Prevalence and Distribution of Hepatitis C Virus in Iranian Drug User: Systematic Review and Meta-Analysis Study

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Context: Hepatitis C, as a major public health problem, has serious complications and drug users are the highest risk group for it.

Objectives: As the importance of this subject, the current study has been done to estimate the pooled prevalence and distribution of hepatitis C virus in Iranian Drug User.

Evidence Acquisition: Articles were identified through international searching databases including PubMed, Scopus, Elsevier, Google Scholar and Web of Science and Iranian scientific information database (SID), Health.barakatkins, IranDoc, Civilica and MagIran. We reviewed systematically all studies reporting the prevalence of HCV Iranian Drug User.

Results: 227 records were identified by the electronic search, of which 62 studies were identified as relevant papers which were meta-analyzed for the pooled HCV prevalence. Overall, prevalence of HCV was 42.01% (36.83%-47.20%) in Iranian drug user.

Conclusion: Our meta-analysis study showed that HCV prevalence is high in drug users in Iran. With respect to the high prevalence of Hepatitis C among Drug User, ongoing preventive actions for this group are recommended.
Prevalence and Distribution of Hepatitis C Virus in Iranian Drug User

Health.barakatkns, MagIran and Civilica. Our last search was conducted on March 20, 2019. In order to search and include related studies as many as possible, we used the following terms: “Drug user” “Hepatitis C”, “HCV”, “Prevalence”, “Iran” (or the names of its provinces) as keywords for titles and/or abstracts in MeSH word search database.

Selection of Studies and Data Extraction
Published studies were regarded as qualified for the analysis if they met the following criteria: 1- Cross sectional studies with the full text of the paper available in Persian or English languages; 2- Studies with sample size more than 30; and 3-Studies that reported the prevalence of Hepatitis C in provinces of Iran. Conversely, the following were excluded: 1- Non-English or Persian full-text reports; 2- Articles with irrelevant titles.

Data Extraction
All articles categorized as potentially relevant were reviewed separately by both of the authors. They evaluated the relevance of each report and summarized the following data using Excel data sheets: first author’s name, year of publication, year of study, sample size, and mean age of responder. The analysis was conducted according to the preferred reporting items for systematic reviews and meta-analysis (PRISMA) [7]. In this study, for quality assessment “Appraisal tool for Cross-Sectional Studies (AXIS)” [8], for better data extraction, blinding in addition to task separation[9] were used

Statistical Analysis
In the current meta-analysis, the prevalence rate of HCV from each province of Iran analyzed by metan command in Stata software version 11. Statistical tests of heterogeneity among the studies were carried out using the Q test (P<0.10) and I-squared statistics. According to the result of the heterogeneity test, we used fixed- or random-effect models for determining the prevalence rate of hepatitis C. in this study for evaluating publication Bias the Begg’s rank test and Egger test in addition Funnel were used.

Results

Search Results and Study Selection
The study selection process is depicted in Figure 1. A total of 392 studies potentially associated with the prevalence of HCV in provinces of Iran, of which 165 duplicates were excluded. After reviewing the abstracts and titles, 152 studies were omitted based on the stated inclusion and exclusion criteria. After the full-text screening, a total of 75 records seemed to be relevant papers published between 1996 and 2018 but in quality assessment 7 articles were also removed. Finally, 62 articles were reviewed and used in a meta-analysis study.

Prevalence of hepatitis C in provinces of Iran
In Table.1, study features like the Reference, Province, First Author’s Name, Year of Publication, Year of Study, Mean Age, The Number of HCV Patient and Study Sample Size were presented. Also, the pooled prevalence of hepatitis C according to each province of Iran was presented in Table.2. As can be seen, the pooled meta-analysis prevalence of HCV with a 95% Confidence Interval (CI) was 42.01 % (36.83%-47.20%) in Iranian drug user. The result of pooled prevalence of HCV during time presented in Figure 2. As it see in this figure, an increasing prevalence trend rate was observed until year 2005 (33% → 45%) while after year 2005 this trend was decreasing (45% → 38%).

Discussion
The result of this systematic review and meta-analysis study in Iranian drug user was 42.01 % (36.83%-47.20%). Previously published meta-analysis study has reported HCV prevalence in the different subsets of the Iranian population. Alavian et al [10], Mirminachi et al [11] and Mahmud et al [6] reported 0.16%, 0.6% and 0.3% HCV prevalence for general population respectively. Shamshirian et al [12] and Behzadifar et al [13] reported 17% and 19% HCV prevalence for thalassemia patients respectively. Such prevalence for hemodialysis patients were reported 7.61% [14] and 11% [15]. For the prisoner, the results varied among different studies because of different definitions. Some studies like studies done by Mohammadi et al (HCV prevalence = 18.6%) [16], Nematollahi (HCV prevalence = 22.90%) [17] and Behzadifar (HCV prevalence =
28% [18] combined high risk and low risk prisoners and reported pooled prevalence but some other studies considered just low risk prisoners as prisoner and report pooled HCV prevalence equal to 6.2% [6] to 9.48% [19]. For addicts, the previous studies commonly separated drug users with and without an injection history. HCV prevalence for drug use without injection was reported between 6.2% [6, 20] to 16.20% [17] but this prevalence for drug users with an injection history was reported higher and varied between 32.1% [6, 17] to 45% [20].

A number of limitations exist in the present study that should be noted. Firstly, the sample size for some provinces in Iran was not adequate and the quantity of data varied among provinces. Secondly, different sample locations (public or private hospitals) were utilized in sampling method, which may affect the obtained results of the current systematic review. In addition, nonexistent data and studies from some provinces did not allow us to include them in the final analysis.

**Conclusion**
The result showed a high prevalence of HCV in drug users in Iran. Therefore, ongoing preventive actions are highly recommended. HCV prevention and treatment programs focused on drug users are urgently needed.

**Conflict of interest**
The authors declare that they have no conflict of interest.

**Acknowledgment**
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Table 1: Characteristics of the included published HCV articles in the field of Drug User in Iran

<table>
<thead>
<tr>
<th>Province</th>
<th>First Author</th>
<th>Ref.</th>
<th>Year of Publication</th>
<th>Year of Study</th>
<th>Mean Age</th>
<th>No. HCV (Sample Size)</th>
<th>Province</th>
<th>First Author</th>
<th>Ref.</th>
<th>Year of Publication</th>
<th>Year of Study</th>
<th>Mean Age</th>
<th>No. HCV (Sample Size)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Afshari</td>
<td>[66]</td>
<td>2010</td>
<td>2010</td>
<td>36</td>
<td>59(100)</td>
<td>Khorvash</td>
<td>Saleh</td>
<td>[68]</td>
<td>2010</td>
<td>2010</td>
<td>36</td>
<td>59(100)</td>
</tr>
</tbody>
</table>

Table 2: Pooled prevalence of HCV according to the provinces of Iran

<table>
<thead>
<tr>
<th>Province</th>
<th>Number of studies</th>
<th>Prevalence 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alborz</td>
<td>3</td>
<td>40.00% (35.00%-45.00%)</td>
</tr>
<tr>
<td>Chahar Mahaal and Bakhtiari</td>
<td>2</td>
<td>29.00% (24.00%-34.00%)</td>
</tr>
<tr>
<td>Fars</td>
<td>2</td>
<td>26.36% (11.95%-40.77%)</td>
</tr>
<tr>
<td>Golestan</td>
<td>3</td>
<td>37.14% (22.07%-52.21%)</td>
</tr>
<tr>
<td>Hamedan</td>
<td>3</td>
<td>41.20% (28.06%-54.33%)</td>
</tr>
<tr>
<td>Hormozgan</td>
<td>1</td>
<td>64.68% (58.78%-70.58%)</td>
</tr>
<tr>
<td>Isfahan</td>
<td>16</td>
<td>39.95% (30.35%-49.54%)</td>
</tr>
<tr>
<td>Kerman</td>
<td>1</td>
<td>7.22% (3.44%-11.00%)</td>
</tr>
<tr>
<td>Kermanshah</td>
<td>3</td>
<td>39.88% (21.15%-58.62%)</td>
</tr>
<tr>
<td>Khorasan, Razavi</td>
<td>2</td>
<td>64.78% (53.48%-76.08%)</td>
</tr>
<tr>
<td>Khuzestan</td>
<td>2</td>
<td>63.05% (41.56%-84.54%)</td>
</tr>
<tr>
<td>Kohgiluyeh and Boyer-Ahad</td>
<td>1</td>
<td>42.40% (34.69%-50.11%)</td>
</tr>
<tr>
<td>Lorestan</td>
<td>1</td>
<td>16.23% (11.84%-20.62%)</td>
</tr>
</tbody>
</table>

www.jbe.tums.ac.ir
Markazi 2 49.54% (37.60%-61.49%)
Mazandaran 2 32.16% (22.96%-41.37%)
Semnan 1 39.68% (27.60%-51.76%)
Tehran 18 46.96% (36.99%-56.93%)
Zanjan 1 47.68% (42.42%-52.95%)

Pooled Effect
Heterogeneity chi-squared = 5111.26 (d.f. = 63), p = <0.001
I²=98.8%, τ² = 0.0435
Begg’s rank test
r=0.208, P=0.099
Egger Test
Constant =-5.13±2.62, P=0.055
Slop=126.16±71.76, P=0.084

Figure 2: Trend of HCV prevalence in drug during time in Iran country

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