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Prevalence of Hepatitis B virus among Iranian hemodialysis patients: A systematic review and meta-analysis

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Abstract

Introduction: The aim of this study was evaluated the Prevalence of Hepatitis B virus among Iranian hemodialysis patients .

Methods : The methods used in this systematic review are developed based on the Checklist Guidelines (PRISMA). The searches were conducted by two independent researchers and the objective was to find studies published from 1/1/2000 to 30/5/2019.

Results: According to the random effects model, the overall prevalence of hepatitis B in 2239 hemodialysis patients was 3.3% (2.6- 4.1% at 95% confidence interval and $I^2 = 58.2\%$).

Conclusion: Patients with symptoms of hepatitis B virus proliferation are said to be at a high risk for the progressive liver disease, and patients with end-stage renal disease who have these symptoms should be treated as best as possible for viral hepatitis. Although in some cases a patient with permanent proliferative viral hepatitis may be advised not to undergo kidney transplantation, it is not yet clear to what extent the survival of the patient and the transplanted kidney are affected by the progressive liver disease caused by hepatitis B and C viruses(21). There are controversial and sometimes conflicting opinions about the impact of viral hepatitis on acute transplant rejection in kidney-transplanted patients.

Keywords: Hepatitis B virus, Hepatitis ,virus, Thalassemia, Dialysis .

Introduction

Since 1980, the prevalence of End-Stage Renal Disease (ESRD) has been steadily increasing in most countries of the world (1). Between 1981 and 1999, the number of new patients with end-stage renal disease diagnosed increased by 7.3% (2). End-stage renal disease is associated with a significant decrease in patients' quality of life and early death. Kidney transplantation is one of the appropriate approaches for these patients that

leads to increased life expectancy of ESRD patients, improves the quality of life of these patients, and even in the long term, its cost is lower than the cost that dialysis imposes on the individual and society (3). After kidney transplantation in the patient with end-stage renal disease, there is a great deal of effort and care given for maintaining the quality and non-rejection of the transplanted kidney (4). Immunosuppressive treatments and special attention to the prevention of infections are of particular importance in these

patients (5). Liver disease has been recognized as one of the causes of long-term morbidity and mortality in patients undergoing kidney transplantation, with death due to liver failure in 8-28% of patients with kidney transplantation (6). Hepatitis B and C viruses are the most common causes of viral infection leading to liver disease in patients with end-stage renal disease, which may appear to have significant effects on the recipient of the transplanted kidney (7). Even some researchers in their studies have focused on special efforts for the identification and treatment of B and C viral hepatitis before and after kidney transplantation (8).

Methods

Inclusion Criteria (eligibility criteria)

The methods used in this systematic review are developed based on the Checklist Guidelines (PRISMA). Cross-sectional studies, case control study, and cohort study are included in this study and case reviews, letters to editors, case reports, clinical trials, study protocols, systematic reviews, and review studies are excluded.

Participants: All studies about the prevalence of hepatitis B were conducted on hemodialysis patients. The main objective of the study was the prevalence of hepatitis in hemodialysis patients.

Sampling Methods and Sample Size: All observational studies were included in the systematic review regardless of their design. The minimum sample size was 25 patients or more.

Search Strategy

The searches were conducted by two independent researchers and the objective was to find studies published from 1/1/2000 to 30/5/2019. Studies were searched in Cochrane Library and the English database, and studies published in MEDLINE were searched through PubMed, and those published in EMBASE were searched through Ovid. We searched the national database of Magiran and SID to find studies published in Iran. To ensure the adequacy of the studies, a list of references or related

Systematic review studies

were searched through MESH and open-ended terms in accordance with publication standards. After finalizing the MEDLINE strategy, the results were compared to search other databases, and PROSPERO was searched for recent or ongoing systematic reviews. The key words used in the search strategy include: Hepatitis B virus, Hepatitis ,virus, Thalassemia, Dialysis .

Study Selection and Data Extraction

Two researchers independently analyzed the titles and abstracts of the studies according to eligibility criteria. After excluding additional studies, the full texts of the studies were analyzed based on eligibility criteria and information about authors were collected if necessary. General information (relevant author, province, and publication year), study information (sampling technique, diagnostic criteria, data collection method, research conditions, sample size and risk of bias) and exclusion criteria were collected.

Quality Assessment

Hoy et. al.'s developed scale was used to assess the quality of the method and the risk of bias of observational studies.

Data Collection :

All eligible studies were included in the data collection after systematic review and data were integrated using the forest plot. The random effects model was evaluated based on the overall prevalence of the disease among the participants. The heterogeneity of the initial studies was assessed using I^2 test. In addition, subgroups were analyzed based on the participants' age, publication year, and country to determine heterogeneity. Finally, a meta-analysis was performed in STATA14 statistical software.

Results

Study Selection

A total of 245 studies were extracted through initial searches in various databases. Among 245 studies identified by analyzing titles and abstracts, 203 studies were removed due to irrelevant titles.

Of the remaining 12 studies, 5 met the study criteria. (Figure 1).

Research Properties :

A total of 2239 patients undergoing dialysis were evaluated. All studies, were retrospective and the study design was not mentioned in the other study. A total of 5 studies from 4 provinces that met the inclusion criteria were evaluated. studies conducted in Rasht, Tehran, Ghazvin and Birjand were included in the study. Simple sampling method was used to select the sample (n = 5). In most studies the risk of bias was low. The main method of data collection was medical records. The main study sites were the hospitals (Table 1).

Meta-analysis of Hepatitis B Frequency in Hemodialysis Patients:

According to the random effects model, the overall prevalence of hepatitis B in 2239

hemodialysis patients was 3.3% (2.6- 4.1% at 95% confidence interval and $I^2 = 58.2\%$.) (Figure 2, Table 2).

Subgroup Analysis:

Meta-Regression Results:

Results of Meta-Regression Between publication year and Frequency of Hepatitis B in Dialysis Patients:

Regression of the study was analyzed based on the relationship between prevalence of hepatitis B in hemodialysis patients and publication year. There was no significant linear trend in univariate meta-regression to explain the change in effect size of publication year (Figure 3).

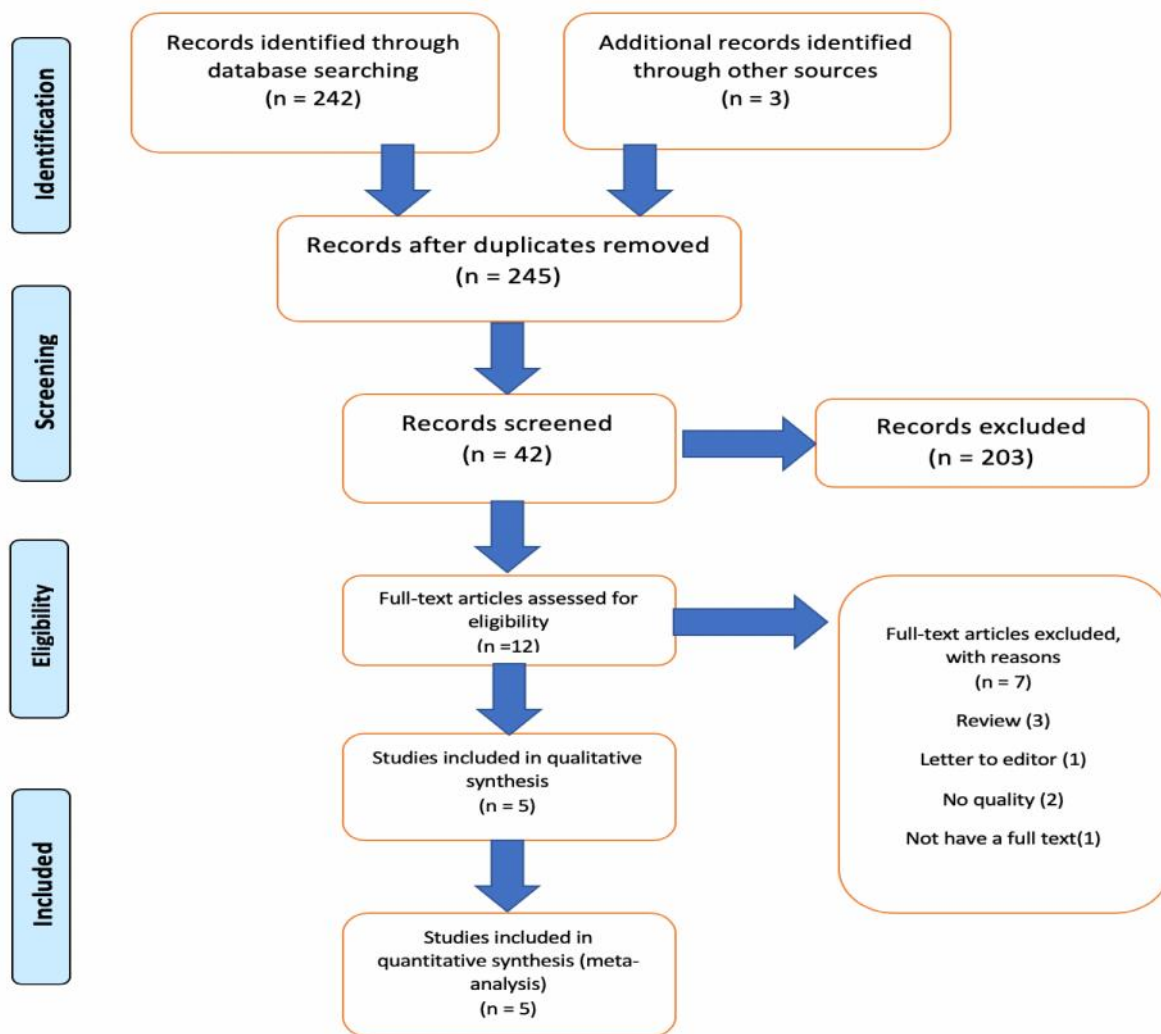


Figure 1. PRISMA flow diagram

Table 1. characteristics of the included studies

| ID | Author | Province | Publications year | Number of patients | Male to female | Mean of age |
|----|---------------------|----------|-------------------|--------------------|----------------|-------------|
| 1 | KoushaKamali(22) | Tehran | 2009 | 1615 | ---- | -- |
| 2 | Zohreazarkar(23) | Birjand | 2009 | 38 | 21/17 | -- |
| 3 | SepideHaghAzali(24) | Ghazvin | 2010 | 134 | 43/57 | --- |
| 4 | Amitis Ramazani(25) | Tehran | 2008 | 289 | 60/40 | --- |
| 5 | MaansourGhaneii(26) | Rasht | 2008 | 163 | --- | ---- |

Table 2. Meta-analysis of the Prevalence of Hepatitis B virus among Iranian hemodialysis patients

| First author | 95% confi. interval | | | | Publications year | Number of patients |
|-----------------|---------------------|-------|-------|--------|-------------------|--------------------|
| | Low | UP | ES | Weight | | |
| KoushaKamali | 0.022 | 0.038 | 0.030 | 79.52 | 2009 | 1615 |
| Zohreazarkar | 0.051 | 0.289 | 0.17 | 0.38 | 2009 | 38 |
| SepideHaghAzali | 0.007 | 0.073 | 0.040 | 4.91 | 2010 | 134 |
| Amitis Ramazani | 0.033 | 0.087 | 0.060 | 7.26 | 2008 | 289 |

| | | | | | | |
|----------------|-------|-------|-------|-----|--|-------|
| MaansourGhanei | 0.004 | 0.056 | 0.039 | 100 | Int. J. Cur. Res. Med. Sci. (2020) 8(2): 13-19 | 163 |
| Pooled ES | 0.026 | 0.041 | 0.033 | 100 | ----- | ----- |

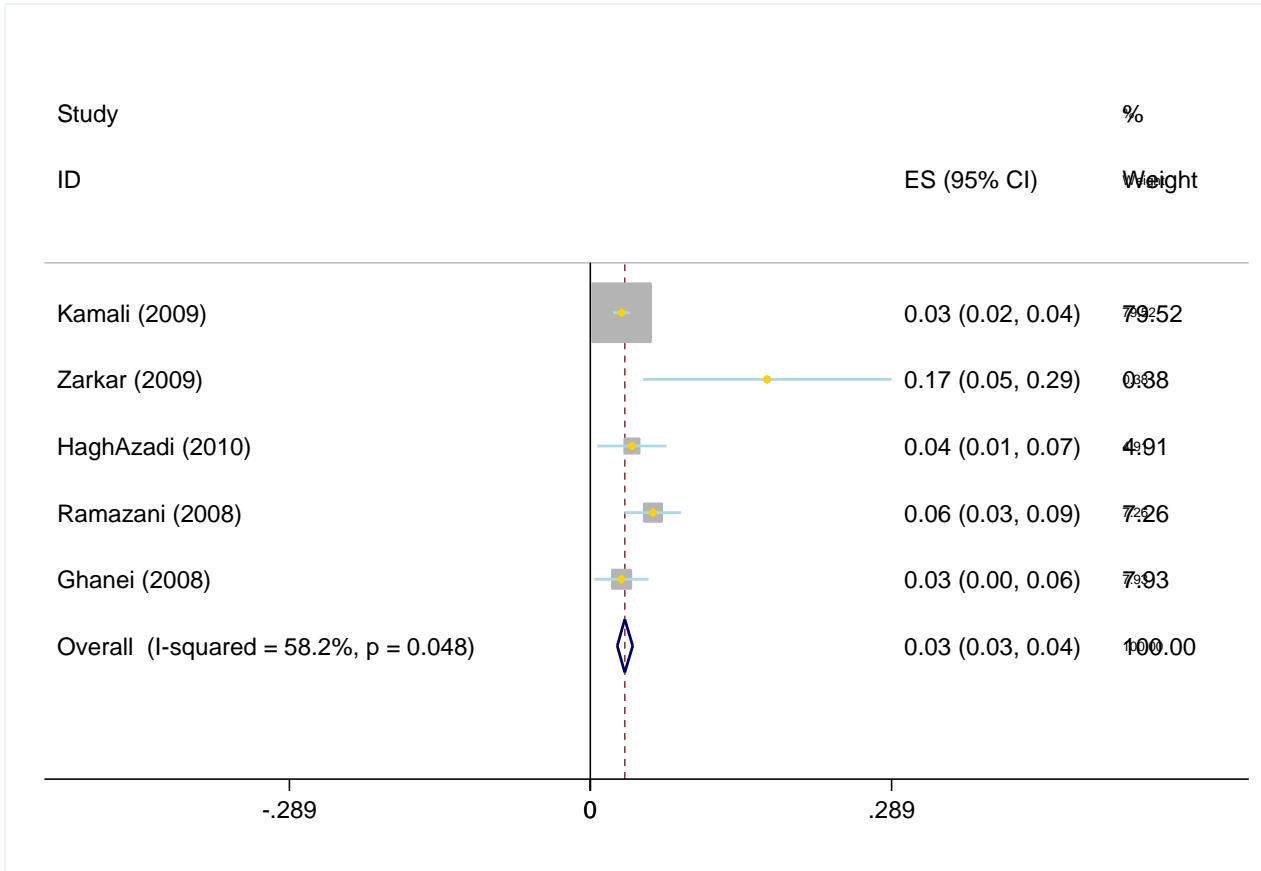


Figure 2. Meta-analysis of the Prevalence of Hepatitis B virus among Iranian hemodialysis patients

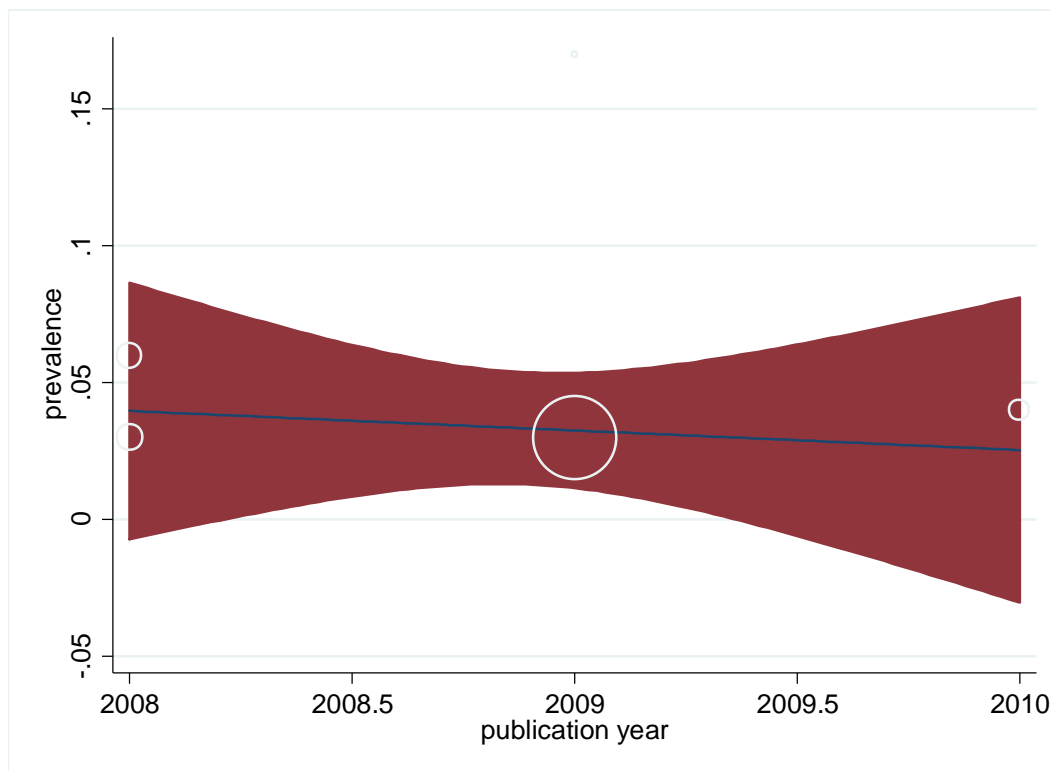


Figure 3. Meta-regression between publication year of study and Prevalence of Hepatitis B virus among Iranian hemodialysis patients

Discussion

According to the random effects model, the overall prevalence of hepatitis B in 2239 hemodialysis patients was 3.3% (2.6- 4.1% at 95% confidence interval and $I^2 = 58.2\%$). Results of preliminary studies indicate that kidney-transplanted patients with HBs antigen are at higher risk of death after kidney transplantation compared with patients without hepatitis B virus infection (9). Hepatitis C virus has a higher probability of liver failure, as well as complications such as proteinuria, glomerular disease, and post-transplant diabetes mellitus in kidney-transplanted patients (10). What is important to note is that the poor prognosis of kidney-transplanted patients, as shown in some previous studies, did not indicate the status quo (11). Because many of these studies did not consider the viral replication and the histopathology of the liver, and on the other hand, current treatments for viral hepatitis were not available at that time (12). Also, the real impact of viral hepatitis on the survival of the

transplanted kidneys and patients has not been carefully studied (13). Long-term dialysis treatment has both adverse effects on the patient's life, both physically and mentally (14). In addition to imposing heavy costs on the community health system, it makes patients susceptible to viral hepatitis (15 and 16). Patients with symptoms of hepatitis B virus proliferation are said to be at a high risk for the progressive liver disease, and patients with end-stage renal disease who have these symptoms should be treated as best as possible for viral hepatitis (17-20). Although in some cases a patient with permanent proliferative viral hepatitis may be advised not to undergo kidney transplantation, it is not yet clear to what extent the survival of the patient and the transplanted kidney are affected by the progressive liver disease caused by hepatitis B and C viruses (21). There are controversial and sometimes conflicting opinions about the impact of viral hepatitis on acute transplant rejection in kidney-transplanted patients.

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