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PREVALENCE AND CORRELATION OF VIRAL INFECTION (HEPATITIS B OR/AND HEPATITIS C) AMONG HYPERTENSIVE AND DIABETIC PATIENTS IN MALAYSIA AND INDONESIA WHO UNDERWENT HEMODIALYSIS

Diana Laila Ramatillah [*1], Syed Azhar Syed Sulaiman [1], Amer Hayat Khan [1], Dato' DR Ong Loke Meng [2] and Markum [3]

Discipline of Clinical Pharmacy [1], School of Pharmaceutical Sciences, Universiti Sains Malaysia.
Consultant and Physician in Nephrology and Hemodialysis Ward [2], at General Hospital Penang, Malaysia.
Consultant and Physician in Nephrology and Hemodialysis Ward [3], at Cempaka Putih Islamic Hospital Jakarta, Indonesia.

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Correspondence to Author:
Diana Laila Ramatillah

Discpline of Clinical Pharmacy, School of Pharmaceutical Sciences, Universiti Sains Malaysia.

Email: dianalailaramatillah@gmail.com

ABSTRACT: Background: Increase prevalence of viral infection such as hepatitis B or/and hepatitis C are followed by high incidence of mortality among hemodialysis patients. **Objective:** To determine prevalence and correlation of viral infection (Hepatitis B or/and Hepatitis C) among Hemodialysis Patients that died for the last five years in Indonesia and Malaysia in relation to gender, age, causes, and country. **Method:** A retrospective study was done in this research. The study included only hepatitis patients (hepatitis B and / or hepatitis C) passed away from 2010 to 2015. Universal sampling was used to select 185 patients from Indonesia hospital and 14 patients in Malaysia hospital but only 108 patients in Indonesia and 5 patients in Malaysia were included in this research. **Results:** The result indicates that more than 50 % patients have hepatitis C (63 patients). Hepatitis C mostly occurred among male and hypertensive patients between 51-60 years old. There is a significant correlation (P value ≤ 0.05) between age and type of infection for all hemodialysis hepatitis patients. Also, there is a significant correlation between hepatitis B and hypertensive patients (P value 0.032), hepatitis B and diabetic hypertensive patients (P value 0.024), hepatitis C and hypertensive patients (P value 0.022) and hepatitis C and diabetic hypertensive patients (P value 0.043). **Conclusions:** The study concludes that, hepatitis C is more prevalence in Indonesia and correlation of viral infection (hepatitis B, hepatitis C and hepatitis B & C) with hypertensive and diabetic hypertensive is present in both Indonesia and Malaysia.

INTRODUCTION: Diabetics and hypertensive are the main diseases which cause renal failure in patients [1]. Renal is one of the vital organs which help the body to excrete metabolism residual [2]. There have two ways to help renal function in excreating metabolism residual; Renal transplantation and Dialysis (Hemodialysis or Peritoneal dialysis) [3].

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Hemodialysis is one of treatment in replacing renal function that must be done as continuously to the patients [2]. Because of that, infection is one of the risk factors that might occur among these patients. Hepatitis B and hepatitis C are the common viral infections. Patients contracted viral infection before or after hemodialysis treatment. The infection might be from their family, from a blood transfusion or continuous treatment of hemodialysis, which is considered as a high-risk factor for these infections (hepatitis B and hepatitis C [3, 4].

Hemodialysis is one of the treatment in replacing renal function [5]. A lot of factors can cause hemodialysis but the main factor is because of the

metabolic syndrome disorder like diabetic and hypertensive [6, 7, 8, 9, 10, 11, 12, 13, 23]. Hypertensive can occur a long time before hemodialysis started or when patients diagnosed the renal failure. Hypertensive is related with activation of Renin Angiotensinogen System (RAS) in renal and diabetic is related with the damaging of glomerular filtration in renal due to the bigger of glucose molecule weight than the glomerular filtration hole [13, 14].

Prevalence of hepatitis B and C is high in the world, especially in Asian countries [3, 18]. In Indonesia, the prevalence of hepatitis C infection among hemodialysis patients is about 80 % including the patients who are doing hemodialysis in government and private hospitals [15]. For hepatitis B, based on the study that had been done among hemodialysis patients in Surabaya, Indonesia , 80 percent samples were detected as hepatitis B positive [16]. According to 5th Indonesian Renal Registry 2012, It described 276 patients of 8998 hemodialysis patients infected hepatitis B and hepatitis C whereas 132 hemodialysis patients infected hepatitis B ($HBsAg^+$) and 144 patients infected hepatitis C (anti-HCV^+) [17].

Malaysia, the neighboring country of Indonesia also have a high prevalence in hemodialysis patients [24]. According to 20th Report of the Malaysian Dialysis and Transplant Registry 2012, it showed the prevalence of hepatitis B ($HBsAg^+$) at 4 patients and hepatitis C (anti-HCV^+) at 5 patients among 25239 hemodialysis patients [3]. Viral infections are one the factor that causes a high incidence of mortality among hemodialysis patients but few publications that explain about the correlation between viral infections and mortality.

According to Goodkin DA, *et al.,* (2004) study, practice pattern, race, gender, comorbidity and length of hemodialysis treatment were associated with high incidence of hepatitis B or/and hepatitis C infection among hemodialysis patients [25]. Practice pattern such as facilities with more highly trained staff patients were associated with lower prevalence of hepatitis C, meanwhile, race like black patients and male were associated with higher prevalence of hepatitis C. For hepatitis B, the length of hemodialysis treatment was one of the high-risk factors in infecting of HBV (hepatitis B). Patients who did hemodialysis more than 1 year had a big chance to get HBV infection [4, 19].

MATERIAL AND METHODS:

Study Location: Research was carried out in hemodialysis ward Cempaka Putih Islamic Hospital Jakarta Indonesia and General Hospital Penang, Malaysia.

Study participants: For Indonesia data, 185 patients died between 2010 and 2015 and 14 patients died for those years in Malaysia. Among 199 patients from both countries about 113 patient were found to have viral infection (108 patients in Indonesia and 5 patients in Malaysia).

Inclusion criteria:

1. All hypertensive and / or diabetic patients underwent hemodialysis infected with viral infection (Hepatitis B or/ and Hepatitis C) from 2010 to 2015
2. Patients ≥ 18 years

Exclusion criteria:

1. Patients ≤ 18 years
2. Cancer patients
3. Pregnancy patients
4. HIV/AIDS Patients

Ethical Clearance: Ethical clearance was sourced from ethical medical committee from Faculty of Medicine in Indonesia and CRC Hospital Pulau Pinang, Malaysia and approval letter was given before data collection. Data was collected in Cempaka Putih Islamic Hospital Jakarta Indonesia and in Hospital Pulau Pinang.

Data Collection and Handling: Patients were selected by observing through the medical record for infected patients in hemodialysis ward. The data were arranged according to socio-demography status, history of the disease, and history of medication and transferred to clinical research form (CRF). Data were analyzed descriptively by chi-square, bivariate correlation test using SPSS 22 version software. Significance correlation was showed by P-value < 0.05.

Research Framework:

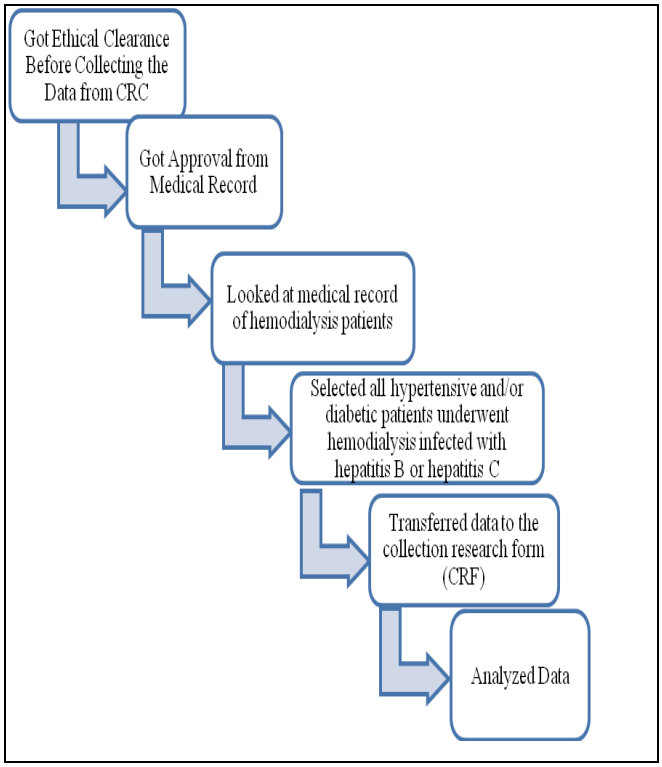

FIG. 1: RESEARCH FRAMEWORK OF THE STUDY

RESULTS:

Sociodemography: Of the total 113 patients, 70 patients were male and 43 female (**Table 1**). Patients with hepatitis C infection are 36/27 males and female respectively. The total patients with hepatitis B, C, and B & C are 24, 63, and 25, respectively.

There were 6 age categories of patient in this study; 21- 30, 31 – 40, 41 – 50, 51 – 60, 61 – 70, and >70 (**Table 1**). The fourth category(51-60) have a large number of infection with 46 patients. A significant relationship was found in this correlation (between age and type of infection); 0.044 (Chi-square test, P value ≤ 0.05). Based on the causes of disease, among the three types of infection (hepatitis B, C and B & C), hypertensive was found among 69 patients with mean±standard deviation; 2.9710± 0.72702, while about 2 patients got viral infections was diabetic.

No significant correlation was found between country and type of infection; 0.980 (Chi-square test, P value ≤ 0.05.

TABLE 1: CORRELATION BETWEEN SOCIODEMOGRAPHY AND TYPE OF HEPATITIS

Sociodemography	Type of Hepatitis			Total	P value*
	B	C	B and C		
1.1 Gender					
Male	17 (15.04%)	36 (31.86%)	17 (15.04%)	70 (61.95%)	0.460
Female	7 (6.19%)	27 (23.89%)	9 (7.96%)	43 (38.05%)	
Total	24 (21.24%)	63 (55.75%)	26 (23.01%)	113	
1.2 Age					
21- 30	2 (1.77%)	1 (0.88%)	0	3 (2.65%)	0.044
31 - 40	1 (0.88%)	0	3 (2.65%)	4 (3.54%)	
41 – 50	8 (7.08%)	9 (7.96%)	5 (4.42%)	2219.47%)	
51 – 60	7 (6.19%)	29 (25.66%)	10 (8.855)	46 (40.71%)	
61 - 70	5 (4.42%)	18 (15.93%)	8 (7.08%)	31 (27.43%)	
>70	1 (0.88%)	6 (5.31%)	0	7 (6.19%)	
Total	24 (21.24%)	63 (55.75%)	26 (23.01%)	113	
1.3 Cause of Hemodialysis					
Diabetic	1 (0.88%)	1 (0.88%)	0	2 (1.77%)	0.112
Hypertension	19 (16.81%)	33 (29.20%)	17 (15.04%)	69 (61.06%)	
Diabetic & Hypertension	4 (3.54%)	29 (25.66%)	9 (7.96%)	42 (37.17%)	
Total	24 (21.24%)	63 (55.75%)	26 (23.01%)	113	
1.4 Country					
Indonesia	23 (20.35%)	60 (53.09%)	25 (22.12%)	108 (95.58%)	0.980
Malaysia	1 (0.88%)	3 (2.65%)	1 (0.88%)	5 (4.42%)	
Total	24 (21.24%)	63 (55.75%)	26 (23.01%)	113	

*Chi-Square test

For hypertensive patients (mean±SD, 1.3982 ± 0.49171), a significant relationship was found in hepatitis B and hepatitis C patients; 0.032 and 0.022 (Pearson Correlate, P value ≤ 0.05).

Besides that, hypertensive and diabetic patients also had a significant relationship to hepatitis B and hepatitis C whereas P value were 0.024 and 0.043, respectively. (**Table 2**)

TABLE 2: CORRELATION BETWEEN VIRAL INFECTION (HEPATITIS B AND /OR C) AND CAUSES OF DISEASE (HYPERTENSIVE AND/OR DIABETIC)

Correlation	P value*
Hepatitis B Hypertensive	0.032*
Hepatitis B Diabetic	0.320
Hepatitis B Diabetic and Hypertensive	0.024*
Hepatitis C Hypertensive	0.022*
Hepatitis C Diabetic	0.870
Hepatitis C Diabetic and Hypertensive	0.043*
Hepatitis B & C Hypertensive	0.541
Hepatitis B & C Diabetic	0.440
Hepatitis B & C Diabetic and Hypertensive	0.842

*Pearson Correlate (Bivariate)

DISCUSSION: In 2012, Indonesian Registry Renal described 3332 hemodialysis patients died [12] meanwhile Malaysian Registry Data showed 2719 hemodialysis patients died [3]. From this study, the difference between the number of Indonesia patients and Malaysia patients is also quite huge (185 Indonesian patients and 14 Malaysian patients) with a similarity the number of sites, the type of hospital and the same of range time.

From the **Table 1**, it can be seen that hepatitis C was the biggest number patients among others infection (hepatitis B and B & C infection). That finding is similar to Pradip Bhaumik & Kalyan Debnath studied whereas they reported hepatitis increase among hemodialysis patients due to blood transfusion [20]. Blood transfusion is the common reason that caused hepatitis C among those patients whereas that treatment was needed due to anemia complication as a causal for reducing of erythropoietin hormonal in kidney failure [7].

There were 3 main diseases which cause hemodialysis for the patients: diabetes mellitus, hypertensive, and diabetes mellitus & hypertensive [7]. This finding found that hypertensive was the biggest disease in term of patients number who got C hepatitis. Mostly end-stage renal failure patients will have a problem in blood pressure whereas patients will maintain their blood pressure by taking antihypertensive drugs [7]. It was opposite with Kwon, *et al.*, studied that they said diabetes was the largest primary renal disease which has caused hemodialysis and also the number of patients who got hepatitis B was higher than hepatitis C [21]. Some reason can be possible for this difference such as management of disease, compliance patients in taking drugs, the difference in lifestyle and spreading of an infection.

Based on the age and gender have known that age of patients who got hepatitis C in the large number in this research was 51-60 years old and mostly it occurred among male patients. No significant relationship between sociodemography and type of hepatitis except age data and type of hepatitis (0.050, $P < 0.05$).

From **Table 2**, it can be seen, among 3 types of infection, only two of them that had a significant relationship; hepatitis B and hepatitis C. It might be, the prevalence of complication infection between hepatitis B and hepatitis C in one patient is few. The patients who had diabetic only is also few, so only hypertensive and complication hypertensive diabetic that had a relationship with hepatitis B and hepatitis C patients.

Mostly hemodialysis patients infected by single hepatitis viral. It is caused by the protocol of hemodialysis treatment that order the patient to check their $HBsAg^+$ (for hepatitis B) and anti-HCV^+ (for hepatitis C) before they do first hemodialysis treatment. So, if they know about this thing from the first time, the physician will separate them in different dialysis room to avoid the cross-contamination from these viral.

Besides that, an observational study showed that mostly cause of hemodialysis treatment is hypertensive. The majority of the hemodialysis patients will have a problem in their blood pressure before they do hemodialysis [9, 10, 22].

CONCLUSION: There is a high prevalence of infection (hepatitis C) among male hypertensive patients from Indonesia. There are a correlation among hepatitis B and also hepatitis C in hypertensive and diabetic hypertensive patients.

LIMITATION OF STUDY: The medical record was not computerized and some missing data was present, especially for laboratory value.

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CONFLICT OF INTEREST: There is no conflict of interest regarding of this publication.

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