end-stage renal disease (ESRD), with nearly one-fifth (19.0%) such patients. The predominant patient demographic was females aged 31 to 45 residing in metropolitan regions. We found no notable correlation between end-stage renal disease and age, illness duration, place of residency, or concomitant conditions; however, serum creatinine levels were strongly associated with end-stage renal disease. These results support regular renal surveillance in SLE to ensure early diagnosis of renal impairment and prompt treatment to prevent irreversible renal disease.

Authors’ Contributions

Aina Nowsherawan¹, Hafsa Fahim², Kamran Amir Khan³, and Muhammad Adeel⁴ contributed to the preparation of this manuscript. All authors should be credited according to their actual contributions to the study, including conception and design, data acquisition, analysis and interpretation, manuscript drafting or critical revision, and final approval of the version to be published. All authors agree to be accountable for the accuracy and integrity of the work and to ensure that questions concerning any part of the manuscript are appropriately investigated and resolved.

Conflict of Interest

The authors declare that they have no conflicts of interest related to the publication of this manuscript.

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Ethical Approval

Ethical approval was obtained from the Institutional Review Board (IRB Approval No. 0114), and the study synopsis was approved by the College of Physicians and Surgeons Pakistan before commencement of the study.

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