Risk Factors for Patients with Hepatitis B and C in Hemodialysis Unit

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Abstract

Background: *Risk factors for HCV, HBV transmission are blood transfusions and surgeries before 1992, intravenous drug use, contaminated parenteral drugs and other invasive non-medical procedures (tattooing, piercing). Based on these risk factors, high-risk groups are: multiramified patients (i.e., hemophiliacs), health personnel, intravenous drug users, inmates, individuals with high-risk sexual behaviors (early sex life, high number of sexual partners and prostitution). Other populations at risk are patients on extracorporeal circulation system, such as end-stage kidney disease patients on hemodialysis program.*

Study aim: *To determine risk factors for patients with hepatitis B and C in hemodialysis unit.*

Methodology: *A descriptive study design was conducted at Al-Najaf city in the southern region of Iraq in Al-Sadder Medical City and Al-Hakim General Hospital from February 20th, 2023, to May 23th, 2023, in order to assess risk factors for patients with hepatitis B and C in hemodialysis unit. The methodological strategies for data collection used an assessment questionnaire survey.*

Results: *As the study shows, that the risk factors that cause the most infection are hemodialysis sessions, contact with infected persons, and injected medication, while the lowest risk factors to spread infection are children born with infected hepatitis and unprotected sexual contacted.*

Conclusion: *The study concludes that the first leading risk factor for infection is the hemodialysis session, while the contact with infected persons and contaminated injections of medication comes in the second place.*

Recommendations: *Careful monitoring and strict adherence to infection control procedures among patients undergoing hemodialysis treatment, including commitment to sterilization of hemodialysis devices and the use of all preventive measures when starting the hemodialysis procedure.*

Keywords: Hepatitis, Hemodialysis Unit, Infection.

Introduction

Hepatitis is an inflammation of the liver cells and damage to the liver. There are different types and causes (like bacteria, viruses, parasites, Autoimmune disease, alcohol and others), but the symptoms can be similar. There are six types of Hepatitis viruses (A, B, C, D, E, G). Virus type B and C are the most dangerous viruses that threaten the world due to rapid spreading and causing a serious complication (like carcinoma and liver fibrosis), that leads to high mortality among infected patients [1]. These viruses have a high ability to infect mainly liver cells and a small number of this family affects the kidneys and pancreas, Inflammation and necrosis of liver cells weaken the liver's ability and functions like

the lacks of blood clotting elements, which in turn causes anemia and hypotension and lack of oxygen and nutrients to the body. Hepatitis B virus is transmitted from person to person by blood, semen or other body fluids [1].

While hepatitis C virus is transmitted by sharing Patients undergoing HD potentially have an increased risk of exposure to infections especially blood borne viruses (BBV) infections. Viral hepatitis such as HBV and HCV are the most frequent disease resulting in a complication of HD treatment. Infections with HBV and HCV are well-known and important causes of liver disease in ESRD patients on HD. HD patients are at high risk for viral

hepatitis infections due to a history of blood transfusion, the high number of blood transfusion sessions, the potential for exposure to infected patients and contaminated equipment. The duration of HD therapy is also considered as a risk factor for viral hepatitis infections transmission [2].

Risk factors for HCV, HBV transmission are blood transfusions and surgeries before 1992, intravenous drug use, contaminated parenteral drugs and other invasive non-medical procedures (tattooing, piercing). Based on these risk factors, high-risk groups are: multiramified patients (i.e., hemophiliacs), health personnel, intravenous drug users, inmates, individuals with high-risk sexual behaviors (early sex life, high number of sexual partners and prostitution) [3]. Other populations at risk are patients on extracorporeal circulation system, such as end-stage kidney disease patients on hemodialysis program [4].

On the other hand, chronic HCV infects approximately 1.0% of the world, which is estimated to be 71 million individuals. In different parts of the world, hepatitis B and C viruses show great variation in their prevalence. In the Eastern Mediterranean Region, the prevalence of HBV infection is 3.3%; whereas, the prevalence of HCV infection ranges from 1% to 2% excluding Egypt, where the prevalence rate is greater. In Iraq, a prevalence rate of 1.6% and 0.4% for HBV and HCV was reported, respectively. The prevalence of HBV infection within HD units in developing countries range from 2% to 20%, and HCV prevalence among HD patients varies from 4% to 70% in different countries. The prevalence of HCV infections among HD patients is high and varies from (2% to 60%) between different countries, and between different dialysis centers within a single country. In Arab countries, the prevalence of HBV among HD patients ranged from 2% in Morocco, to 11.8% in Bahrain, and the prevalence of HCV among HD patients has been reported to range from 27% in Lebanon to 75% in Syria. In USA, and Taiwan the prevalence of HBV infection among patients undergoing long-term HD was 0.9% and 16.8% respectively. In Brazil, HBV infection in HD centers varies from 7.5 to 28.0 %. In Iraq the prevalence of HCV infections varies from (7.1%) in Iraqi renal transplant center at Baghdad, and 26.7%, 11.7 % in sulaimania dialysis unit and Al- Anbar governorate respectively [5].

Study Significance
Chronic hepatitis C viral (HCV) infection, which affects 130 million to 150 million people worldwide, is one of the leading causes of liver cirrhosis and hepatocellular cancer, as well as a leading indication for liver transplantation in developed countries

[6]. Hepatitis B (HBV) or Hepatitis C virus (HCV) infection status alone should not disqualify healthcare workers from undertaking patient care activities, provided an appropriate risk assessment has been undertaken [7].

Three centuries after the identification of hepatitis C virus (HCV), specialized literature has outlined the epidemiology, viral kinetics and clinical manifestations of this infection. A major cause of morbidity-mortality in patients with renal transplantation and in hemodialysis patients is HCV infection. In high seroprevalence countries, internal accounts are not uniform. The European trend is to decrease the incidence and prevalence of HCV in hemodialysis patients. In Europe, the prevalence of HCV infection among hemodialysis patients tends to be higher than that of the general population, but it is variable by region [8].

Methodology
Study Design
A descriptive study design was conducted at Al-Najaf city in the southern region of Iraq in Al-Sadder Medical City and Al-Hakim General Hospital from February 20th, 2023, to May 23th, 2023. In order to assess risk factors for patients with hepatitis B and C in hemodialysis unit. The methodological strategies for data collection used an assessment questionnaire survey.

Population and Study Sample
A Non-probability (convenience) sample of (100) patients who visit the hemodialysis unit in Al-Sadder Medical City and Al-Hakim General Hospital.

Data collection Tool
A questionnaire was constructed by researcher to measure the variables of interest. The final study instrument consisting of three parts: the first part is the demographic data, the second part regarding the clinical data, while the third part consist of 14 risk factors for hepatitis.

Statistical Methods
The data analysis process entailed using Statistical Package for Social Sciences computer software. Statistical analysis was performed using Statistical Package for Social Sciences version 21.0 for Windows. Descriptive statistics were used to present the demographic data and patterns of answers to the different questionnaire items; categorical variables were presented as frequency and percentage, whereas numerical ones were presented as mean ± standard deviation (S.D).

Results

| Variables | Responses | Statistics | Type of hepatitis | | Total |
			C	B	
Age	30 and less	Freq.	16	1	17
		%	94.1%	5.9%	100.0%
	31+	Freq.	54	29	83
		%	65.1%	34.9%	100.0%
Total		%	70.0%	30.0%	100.0%
Monthly income	low income	Freq.	46	19	65
		%	70.8%	29.2%	100.0%
	good income	Freq.	24	11	35
		%	68.6%	31.4%	100.0%
Total		%	70.0%	30.0%	100.0%
Gender	male	Freq.	40	16	56
		%	71.4%	28.6%	100.0%
	female	Freq.	30	14	44
		%	68.2%	31.8%	100.0%
Total		%	70.0%	30.0%	100.0%
Level of education	Do not read and write	Freq.	13	15	28
		%	46.4%	53.6%	100.0%
	Read and write	Freq.	25	3	28
		%	89.3%	10.7%	100.0%
	Primary	Freq.	20	6	26
		%	76.9%	23.1%	100.0%
	Secondary	Freq.	7	3	10
		%	70.0%	30.0%	100.0%
	Institute	Freq.	1	1	2
		%	50.0%	50.0%	100.0%
	intermediate	Freq.	4	2	6
		%	66.7%	33.3%	100.0%
Total		%	70.0%	30.0%	100.0%
Residency	Rural	Freq.	20	4	24
		%	83.3%	16.7%	100.0%
	Urban	Freq.	50	26	76
		%	65.8%	34.2%	100.0%
Total		%	70.0%	30.0%	100.0%
Marital status	Single	Freq.	18	3	21
		%	85.7%	14.3%	100.0%
	Married	Freq.	48	27	75
		%	64.0%	36.0%	100.0%

		Statistics			Total
	Divorce	Freq.	2	0	2
		%	100.0%	0.0%	100.0%
	Separate	Freq.	2	0	2
		%	100.0%	0.0%	100.0%
Total		%	70.0%	30.0%	100.0%
Occupation	Employee	Freq.	3	1	4
		%	75.0%	25.0%	100.0%
	House wife	Freq.	25	14	39
		%	64.1%	35.9%	100.0%
	Free job	Freq.	17	8	25
		%	68.0%	32.0%	100.0%
	Not working	Freq.	19	5	24
		%	79.2%	20.8%	100.0%
	Retired	Freq.	6	2	8
		%	75.0%	25.0%	100.0%
Total		%	70.0%	30.0%	100.0%
Duration of disease	<= 5	Freq.	60	28	88
		%	68.2%	31.8%	100.0%
	6+	Freq.	10	2	12
		%	83.3%	16.7%	100.0%
Total		%	70.0%	30.0%	100.0%

Table 1: Characteristics and sociodemographic data of the study participants.

This table shows that the most of participant age groups are more than (31 years old) considered as the highest percentage (83%) among the study sample. Regarding gender of the study sample, the study indicate that (56%) are males, also this table present that the majority of the sample (28%) are do not read and write and (28%) read and write. The results indicate that (65%) of study sample had low monthly income, (76%) are living in urban residential area. The majority of the study sample (85.9%) are married before getting hepatitis. Concerning occupational status, about (39%) House wife of the study participant, and the most of the study participant had less than five years' duration of disease.

Variables	Responses	Statistics	Type of Hepatitis		Total
			C	B	
Q1	yes	Freq.	14	6	20
		%	70.0%	30.0%	100.0%
	No	Freq.	56	24	80
		%	70.0%	30.0%	100.0%
Total		%	70.0%	30.0%	100.0%
Q2	Yes	Freq.	19	6	25
		%	76.0%	24.0%	100.0%
	No	Freq.	51	24	75
		%	68.0%	32.0%	100.0%
Total		%	70.0%	30.0%	100.0%
Q3	Yes	Freq.	21	5	26
		%	80.8%	19.2%	100.0%
	No	Freq.	49	25	74
		%	66.2%	33.8%	100.0%

Total		**%**	70.0%	30.0%	100.0%
Q4	**Yes**	**Freq.**	9	3	12
		%	75.0%	25.0%	100.0%
	No	**Freq.**	61	27	88
		%	69.3%	30.7%	100.0%
Total		**%**	70.0%	30.0%	100.0%
Q5	**Yes**	**Freq.**	22	9	31
		%	71.0%	29.0%	100.0%
	No	**Freq.**	48	21	69
		%	69.6%	30.4%	100.0%
Total		**%**	70.0%	30.0%	100.0%
Q6	**Yes**	**Freq.**	7	2	9
		%	77.8%	22.2%	100.0%
	No	**Freq.**	63	28	91
		%	69.2%	30.8%	100.0%
Total		**%**	70.0%	30.0%	100.0%
Q7	**Yes**	**Freq.**	48	17	65
		%	73.8%	26.2%	100.0%
	No	**Freq.**	22	13	35
		%	62.9%	37.1%	100.0%
Total		**%**	70.0%	30.0%	100.0%
Q8	**Yes**	**Freq.**	46	21	67
		%	68.7%	31.3%	100.0%
	No	**Freq.**	24	9	33
		%	72.7%	27.3%	100.0%
Total		**%**	70.0%	30.0%	100.0%
Q9	**Yes**	**Freq.**	23	7	30
		%	76.7%	23.3%	100.0%
	No	**Freq.**	47	23	70
		%	67.1%	32.9%	100.0%
Total		**%**	70.0%	30.0%	100.0%
Q10	**Yes**	**Freq.**	66	28	94
		%	70.2%	29.8%	100.0%
	No	**Freq.**	4	2	6
		%	66.7%	33.3%	100.0%
Total		**%**	70.0%	30.0%	100.0%
Q11	**Yes**	**Freq.**	5	1	6
		%	83.3%	16.7%	100.0%

			C	B	Total
	No	Freq.	65	29	94
		%	69.1%	30.9%	100.0%
Total		%	70.0%	30.0%	100.0%
Q12	Yes	Freq.	33	11	44
		%	75.0%	25.0%	100.0%
	No	Freq.	37	19	56
		%	66.1%	33.9%	100.0%
Total		%	70.0%	30.0%	100.0%
Q13	Yes	Freq.	11	2	13
		%	84.6%	15.4%	100.0%
	No	Freq.	59	28	87
		%	67.8%	32.2%	100.0%
Total		%	70.0%	30.0%	100.0%
Q14	yes	Freq.	31	14	45
		%	68.9%	31.1%	100.0%
	No	Freq.	39	16	55
		%	70.9%	29.1%	100.0%
Total		%	70.0%	30.0%	100.0%

Table 2: Distribution of the observed frequencies and percent of Individual Factors for Study and Control Sample.

This table reveals that the patients most responses for the risk factors infected form hemodialysis session, and another highly infected from contacted with infected persons and medication injection. While the lowest risk factors to spread infection from children born with infected hepatitis and unprotected sexual contacted.

Risk factor	Categories	Type of hepatitis		CI 95%	Chi square	P-value
		C	B			
Gender	Male	40	16	1.167	.124[a]	0.725
	Female	30	14			
Total		70	30			
Residency	Rural	20	4	2.600	2.647[d]	0.129
	Urban	50	26			
Total		70	30			
Marital status	Not married	22	3	4.125	5.143[a]	0.042
	Married	48	27			
Total		70	30			
Age	30 and less	16	1	8.593	5.673[a]	0.017
	31+	54	29			
Total		70	30			
Duration of	<= 5	60	28	0.429	1.154[a]	0.283

disease	6+	10	2			
Total		70	30			
Level of education	Low education	58	24	1.208	.116[a]	0.733
	High education	12	6			
Total		70	30			
Monthly income	Low income	46	19	1.110	.052[a]	0.819
	Good income	24	11			
Total		70	30			

Table 3: Possible Risk Factors related to Demographic Data of hepatitis Patients based on Odd Ratio (to determine the Risk), Pearson Chi Square, and Fisher Exact test (to determine the significance of risk).

This table shows that there is a significant relationship between the risk factors for patient with hepatitis and their married person and age special more than 31 years old demographic data and their demographic data at p-value less than 0.05.

Discussion

The study shows that the most of participant age groups are more than (31 years old). This result agrees with [9,10], they find that the (more than 31 years old) is the dominant age group of the study sample considered as the highest percentage (83%) among the study sample. In additional gender of the study sample, the study indicates that (56%) are males. This result agrees with [11], also this table present that the majority of the sample (28%) are do not read and write and (28%) read and write. This result agrees with [12]. The results indicate that (65%) of study sample had low monthly income. This result agrees with [13], (76%) are living in urban residential area. This result agrees with [14]. The majority of the study sample (85.9%) are married before getting hepatitis. This result agrees with [15], concerning occupational status, about (39%) house wife of the study participant. This result agrees with [16], and the most of the study participant had less than five years' duration of disease. This result agrees with [17,18]. The result reveals that the most patient's participant infected with hepatitis from hemodialysis session. This result agrees with [8,19,20]. HCV infection is more common among dialysis patients than in the general population and HCV transmission has been reported in dialysis clinics. In the context of the increased morbidity and mortality associated with viral hepatitis infection in end stage kidney disease, it is important that dialysis clinics have processes in place to ensure recommended infection control practices.

From point of view researchers, the main reason to separated virus from patient to another lack of supplies and hemodialysis machines and found a lot of ESRD that lead the hemodialysis machines don't take the sufficiently duration for sterilization and preparation to the next session, also observed don't applied that Standard Precautions and don't take the enough through regular audits and training of the staff.

Regarding correlation between patients' risk factors and their demographical data, the study shows that there is a significant relationship between the risk factors for patient with hepatitis and their married person and age special more than 31 years old demographic data. This result agrees with [21,22]. This study reveal the significant relationship between age more than 31 years old and married person and transmission of hepatitis virus, their demographic data at p-value less than 0.05.

Conclusion

The study concludes that the first leading risk factor for infection is the hemodialysis session, while the contact with infected persons and contaminated injections of medication comes in the second place. Also, there is a relationship between the risk factors for patients with hepatitis and their married person and age special more than 31 years old, and demographic data.

Recommendations

Careful monitoring and strict adherence to infection control procedures among patients undergoing hemodialysis treatment, including commitment to sterilization of hemodialysis devices and the use of all preventive measures when starting the hemodialysis procedure. Furthermore, periodic examination of the extent of transmission of infection with hepatitis C virus type and type (B) among patients undergoing treatment with hemodialysis. Also avoid sharing any tools among patients such as injections, medical equipment, and personal care tools with others, such as razors or toothbrushes, because they may carry remnants of contaminated blood or fluids.

In addition, health education programs should be applied to increase the patients' knowledge and awareness regarding mode of transmission of hepatitis. Because the nurses still with the patients 24 hours daily, the Health management should be activated and to increase nurses roles in health education process that improve the patients' knowledge.

Study Limitations

The chosen participants may not have been an adequate sample size to be generalized to the larger population. Also, some patients were less cooperative than others, or uncooperative at all.

Ethical Considerations

The researcher obtains an approval from the nursing specialists department in the Faculty of nursing /University of Kufa. also an official permission is attained from Al-Sadder Medical City and Al-Hakim General Hospital, in order to interviewing each subject. And finally, subject agreement also obtained from the patient himself after the researcher explain the purpose of the study to them; seeks informed consent; and offer a respect to participants' confidentiality as well as making the participation voluntary, to answer the questionnaire.

Conflicts of Interest

The author declares no conflict of interest to declare for publication

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