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Association between vascular access type with profile hemodialysis patient in west Nusa Tenggara district hospital

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ABSTRACT

Intoduction: Currently, the prevalence of chronic kidney disease (CKD) is an increasing public health problem. In Indonesia, CKD increased from 0.2% in 2013 to 0.38% in the year 2018. CKD requires very high maintenance and handling costs for hemodialysis. To be able to do hemodialysis, it is necessary to create vascular access as a pathway for blood circulation from the patient's body to the hemodialysis machine. This research is to determine the profile of vascular access and the association between vascular access with comorbid, age, and sex.

Methods: This research is descriptive quantitative research, cross sectional. Data were taken from the registration data or medical record of CKD patient that undergo hemodialysis at West Nusa Tenggara Distric Hospital. Data collection was carried out from 10th January 2020 to 10th March 2020. By applying certain inclusion and exclusion criteria, there were 100 obtained data and subsequently were analyzed using SPSS software. Univariate and bivariate analysis using chi-square test were carried out to descrive the data distribution and the association between variables respectively.

Result: Of the 100 respondents, it was found that most of them were female 57%. Most data were aged 48-58 years 43% people. The most comorbid is Diabetes Mellitus with 53% of people. The most used vascular access is AV Fistula Brachiocephalic 58.0%. Based on the Chi-Square statistical test, it shows that there is a significant association between vascular access with the comorbid disease ($p < 0.05$) $p = 0.003$, and the present association between vascular access to sex was obtained p-value $= 0.001$ ($p < 0.05$) and there is no significant association between the use of vascular access to age showed a value ($p > 0.05$) $p = 0.08$. Based on this study to determine vascular access, comorbid and sex are considered in decision making.

Conclusion: The research shows that there is association between the vascular access type to comorbidities and gender.

Keywords: Chronic kidney disease, vascular access, comorbid, gender, age.
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INTRODUCTION

Currently, the prevalence of chronic kidney disease (CKD) is an increasing public health problem. In Indonesia, CKD increased from 0.2% in 2013 to 0.38% in the year 2018. CKD, also known as kidney failure, requires very high treatment and handling costs for renal replacement therapy, namely hemodialysis or a kidney transplant. Hemodialysis is a replacement therapy that is performed 2-3 times a week, with a period of approximately 5 hours for each hemodialysis procedure, which aims to remove protein metabolism waste and to correct fluid and electrolyte balance disorders.[1]

To be able to do hemodialysis, it is necessary to create vascular access as a pathway for blood circulation from the patient's body to the hemodialysis machine. There are three main type of vascular access that can be applied to hemodialysis patient. The choice of vascular access type is depend to various factors such as the choice of the type of vascular access, the determination of when to do access, the patient's condition, and the patient's medical history has a big influence in obtaining adequate hemodialysis. Therefore, this study was performed with aims to determine the association between vascular access type and hemodialysis patient's profile (i.e. comorbidities, age, gender) that previously has been diagnosed with CKD.[2,3]

METHODOLOGY

This research is cross-sectional study that uses an analytic observational method, hence there was no intervention that given to the subject. The data used in this study are primary data obtained from the registration data or the medical record of patients who underwent hemodialysis treatment at the West Nusa Tenggara Province Hospital, where each patient has been diagnosed with CKD as a research subject. The data was collected form 10th January 2022 until 10th March 2022.

The collected data must meet the inclusion and exclusion criteria. The patients that have been diagnosed with CKD and underwent hemodialysis were the inclusion criteria. CKD can be diagnosed

using clinical findings, laboratory and radiological examination. Then, the CKD patient's medical record were evaluated to identify the comorbidities, age, gender, and vascular acces type. Meanwhile, exclusion critera in this study were incomplete patient medical records.In this study, the independent variable was vascular acces type such as AV fistula radiocephalica, AV fistula brachiocephalika, and temporary vascular access. Meanwhile the dependent variable in this study was comorbidities, age, and gender.

The data that has been collected will then be processed using Microsoft Excel and SPSS version 23.0 applications on the computer for further statistical analysis. Data analysis used in this research are univariate analysis and bivariate analysis, where univariate analysis descrive the data distribution and bivariate analysis describe the association between independent and dependent variable. The choice of vasulcar acces type and hemodialysis patient's profile (i.e. comorbidities, age, gender) were statistically analyzed using chi-square test with p-value less than 0.05 as the significance indicator.

RESULT

Characteristics of Research Subjects and Vascular Access Profile

Following the inclusion and exclusion criteria, 100 research subjects were obtained. The characteristics of the research subject are shown in Table 1.

The results of the vascular access profile data in patients with CKD are shown in Tabel 2.

Table 1. Characteristics of research subjects.

Characteristics	Frequency N=100	Percentage (%)
Gender		
Male	43	43.0
Female	57	57.0
Age		
15-25 years	4	4.0
26-36 years	10	10.0
37-47 years	23	23.0
48-58 years	43	43.0
59-69 years	20	20.0
Comorbid		
Diabetes mellitus	53	53.0
Hypertension	41	41.0
Others	6	6.0

Table 2. Vascular access profile in chronic kidney disease patients.

Characteristics	Patient	
	Frequency (n = 100)	Percentage(%)
Vascular access		
AV Fistula Radiocephalica	31	31.0%
AV Fistula Brachiocephalica	58	58.0%
Temporary Vascular Access	11	9.0%

Table 3. Association between vascular access with the comorbid.

Comorbid	Vascular Access			p
	AV Fistula Radiocephalica (n=31)	AV Fistula Brachiocephalika (n=58)	Temporary Vascular Access (n=11)	
DM	3	44	4	
HT	25	7	6	**0.02***
Others	3	7	1	

*Significant p value was <0.05

Association Between Vascular Access with The Comorbid

Comorbid in this study were assessed from three things, Diabetes Mellitus, Hypertension and others. Table 3 provides the results of the data showing the relationship between vascular access selection and comorbidities.

Based on the table above, shows that there is a relationship between the choice of vascular access to comorbid diseases (p <0.005). Many comorbid of diabetes mellitus choose AV fistula Brachiocephalica vascular access while in hypertension many use vascular access in the form of AV Fistula Radiocephalica because the value generated is 0.02 which is a significant value.

Association Between Vascular Access with Gender

Based on the results of research data on the selection of vascular access to gender, it was found that the average female using AV Fistula Brachiocephalica vascular access was 40 patients, while the male on average used AV Fistula Radiocephalica vascular access which was 23 patients. The association between these variable is shown in Table 4.

Based on the chi-square statistical test, a significant value was obtained because the value of p = 0.001, so it can be concluded that, there is a relationship between the choice of vascular access to gender.

Association Between Vascular Access with Age

Based on the Table 5 above, after performing a statistical test using chi-square the results obtained p value> 0.05, so it can be concluded that there is no relationship between the choice of vascular access and age.

DISCUSSION

The Characteristics of Research Subjects and Vascular Access Profile

Based on research data, the gender variable was found that the female had more CKD (57%) than the male (47%). Clinically female have a risk of experiencing chronic kidney failure twice as large as men. According to the study by Hu *et al.* (2018),

Table 4. Association between vascular access with gender.

Gender	Vascular Access			p
	AV Fistula Radiosephalica (n=31)	AV Fistula Brachiocephalika (n=68)	Temporary Vascular Access (n=11)	
Man	23	18	5	**0.001***
Women	8	40	6	

*Significant p value was <0.05

Table 5. Association between vascular access with age.

Age (Years)	Vascular Access			P-value
	AV Fistula Radiocephalica (n=31)	AV Fistula Brachiocephalica (n=58)	Temporary Vascular Access (n=11)	
15-25	2	1	1	
26-36	3	6	0	
37-47	5	19	3	**0.8**
48-58	11	15	4	
59-69	10	17	3	

*Significant p value was <0.05

the sex of women more than men can be caused by several things, because female have a poor lifestyle and quality of life that can affect health such as consumption of drugs, consumption of foods with high sugar levels, drinking coffee and alcohol.[4]

Based on the results of research data, from the age variables, it was found that the average age was more than 35 years with a total 86.0% patients experiencing CKD. Meanwhile, only 14.0% patients under 35 had CKD. Clinically, patients with older age are more at risk of developing CKD. Age is an unavoidable risk factor for degenerative diseases. Naturally, all the functions of the body's organs, including the kidneys, will decline with age. In this study, as you get older, the risk of experiencing CKD will increase.[5]

In this study, it was found that the most comorbid diseases were Diabetes Mellitus at 58.0%, then hypertension at 38.0%, and others only 11.0%. This is in concordance with a study by Shankar *et al.* (2021), who found the common comorbidities in CKD patient were hypertension (83.3%) and diabetes mellitus (44.4%).[6] Diabetes mellitus, hypertension, kidney stones, glomerular or tubulointerstitial kidney disease, and drug toxicity are referred to as initiation factors, that can directly initiate kidney damage. This initiation factor, if not controlled will worsen and accelerate kidney damage, so it is also known as a progression factor.[2]

From the results of this study, most of the research subjects used AV fistula 81.0% with the Brachiocephalic vascular access 51.0%, Radiocephalica of 30.0%, while the use of other vascular access was only 19.0%. The use of arteriovenous fistula (AVF) is recommended over other accesses as hemodialysis access because it can be used for the long term, morbidity and mortality rates are lower.

Association Between Vascular Access with The Comorbid

From the results of this research data, it was found that many patients with comorbid diabetes mellitus choose AV fistula Brachiocephalic vascular access (44.0%) while in hypertension many use vascular access in the form of AV fistula radiocephalica (25.0%). The correlation between vascular access and comorbid diseases had a relationship p = 0.003. The results of this study indicate that the p-value is less than 0.05, so it can be concluded that there is a significant association between the use of vascular access and disease comorbidities in CKD. But it is in contrast with a study by Lee *et al.* (2017) that shown the association between diabetes comorbidity with vascular acces (i.e. AV fistula or graft) is below the significance indicator, with the p-value is 0.66 (significant if <0.05).[7] But theoritically, patients who experience diabetes mellitus develop complications more quickly in the form of damage to the endothelium of blood vessels or lesions on the arteriolar walls so that patients with diabetes mellitus are less likely to be able to use vascular access. AV Fistula Radiocephalica because at a. radialis towards v. cephalic has a smaller vessel diameter so that it lacks the dilatation power of the blood vessels to fight the rate of blood flow. In the absence of a suitable blood vessel on the wrist.[8]

So for this current state, usage of AV Fistula Brachiocephalic is safer and better to choose, because a. brachialis towards v. cephalic has a large blood vessel diameter so that it is sufficiently capable of dilating against the higher blood flow rate of blood pressure during hemodialysis.

Association Between Vascular Access with Gender

Based on the results of the study, the female sex mostly used the AV fistula Brachiocephalic vascular access, which was 40 patients, while the male gender used the AV fistula radiocephalica vascular access on average 23 patients. Based on the results of the statistical test values on the dependent variable with the independent variable, it was found that the value of p = 0.001, this result indicated that there was an association between vascular access and the type of vascular access. It is in concordance to a study by Soleymanian *et al.* (2017), that found one of risko factor for higher usage of non-AV fistula access are female gender (OR: 1.97; 95% CI: 1.30-3.01).[9] Sex differences will affect the size of blood vessels, the adequacy of blood vessels, and the speed of blood flow. The female sex tends to have smaller blood vessels so that the use of vascular access The Brachiocephalic AV fistula is preferred because it can function properly and provide adequate access to dialysis.[8]

Association Between Vascular Access with Age

Based on the results of research data, it was found that the age group 37-47 years used AV Fistula Brachiocephalika (19 patients) while in the 59-69 years age group AV Fistula Brachiocephalika (17 patients) this did not reach statistical significance. The results of this study indicate that the p-value is greater than 0.05 (p = 0.08). This is in contrast to study by Jeong *et al.* (2019), that found the association between

autologous AV fistula with age (p-value <0.01), where it was more common in the nonelderly group of CKD patients that undergo hemodialysis.[10] The patients with characteristics suitable for AV fistula vascular access were not automatically offered to choose Brachiocephalic AV fistula vascular access. Based on the procedure for selecting vascular access for patients with CKD, it would be advisable to use AV fistula radiocephalica in patients who appear to be clinically suitable. Although the choice of vascular access in patients is important, elderly patients who are deemed suitable for placement of vascular access with AV radiocephalica should not be refused insertion simply because of age. Returning to review other factors that may influence the choice of vascular access such as anatomic factors assessed by the size of the radial artery diameter.[11]

Limitation of The Study

The limitation of this study was the lack of information about association between independent and dependent variable without neglecting the influences between depedent variables on each other. This aspect can be improved by establishing a study design and its methodology that can accommodate the needs of multivariate analysis. Another thing that can be improved is also the sample size that relatively smaller that other researcher's studies.

CONCLUSIONS

Based on the results of research conducted on vascular access profiles in patients with CKD at the West Nusa Tenggara Province Hospital, it can be concluded that: the sex ratio of female has more CKD than male, age more than 35 years increases the risk of CKD, the most common disease comorbid in CKD is diabetes mellitus, there is a relationship between the choice of vascular access to comorbid diseases, there is a relationship between the choice of vascular access to gender, and there is no relationship between the choice of vascular access to age.

ETHICAL CLEARANCE

The institution has approved this study.

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None.

CONFLICT OF INTEREST

None.

AUTHOR CONTRIBUTION

All of the author has been participated in preparing the article

REFERENCES

1. Badan Penelitian dan Pengembangan Kesehatan. Laporan Riskesdas 2018 Nasional. 2018.
2. Levey AS, Coresh J. Chronic kidney disease. Lancet. 2012;379(9811):165–80. Available from: http://dx.doi.org/10.1016/S0140-6736(11)60178-5
3. McClellan WM, Flanders WD. Risk factors for progressive chronic kidney disease. J Am Soc Nephrol. 2003;14(SUPPL. 2):65–70.
4. Hu EA, Selvin E, Grams ME, Steffen LM, Coresh J, Rebholz CM. Coffee Consumption and Incident Kidney Disease: Results From the Atherosclerosis Risk in Communities (ARIC) Study. Am J Kidney Dis. 2018;72(2):214–22.
5. Kazancioğlu R. Risk factors for chronic kidney disease: An update. Kidney Int Suppl. 2013;3(4):368–71.
6. Shankar M, Narasimhappa S, MuddeGowda MK, Siddappa MN, Ramprasad K, Lingaraj U. Coronavirus Disease 2019 and Chronic Kidney Disease – A Clinical Observational Study. Saudi J Kidney Dis Transplant. 2021;32(3):744–53.
7. Lee T, Thamer M, Zhang Q, Zhang Y, Allon M. Vascular access type and clinical outcomes among elderly patients on hemodialysis. Clin J Am Soc Nephrol. 2017;12(11):1823–30.
8. Maya Sari N. Faktor - faktor Risiko Yang Berperan Terhadap Terjadinya Kegagalan Arteriovenous Fistula Pada Pasien Gagal Ginjal Kronis Stadium Akhir Di RSUP Sanglah. Medicina (B Aires). 2019;50(1):20–6.
9. Soleymanian T, Sheikh V, Tareh F, Argani H, Ossareh S. Hemodialysis vascular access and clinical outcomes: An observational multicenter study. J Vasc Access. 2017;18(1):35–42.
10. Jeong S, Kwon H, Chang JW, Kim MJ, Ganbold K, Han Y, et al. Effects of patient age on patency of chronic hemodialysis vascular access. BMC Nephrol. 2019;20(1):1–8.
11. Weale AR, Bevis P, Neary WD, Boyes S, Morgan JD, Lear PA, et al. Radiocephalic and brachiocephalic arteriovenous fistula outcomes in the elderly. J Vasc Surg. 2018;47(1):144–50.