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Epidemiology of End-Stage Renal Disease Among Dialysis Patients: Pre, During, and Post-COVID-19 Pandemic Era in Klaten Islamic General Hospital

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**Objectives :** Global Burden of Disease (GBD) studies indicate that chronic kidney disease (CKD) is a significant cause of death globally. This study assesses the health and demographic characteristics of patients receiving hemodialysis at Klaten Islamic General Hospital in Indonesia. The goal is to determine the end-stage renal disease (ESRD) leading causes of the patients, the socioeconomic and healthcare-related variables linked to them.

**Methods :** This cross-sectional study analyzed data from ESRD patients on hemodialysis at Klaten Islamic General Hospital. We evaluated variables such as gender prevalence, age, socioeconomic factors such as education and occupational status, dropout rate (including in-hospital mortality), and the leading cause of the patients from 2019 until 2023. We aimed to understand the fluctuations of ESRD patients from the pre-COVID-19 pandemic to the post-pandemic era.

**Results :** According to the study, hypertension was the leading cause of ESRD (82.18%), and diabetes became the second leading cause (35.47%). The data from 2019 until 2023 showed that the majority are male patients (57.4%) and secondary school graduates (36.6%). The largest age group ranged from 51 to 60 years old (36.9%). Private employees became the second-largest occupation (19.7%). The study found that the highest dropout rate was in 2021–2022, consisting of 358 patients, drastically increasing by 13–14% compared to 2019–2020 (265 patients) and 2020–2021 (275 patients). About 31.4% of patients in 2021 were recorded as deceased in-hospital, primarily because of the severe coronavirus infection. The dropout rate in 2022-2023 decreased by 13% from the previous year.

**Conclusions :** Male patients, those with low educational levels, and people in their middle years made up the majority of ESRD patients receiving hemodialysis. The delta variant coronavirus infection was supposed to affect and cause the highest number of dropouts and mortality rates in 2021.

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Table 1. Characteristics of ESRD patients receiving hemodialysis

Characteristics	2019		2020		2021		2022		2023		
	N	%	N	%	N	%	N	%	N	%	
Gender	Male	434	59.3%	495	59.4%	492	58.5%	440	56.0%	420	55.7%
	Female	298	40.7%	338	40.6%	349	41.5%	346	44.0%	334	44.3%
Age in Years	20-30	27	3.7%	29	3.5%	32	3.8%	34	4.3%	38	5.0%
	31-40	62	8.5%	68	8.2%	64	7.6%	58	7.4%	60	8.0%
	41-50	165	22.5%	162	19.4%	152	18.1%	141	17.9%	138	18.3%
	51-60	265	36.2%	332	39.9%	328	39.0%	292	37.1%	271	35.9%
	61-70	166	22.7%	190	22.8%	216	25.7%	204	25.9%	194	25.7%
	>70	47	6.4%	52	6.2%	50	5.9%	58	7.4%	53	7.0%
Educational Level	Not attending school	65	8.9%	59	7.1%	55	6.5%	39	5.0%	30	4.0%
	Primary school	226	30.9%	271	32.5%	263	31.3%	246	31.3%	231	30.6%
	Middle school	84	11.5%	92	11.0%	103	12.2%	96	12.2%	92	12.2%
	Secondary school	274	37.4%	311	37.3%	309	36.7%	292	37.2%	294	39.0%
Bachelor	76	10.4%	88	10.6%	97	11.5%	103	13.1%	100	13.3%	
Occupation	Governmental employee	84	11.5%	89	10.7%	90	10.7%	78	9.9%	70	9.3%
	Private employees	173	23.6%	167	20.0%	160	19.0%	154	19.6%	152	20.2%
	Students	6	0.8%	8	1.0%	9	1.1%	9	1.1%	8	1.1%
	Unemployed	113	15.4%	128	15.4%	131	15.6%	129	16.4%	120	15.9%
	Merchant/Farmer	133	18.2%	150	18.0%	142	16.9%	124	15.8%	114	15.1%
	Businessmen	25	3.4%	42	5.0%	36	4.3%	35	4.5%	36	4.8%
	Soldier	0	0.0%	3	0.4%	4	0.5%	2	0.3%	1	0.1%
	Others (no data)	198	27.0%	246	29.5%	269	32.0%	255	32.4%	253	33.6%

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Figure 1. Causes in ESRD patients receiving hemodialysis

