

PREVALENCE AND CHARACTERISTICS OF END-STAGE RENAL DISEASE REQUIRING HEMODIALYSIS IN JAMBI PROVINCE: IS KIDNEY TRANSPLANTATION WORTH CONSIDERING?

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ABSTRACT

Introduction: Chronic kidney disease may progress to ESRD, requiring renal replacement therapy. Updated data on ESRD incidence and mortality in Jambi Province remain limited, highlighting the need for current epidemiological data to guide treatment planning. **Objective:** To determine whether kidney transplantation services need to be developed in Jambi Province and to determine the prevalence and characteristics of ESRD patients who underwent hemodialysis in Jambi Province. **Material& Methods:** This descriptive observational study was conducted using secondary data and questionnaire instruments. The secondary data were taken from a total of six hospitals with hemodialysis facilities in Jambi Province, Indonesia. The study sample included 100 people from the two largest hemodialysis centers in Jambi Province. **Results:** The total of ESRD patients who underwent hemodialysis in Jambi from 2022 increased to 1.306 patients in 2023, with an increase of hemodialysis procedures in 2023 (9.2%). The patients who deceased during the hemodialysis phase has also increased, from 259 people in 2022 to 317 people in 2023, with a mortality rate of 25.7%. The results of the questionnaire from 100 respondents revealed that 69% of patients wished to undergo kidney transplant, only 14% were willing to be referred to other provinces due to socioeconomic barriers, 87% of patients agreed that if there is a kidney transplant service in Jambi, it would give them additional hope during hemodialysis, because it might be their turn to undergo a kidney transplant. **Conclusion:** The incidence of ESRD and the number of hemodialysis procedures in Jambi Province increase annually, followed by an increase of deceased patients and high mortality rates. This study also revealed that the majority of respondents who underwent hemodialysis hope can undergo kidney transplantation in Jambi Province.

Keywords: ESRD, renal replacement therapy, hemodialysis, kidney transplantation, Jambi province.

ABSTRAK

Pendahuluan: Penyakit ginjal kronis dapat berkembang menjadi penyakit ginjal tahap akhir (ESRD) yang memerlukan terapi pengganti ginjal. Data terbaru mengenai kejadian dan mortalitas ESRD di Provinsi Jambi masih terbatas, sehingga diperlukan data epidemiologis terkini untuk mendukung perencanaan terapi. **Tujuan:** Untuk mengetahui apakah pelayanan transplantasi ginjal perlu dikembangkan di Provinsi Jambi dan untuk mengetahui prevalensi dan karakteristik pasien ESRD yang menjalani hemodialisis di Provinsi Jambi. **Bahan & Cara:** Penelitian observasional deskriptif ini dilakukan dengan menggunakan data sekunder dan instrumen kuesioner. Data sekunder diambil dari enam rumah sakit yang memiliki fasilitas hemodialisis di Provinsi Jambi, Indonesia. Sampel penelitian mencakup 100 orang dari dua pusat hemodialisis terbesar di Provinsi Jambi. **Hasil:** Total pasien ESRD yang menjalani hemodialisis di Jambi dari tahun 2022 meningkat menjadi 1.306 pasien di tahun 2023, dengan peningkatan prosedur hemodialisis di tahun 2023 (9,2%). Pasien yang meninggal selama fase hemodialisis juga meningkat, dari 259 orang di tahun 2022 menjadi 317 orang di tahun 2023, dengan angka kematian sebesar 25,7%. Hasil kuesioner dari 100 responden menunjukkan bahwa 69% pasien ingin menjalani transplantasi ginjal, hanya 14% yang bersedia dirujuk ke provinsi lain karena hambatan sosial ekonomi, 87% pasien setuju jika ada layanan transplantasi ginjal di Jambi, hal ini akan memberikan harapan tambahan selama menjalani hemodialisis, karena mungkin saja itu adalah giliran mereka untuk menjalani transplantasi ginjal. **Simpulan:** Insiden ESRD dan jumlah prosedur hemodialisis di Provinsi Jambi meningkat setiap tahunnya, diikuti dengan peningkatan pasien yang meninggal dan angka kematian yang tinggi. Penelitian ini juga mengungkapkan bahwa mayoritas responden yang menjalani hemodialisis berharap dapat menjalani transplantasi ginjal di Provinsi Jambi.

Kata kunci: ESRD, terapi pengganti ginjal, hemodialisis, transplantasi ginjal, provinsi jambi.

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INTRODUCTION

Chronic kidney disease (CKD) is a pathophysiologic process with diverse etiologies, resulting in a progressive decline in kidney function and generally results in renal failure or End-stage Renal Kidney Disease (ESRD). This process eventually requires permanent renal replacement therapy, such as hemodialysis, peritoneal dialysis or kidney transplantation.¹

The number of patients with chronic kidney disease is increasing annually. According to the Basic Health Research report, the prevalence of chronic kidney disease in Indonesia has reached 3.8 people/1.000 people.² Basic health research data from Jambi Province in 2018 revealed that the prevalence of chronic kidney disease was 15.469 people, but only 55 people underwent hemodialysis therapy.³

Kidney transplantation has advantages over hemodialysis in terms of extending life expectancy, improving quality of life, and improving the long-term cost efficiency of the disease.⁴ On the basis of data published by Cipto Mangunkusumo Hospital the largest kidney transplant center in Indonesia, the survival rate of grafted kidneys at 10 years is 81% whereas the survival rate of patients at 10 years is 74%.²

The Social Insurance Administration Body or Badan Penyelenggara Jaminan Sosial (BPJS) reported that IDR 2.5 trillion was spent on the treatment of CKD patients in 2019, among the total funds, 98% were paid for hemodialysis claims. On the other hand, to perform kidney transplant procedures, the total cost incurred is as high as 400 million Rupiah. This sometimes leads to the perception that the cost required to perform a kidney transplant is very large, but this amount is almost equivalent to the total cost of hemodialysis for four years, therefore in the long term, kidney transplantation is more cost efficient than hemodialysis is.²

The incidence of ESRD in Jambi Province itself, to the best of the author's knowledge, has not been updated or published properly, so it is difficult to know exactly how many ESRD cases there were, whether there was an increase in ESRD cases, and what the mortality rate was. Without these data, there will be no efforts to reduce the increase in ESRD cases, and there will be no efforts to provide alternative therapeutic options other than hemodialysis for these patients, when other

provinces are competing to develop kidney transplant services.

OBJECTIVE

This study aimed to determine the incidence and characteristics of CKD patients who underwent hemodialysis in Jambi Province, and to determine whether kidney transplantation services need to be developed in Jambi Province.

MATERIAL & METHODS

This descriptive observational study was conducted using secondary data and questionnaire instruments. The secondary data were taken from a total of six hospitals with hemodialysis facilities in Jambi Province, Indonesia. The research sample of 100 people was taken from the two largest hemodialysis centers in Jambi Province. The samples were taken via the purposive sampling technique. Data analysis was performed via the SPSS program with univariate analysis. To maintain patient confidentiality, the name of the hospital was disguised.

RESULTS

Table 1. Age distribution of patients who underwent hemodialysis.

Age Distribution (years)	2022		2023	
	Patient	%	Patient	%
< 15 th	8	0.75	8	0.61
15 - 64 th	844	78.80	1038	79.48
> 64 th	219	20.45	260	19.91
TOTAL	1071	100	1306	100

In 2022, a total of 1.071 patients underwent hemodialysis, which increased to 1.306 patients in 2023, representing an increase of 21.9% (235 patients). In both years, the majority of patients were aged 15–64 years, accounting for 78.80% (844 patients) in 2022 and 79.48% (1,038 patients) in 2023. Patients aged >64 years represented 20.45% (219 patients) of the total patients in 2022 and 19.91% (260 patients) in 2023. Meanwhile, patients aged <15 years accounted for the smallest proportion, with 0.75% (8 patients) in 2022 and 0.61% (8 patients) in 2023 (Table 1).

Compared with those in the previous year, the number of hemodialysis patients in Jambi Province increased from 1.071 patients in 2022, increasing to 1.306 patients in 2023, or an increase of 21.9% (235 new patients). The highest number of patients were in Hospital A with 446 patients (41.64%) in 2022 and this number increased to 559 people (42.80%) in 2023.

Table 2. Data distribution based on the number of patients who underwent hemodialysis.

Hospital	2022		2023	
	Patient	%	Patient	%
RS A	446	41.64	559	42.80
RS B	249	23.25	303	23.20
RS C	70	6.54	77	5.90
RS D	137	12.79	145	11.10
RS E	105	9.80	151	11.56
RS F	64	5.98	71	5.44
TOTAL	1071	100	1306	100

*The name of the hospitals were disguised

The number of hemodialysis procedures in Jambi Province increased from the previous year, with 39.051 procedures in 2022 and increased from 2023 to 42.652 procedures or an increase of 9.2% (3.601 procedures) compared with the previous year. Most hemodialysis treatments were performed in Hospital B with 10.106 treatments (25.88%) in 2022 and 10.120 treatments (23.73%) (Table 3)

The number of patients who deceased during the hemodialysis phase at 5 hemodialysis facilities increased from 259 patients in 2022 (mortality rate: 25.7%), to 317 patients (mortality rate: 25.6%) in 2023, an increase of 58 patients (22.3%) compared with the previous year. The

increase in the number of patients who deceased was inseparable from the increase in the number of hemodialysis patients per year. Data on the number of patients who deceased in Hospital F were not obtained due to limitations from related parties (Table 4)..

Table 3. Data distribution based on the number of hemodialysis procedures.

Hospital	2022		2023	
	n	%	N	%
RS A	8570	21.95	8307	19.47
RS B	10106	25.88	10120	23.72
RS C	4715	12.07	6007	14.08
RS D	6342	16.24	6752	15.83
RS E	4207	10.77	5176	12.13
RS F	5111	13.09	6300	14.77
TOTAL	39051	100	42662	100

Table 4. Data distribution of deceased patients.

Hospital	2022		2023	
	Patient	%	Patient	%
RS A	38	14.67	61	19.24
RS B	94	36.29	105	33.12
RS C	12	4.63	14	4.42
RS D	67	25.87	68	21.45
RS E	48	18.53	69	21.77
TOTAL	259	100	317	100

Compared with males, there were more hemodialysis patients who were female (54.8%) than males (45.1%). Patient data at Hospital F were not obtained due to limitations from the relevant parties (Table 5).

Table 5. Data distribution based of gender.

Hospital*	2022				Total	2023				Total
	M	%	F	%		M	%	F	%	
RS A	722	52.01	667	47.99	1390	664	43.20	873	56.80	1537
RS B	697	52.68	625	47.32	1323	749	57.35	557	42.65	1306
RS C	249	40.00	375	60.00	630	351	47.43	389	52.57	740
RS D	242	30.54	554	69.46	799	310	33.26	622	66.74	932
RS E	303	50.58	296	49.42	599	342	44.53	426	55.47	768
TOTAL	2219	46.80	2522	53.20	4741	2416	45.16	2867	54.84	5283

*The name of the hospitals were disguised, M Male, F Female

The most common type of hemodialysis access in the five hemodialysis facilities was Cimino with 3.248 (61.67%), followed by CDL with 1.809 (34.35%) in 2023. Patient data in Hospital F were not obtained due to limitations from the relevant parties. (Table 6).

In this research, a questionnaire was given to a sample of 100 ESRD patients who underwent hemodialysis at the two largest hemodialysis facilities in Jambi Province to determine their desire to undergo kidney transplantation and their expectations of kidney transplantation services in Jambi Province.

The results of the questionnaire, revealed that 69% of patients wished to undergo kidney transplantation, but only 14% were willing to be referred to other provinces. A total of 92% of patients hoped that hospitals in Jambi Province could provide

kidney transplant services (Table 7). The most common reasons mentioned by those who did not want to undergo a kidney transplant were advanced age and the absence of a donor. While some of the reasons for those who did not want to be referred to other provinces were the lack of money for transportation and accommodation, they were hesitant because the distance was too far from where they lived and could not leave their jobs (Table 7).

As many as 58% of patients were known to have felt depressed, or fatigued or wanted to quit hemodialysis (Table 6). On the other hand, 87% of patients agreed that if there is a kidney transplant service in Jambi Province, it would give them additional hope/enthusiasm in undergoing hemodialysis, because one day it might be their turn to undergo a kidney transplant (Table 7).

Table 6. Hemodialysis (HD) access data distribution.

Hospital	2022						2023					
	CDL	%	Cimino	%	Fem.	%	CDL	%	Cimino	%	Fem.	%
RS A	385	27.70	933	67.12	72	5.18	841	54.68	656	42.65	41	2.67
RS B	153	11.56	865	65.38	305	23.05	300	23.04	841	64.59	161	12.37
RS C	68	32.58	552	97.42	0	0.00	133	17.90	610	82.10	0	0.00
RS D	202	25.06	604	74.94	0	0.00	266	29.49	636	70.51	0	0.00
RS E	249	41.57	344	57.43	6	1.00	269	34.40	505	64.58	8	1.02
TOTAL	1057	22.31	3298	69.61	383	8.08	1809	34.35	3248	61.67	210	3.99

*The name of the hospitals were disguised, CDL Catheter Dual Lumen, Cimino Arterio-Venous Shunt, Fem. Femoral Access

Table 7. Results of the questionnaire.

No.	Question	Category	N	%
1	When did you start HD?	≤1 year	44	44.0
		> 1 year	56	56.0
2	Frequency of HD per week?	1 Time	3	3.0
		2 Times	97	97.0
		> 2 Times	0	0.0
3	Do you ever feel depressed, fatigue or want to quit HD?	Yes	58	58.0
		No	42	42.0
4	Do you want to undergo a kidney transplant?	Yes	69	69.0
		No	31	31.0
5	Are you willing to be referred to another province to receive kidney transplant services?	Yes	14	14.0
		No	86	86.0
6	Do you hope that hospitals in Jambi Province can provide kidney transplant services?	Yes	92	92.0
		No	8	8.0
7	If there is a Kidney Transplant service in Jambi Province, will it give you additional hope / enthusiasm in undergoing hemodialysis?	Yes	87	87.0
		No	13	13.0

*HD Hemodialysis, N The total answers each question

DISCUSSION

CKD is a disease that causes many deaths in the 21st century, until 2017 at least 843.6 million people in the world were reported to suffer from CKD worldwide.⁵ The prevalence of CKD patients who undergo hemodialysis in Jambi Province is increasing every year, from 1,071 people in 2022 to 1,306 people in 2023. This increase will be even sharper than that in 2018, when only 55 patients underwent hemodialysis procedures in Jambi Province.³ The increase in the number of ESRD patients correlates with an increase in the number of hemodialysis procedures, where there were 39,051 procedures in 2022 and 42,652 procedures in 2023. Research by Choi et al (2021) revealed that the prevalence of hemodialysis procedures in Korea has increased up to 6 times since 2002, when there were 11,215 procedures which increased to 67,486 procedures in 2017. Research by Hustrini et al (2022) revealed that the increasing prevalence of ESRD may be caused by increasing rates of metabolic diseases such as hypertension, diabetes mellitus and dyslipidemia with the most common comorbidities in the population being hypertension. The increase in metabolic diseases is generally due to changes in diet and increased lifestyle expectations. There are many factors that make hemodialysis therapy more common in patients with ESRD, including the fact that it can be performed without lengthy and specialized preparation, is more accessible to patients, and is relatively easy to perform than to other options such as kidney transplantation or peritoneal dialysis.^{6,7}

An important finding in this study was the predominance of patients in the productive age group. Patients aged 15–64 years accounted for 78.80% (844 of 1,071 patients) in 2022 and increased to 79.48% (1,038 of 1,306 patients) in 2023. In contrast, patients aged >64 years accounted for 20.45% and 19.91%, respectively, while patients aged <15 years comprised less than 1% in both years. In Indonesia, Hustrini et al. (2023) reported that among 1,152 patients with kidney failure receiving kidney replacement therapy in five tertiary hospitals in Jakarta, the median age at initiation of kidney replacement therapy was 48 years (IQR 37–58 years), indicating that kidney failure requiring replacement therapy predominantly affected middle-aged adults.⁸ This finding is broadly consistent with reports from other developing countries in Asia, where patients receiving

maintenance hemodialysis were predominantly middle-aged adults. Bukhari et al. (2023) reported a mean age of 45 ± 15 years among 342 patients undergoing maintenance hemodialysis across four dialysis centers in Pakistan.⁹

The predominance of patients of productive age has important implications beyond the clinical burden of ESRD, as long-term dependence on hemodialysis may affect employment, productivity, quality of life, and socioeconomic status. Kidney transplantation is generally considered the preferred kidney replacement therapy for eligible patients with ESRD because it is associated with better long-term survival, quality of life, and functional outcomes compared with maintenance dialysis. From a health-policy perspective, the high proportion of patients of productive age undergoing hemodialysis may therefore serve as an important consideration in evaluating the development of a kidney transplantation program in Jambi Province. Transplantation can potentially reduce long-term dependence on dialysis and its associated healthcare burden while providing better patient-centered outcomes in appropriately selected recipients.¹⁰

The results of this study revealed that approximately 58% of hemodialysis patients experienced depression, which is in accordance with a report by Khalil et al (2011) that 20% - 90% of hemodialysis patients are prone to depression.¹¹ Research by Himmelfarb et al (2020) revealed that patients who undergo hemodialysis are prone to depression because of their inability to work and carry out daily activities independently. Other factors such as transportation time for hemodialysis sessions, as well as pain due to vascular access during hemodialysis affect patients quality of life.¹² compared to patients underwent kidney transplantation (33.3%), more patients who underwent hemodialysis experienced depression and fatigue (53%).¹³

This study revealed that the mortality rate was 25% or 1 in 4 people who deceased from hemodialysis each year, with 259 deaths (24.18%) recorded among 1,071 patients in 2022 and 317 deaths (24.27%) among 1,306 patients in 2023. Although the proportion remained relatively stable between the two years, the absolute number of deaths increased by 22.4%, from 259 to 317 patients, in parallel with the increasing number of patients undergoing hemodialysis. This rate is much higher than reports from the Lazio Region (Italy) with a mortality rate of 13.1% and Bali Province

(Indonesia) with a mortality rate of 8.11%.¹⁴⁻¹⁶ The relatively high mortality observed among patients receiving hemodialysis highlights the substantial long-term burden of ESRD despite the availability of kidney replacement therapy. Hemodialysis and peritoneal dialysis are established treatments that effectively replace several essential kidney functions, however they do not fully restore normal renal physiology and patients remain exposed to complications related to ESRD and long-term dialysis. These include cardiovascular disease, infection, malnutrition, anemia, and dialysis-related complications, which contribute substantially to long-term morbidity and mortality.^{12,17}

In contrast, kidney transplantation generally provides superior long-term survival and quality of life compared with maintenance dialysis in appropriately selected patients. A meta-analysis by Thurlow et al. revealed that the 5-year life expectancy rate in patients with HD and kidney transplants is 41% in the United States and 48% in Europe.¹⁷ From a health-policy perspective, the consistently high proportion of deaths among patients undergoing hemodialysis in Jambi Province emphasizes the importance of evaluating kidney replacement therapy beyond dialysis availability alone. Nevertheless, transplantation should be considered as a complementary long-term strategy rather than a replacement for dialysis, since dialysis remains essential as initial, bridging, or alternative therapy for patients who are not suitable candidates for transplantation.

In terms gender in this study, women dominated the entire sample in 2022, there were 2522 women with ESRD who underwent HD (53.20%) while there were 2,219 men (46.80%). In 2023 there was not much difference, with 2867 women (54.84%) and 2416 men (45.16%). Another study conducted by Leny et al (2018) reported that 65 people (51.6%) patients with ESRD who underwent HD were female and 61 (48.4%) were male. Research by Kovesdy et al (2022) revealed that the prevalence of ESRD is greater in women than in men, but the reasons why women experience ESRD more often are still widely debated. Research by Hecking et al (2014) and Iseki et al (2005) revealed that the hormone estrogen has a protective effect on ESRD, and the potential destructive effect of testosterone in nondiabetic ESRD indicates that the incidence of ESRD patients is greater in men.¹⁸⁻²⁰

The most common form of hemodialysis access was Cimino (Arteriovenous fistula/AVF) in

2022 with 3298 accesses, which decreased from 2023 to 3248 accesses. Another frequently used access mode is CDL (Catheter Double Lumens) with 1057 of accesses in 2022 and 1809 accesses in 2023. Research conducted by Dinh et al (2019) at Bach Mai Hospital revealed that the most common access was AVF (94.89%). Researchers reported that the most commonly used vascular access in permanent vascular access is AVF because of the low complication rate. This is because the fistula can last longer and requires less intervention.²¹ However, research by Allon et al (2023) revealed that AVF as a vascular access for dialysis, has decreased from 2015-2020 namely 18600 accesses in 2015 and 14060 accesses in 2020. This reduction is due to several other factors such as aging, high rates of obesity, diabetes mellitus, peripheral arterial disease and recurrent cellulitis which increase the risk of fistula failure and create patency in AVFs. AVF insertion also requires long-term preparation before the patient can start hemodialysis therapy.²¹⁻²³ Whereas in this study, CDL access has increased every year as for in a study conducted by Tey et al (2010) the use of central catheters as hemodialysis vascular access has increased in the past year from 24.7% to 29.5%, whereas the use of AVF has decreased from 62.3% to 58.6%. When hemodialysis must be performed immediately, adequate vascular access needed. Non-tunneling CDL is the best option when long-term access such as AVF is not available. However, hemodialysis catheter infection has high morbidity and mortality rates in patients who have undergone hemodialysis. Some factors that often trigger hemodialysis catheter infection are patient immunity, bacterial virulence and hemodialysis procedures. Studies in Turkey and the Netherlands reported that the bacteremia rate after CDL insertion increased to 23.9% and 22%, respectively. The incidence rate of bacteremia was 10 times greater with hemodialysis catheters than with AVF access.^{23,24}

CONCLUSION

The incidence of ESRD and the number of hemodialysis procedures in Jambi Province increase every year, followed by an increase in the number of deceased patients and high mortality rates. In this study, it can also be concluded that most ESRD patients hope to undergo kidney transplantation. However, the absence of kidney transplantation services in Jambi Province and the socioeconomic barriers that make it difficult for them to be referred

to other provinces, make this hope difficult. The existence of a kidney transplant service in jambi province is expected to not only provide better treatment options, and reduce mortality and depression, but also give patients with esrd additional enthusiasm in undergoing hemodialysis therapy, because one day it might be their turn to undergo a kidney transplant.

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