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Review Article

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

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ABSTRACT

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.barakatkns, 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.

Context

Hepatitis C virus (HCV) related morbidity and mortality places a substantial burden on healthcare systems worldwide[1]. Worldwide, 130 million people are infected with HCV (Hepatitis C Virus), and 350–400 million people are suffering from viral chronic hepatitis [2, 3].Van Handel et al showed that the most leading causes of new HCV infections are unsafe methods used in health care and the use of drug [4]. On the other hand, the common border with Afghanistan (As the largest source of drug production in the world) makes Iran be prone to drug trafficking, low prices and increasing access to injectable drugs lead to the growing use of drug injection and drug dependence[5].

This study aimed to review the relevant literature systematically and determine the pooled prevalence of HCV infection among Drug User. It must be said that although many studies have been published about HCV epidemiology in different cities of Iran[6], the lack of strong evidence in this field is still needed

Objectives

Therefore, this systematic and meta-analysis study with aim of estimating efficient HCV pooled effect prevalence in Iranian Drug user has been done.

Evidence Acquisition

Search Strategy

The literature on the HCV prevalence in Iran was acquired through international searching databases including PubMed, Scopus, Elsevier, Google Scholar and Web of Science and Iranian scientific information database (SID), IranDoc,

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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.

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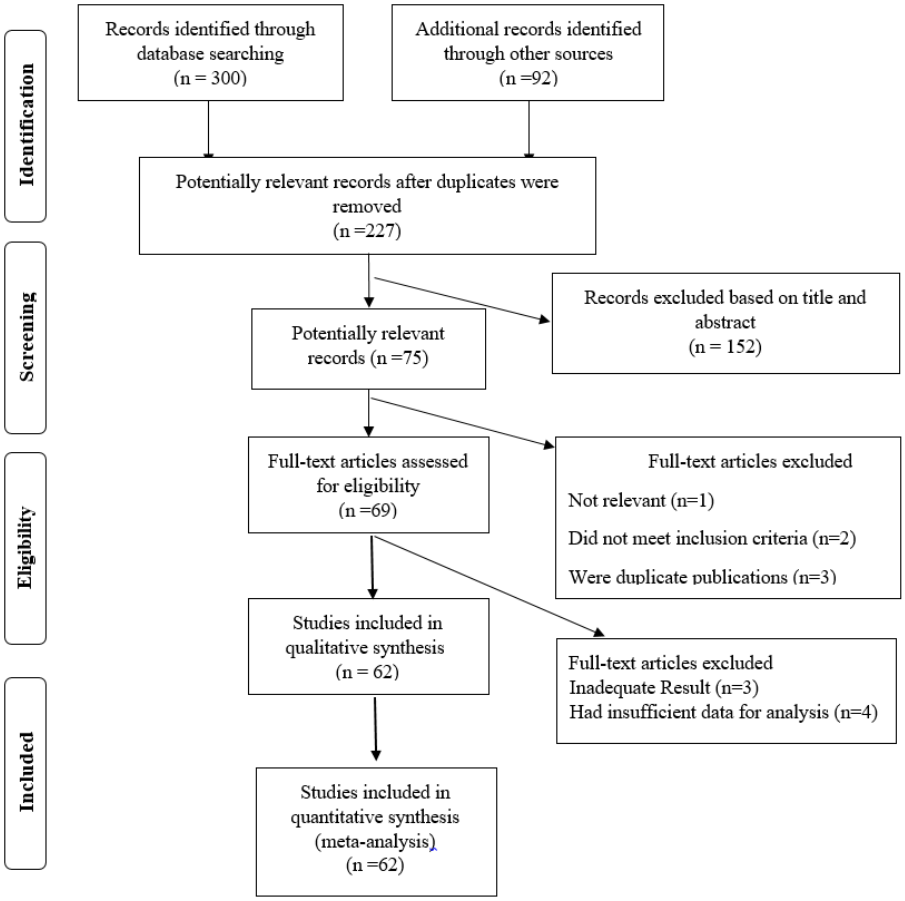

Table 1: Characteristics of the included published HCV articles in the field of Drug User in Iran

Province	First Author	Ref.	Year of Publish	Year of study	Mean Age	No. HCV (Sample Size)	Province	First Author	Ref.	Year of Publish	Year of study	Mean Age	No. HCV (Sample Size)
Isfahan	Rostami	[21]	2006	2002	28	59(148)	Tehran	Amini	[39]	2005	2004	21	7(34)
	Ataei	[22]	2010	2010	33	644(1485)		Mir-Nasseri	[40]	2005	2001	35	308(467)
	MobasheriZadeh	[23]	2010	2010	34	74(1055)		Zamani	[41]	2007	2004	38	105(202)
	Meshkati	[24]	2007	2004	35	51(213)		Aminzadeh	[42]	2007	2007	34	27(70)
	Tayeri	[25]	2007	2004	51	80(106)		Soudbakhsh	[43]	2008	2007	35	48(60)
	Sharif	[26]	2009	2004	37	24(200)		Malekinejad	[44]	2008	2007	37	163(443)
	Zamani	[27]	2010	2008	29	71(118)		Mir-Nasseri	[45]	2008	2001	33	345(580)
	Meidani	[28]	2009	2007	30	39(150)		Kheirandish	[46]	2009	2006	34	363(454)
	Ataei	[29]	2011	2007	35	28(136)		Hosseini	[47]	2010	2006	30	333(417)
	Khorvash	[30]	2008	2005	31	68(92)		Talaie	[48]	2007	2004	38	31(214)
	Meshkati	[31]	2011	2009	41	250(539)		Mir-Nasseri	[49]	2011	2001	35	359(518)
	Kafashian	[32]	2010	2008	33	399(951)		Mehrjerdi	[50]	2014	2011	35	56(209)
	Kassaian	[33]	2012	2009	33	392(943)		Mirahmadizadeh	[51]	2009	2005	33	664(1531)
	Nobari	[34]	2012	2008	35	595(1747)		Majidi	[52]	2012	2010	33	11(104)
	Noroozi	[35]	2011	2011	36	21(42)		RahimiMovaghar	[53]	2010	2006	33	310(899)
	Nokhodian	[36]	2012	2008	32	250(531)		Eskandarieh	[54]	2013	2008	29	168(258)
Alborz	Salem	[37]	2013	2008	35	12(122)		Zali	[55]	2001	1995	34	181(402)
	Noroozi	[35]	2011	2011	36	13(75)		Naderi	[56]	2004	2000	28	30(144)
	Taghizadeh Asl	[38]	2013	2004	31	114(150)	Kohgiluyeh &BoyerAhmad	Sarkari	[70]	2012	2009	26	67(158)
Chahar Mahaal and Bakhtiari	Imani	[57]	2008	2004	32	15(133)	Golestan	Allah kalteh	[71]	2018	2016	NA	70(200)
	Karimi	[58]	2008	2007	28	90(223)		Noroozi	[35]	2011	2011	36	19(32)
Khorasan, Razavi	Rowhani-Rahbar	[59]	2004	2001	33	60(101)		Khodabakhshi	[72]	2007	2002	28	28(121)
	Sani	[60]	2012	2008	34	44(62)	Mazandaran	Rafiei	[73]	2011	2010	35	37(132)
Khuzestan	Alavi	[61]	2007	2002	28	114(154)		Ghasemian	[74]	2011	2008	35	33(88)
	Alavi	[62]	2009	2001	26	74(142)	Markazi	Sofian	[75]	2012	2009	31	67(153)
Zanjan	Khani	[63]	2003	2001	34	165(346)		Ramezani	[76]	2014	2012	33	56(100)
Semnan	Faranoush	[64]	2006	2002	12	25(63)	Hormozgan	Davoodian	[77]	2009	2002	35	163(252)
Fars	Honarvar	[65]	2013	2012	28	108(569)	Hamedan	Saleh	[78]	2010	2007	33	57(94)
	Salehi	[66]	2015	2008	33	447(1327)		Alizadeh	[79]	2005	2002	38	128(427)
Kermanshah	Azizi	[67]	2011	2008	32	58(263)		Keramat	[80]	2011	2005	30	135(379)
	Rezaei	[68]	2016	2014	33	175(410)	Kerman	Khodadadizadeh	[81]	2006	2003	29	13(180)
	Sharhani	[69]	2017	2017	37	332(606)	Lorestan	Norouzian	[82]	2016	2016	32	44(271)

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

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

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%, $\tau^2 = 0.0435$ 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	62	42.01 %(36.83%-47.20%)

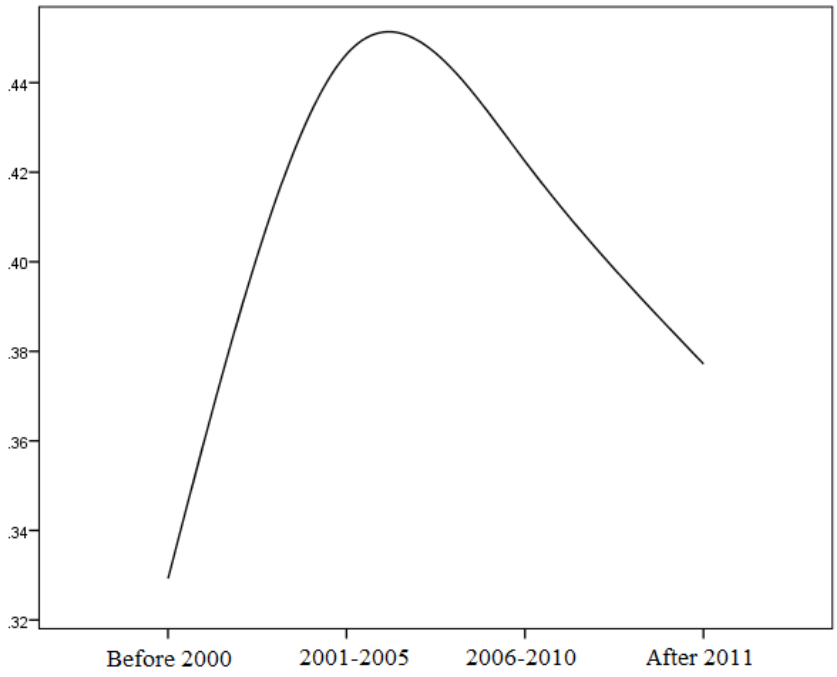

Figure 2: Trend of HCV prevalence in drug during time in Iran country

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