MISSION IMPOSSIBLE?

DEVELOPMENT OF AN ELECTRONIC MEDICAL RECORD (EMR) - DRIVEN SCREENING AND TREATMENT PATHWAY FOR IDENTIFICATION OF PATIENTS WITH HEPATITIS-C VIRUS IN ALBERTA

A META-ANALYSIS OF THE PEER- REVIEWED LITERATURE (2020 - 2026)

BY FINLEY WHYTE 9B
WEBBER ACADEMY
FEBRUARY 2026

1. BACKGROUND

Hepatitis C virus (HCV) is the one of the most common blood-borne infections worldwide; an estimated 70 million people are chronically infected. Long-term HCV infection increases the risk for hepatic fibrosis, cirrhosis and hepatocellular carcinoma, and is the leading cause of liver transplantation [1], [3-5].

Research shows that with early diagnosis and treatment; HCV transmission can be prevented and cured. However, most infected patients (50 – 75%) are unaware of their status as disease presentation does not show acuity until late stages [5]. And during this late-stage, with high rates of morbidity, it is often too late for patients to benefit from treatment interventions [3-4].

Conversely, the prognosis for patients with early intervention is highly favourable. With advances in antiviral therapies, treatments can cure most (estimates range up to ~90 %) chronically infected individuals using short-term, well-tolerated regimens [6-8].

Thus, the challenge for HCV + or HCV query + patients remains early diagnosis and screening. The predictive constellation for high-risk groups is mixed between social and clinical factors with social factors being particularly variable. To inform this research, a meta-analysis of the peer-reviewed literature was undertaken to identify the major predictive factors for HCV + [1-6,7].

2. SEARCH METHODS

A meta-analysis was completed to identify evidence- based screening criteria identified in the peer- reviewed literature. This was conducted for both background research as well as to develop a “shortlist” of critical factors relevant to proactive patient screening.

A comprehensive search was conducted in the databases CINHAL, EmBASE, PsychInfo, PubMed, Web of Science, Cochrane Collaboration and the grey literature. The time parameters for publications were between 2020 to present; notable studies outside this timeframe were hand-picked.

The meta-analysis used the search teams: 'HCV positive', 'screening', 'clinical pathway(s)', 'primary care', 'intervention', 'family medicine', 'community medicine', and these key words were used in a series of permutations. Search strings were formulated by using a combination of keywords and indexed subject headings (use of MeSH terms) [7-9, 10 -13].

Search parameters were limited to patients 18 years or older (birth year 2007 or earlier), patients who were HCV + as identified by serology; exclusions were case studies, single subject designs, non-human studies, studies published before 1990, and any reviews not published in English [13, 14].

3. STUDY SELECTION

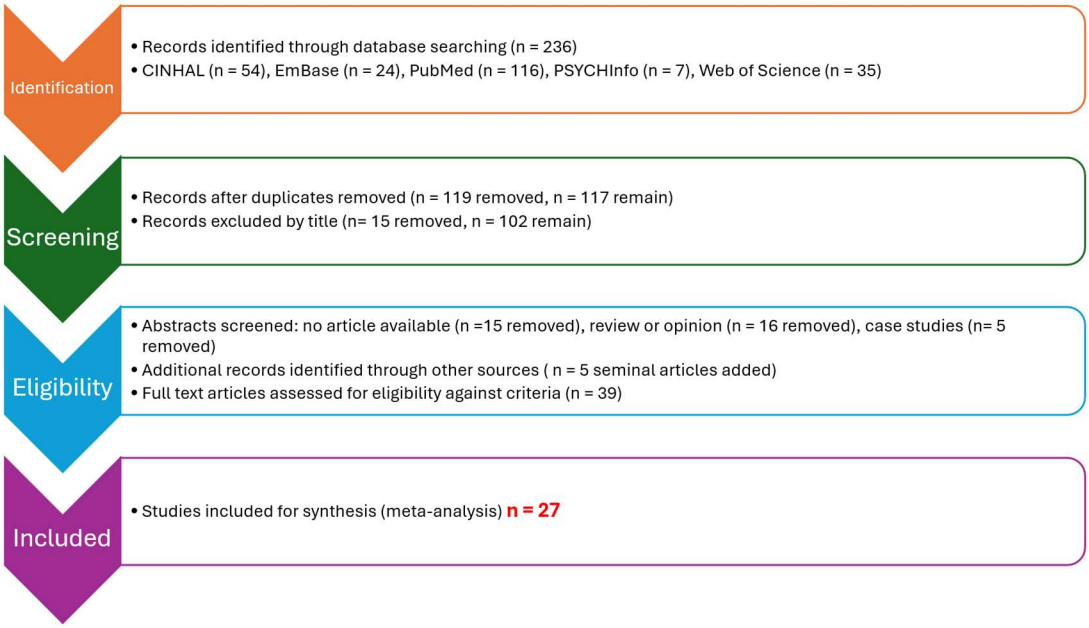
There were a series of reductive screening steps to achieve the final cohort oanalyzable articles (n= 27). First, records retrieved through the search strategy were imported into Excel and filtered for duplicates.

Second, records retrieved from the original search strategy were screened to ensure compliance with the keyword requirements (those as noted above).

Third, abstracts were further screened to ensure study compliance with inclusion exclusion criteria.

At completion, the following number of records were generated:

Figure 1: Search Records HCV Meta-analysis



4. RESULTS

Table 1. Predictive Clinical or Social Factors for HCV + Patients in Peer-Reviewed Literature (2020 – present)

Predictive Factors (n=27)	
Individuals with history of drug use	17
Individuals who have been incarcerated	15
Individuals who are born (~resided in) HCV endemic countries	13
Recipients of blood transfusions, blood products or organ transplant before 1992 in Canada	9
Hemodialysis patients	7
Individuals who had needlestick injuries	4
Individuals who were (or are) unhoused	4

A total of 27 records were synthesized.

The majority of these were from the US (n =15), with the rest being divided between the UK (n=7), Australia (n=3) and parts of Asia (n=2). Patient numbers varied from around 60 participants with pathway studies to several thousand in two large database studies. Most studies recruited less than 500 patients [17, 19, 21].

Most studies focused on collecting data on lifestyle factors affecting HCV + diagnoses (i.e. drug use (n=17) [13, 14, 17], incarceration (n= 15), [17,19], exposure to blood/ blood products (n = 16) [18], and transient/ unhoused status (n=4)[20]. The research was consistent and clear that HCV+ is a virus perpetuated by social demographic circumstances and risk factors must fully address these.

The peer-reviewed literature investigated the impact of Direct Acting Antivirals (DAAs) in primary care and community environments. Four of 17 studies centering on patients who were IV drug users, examining linking specialists with primary care providers. Twelve studies evaluated the impact of identifying risk factors linked to the social cluster of unemployment, IV drug use (past/ present), and incarceration (past). Two studies evaluated the risk factor of being unhoused (that singular risk factor) and the delivery of DAAs via a mobile health unit [14-16, 18-21].

Results from studies focusing on race were mixed. While almost all the 27 studies (22/27) included race as a risk factor, notably, race was defined differently (patient self report, evaluator report, or categorical variables differ between studies) leading to high degrees of variation in documentation. Looking at global data, clearly race is an important risk factor for HCV+, particularly when tied to geography. Some studies examined the impact of public health practices in Canada (9/27) or developing nations (13/27) and examined the risk factor of endemic exposure [17 - 21].

5. LIMITATIONS NOTED

The above meta-analysis has some notable limitations [21-23, 25]:

First, sample size: recently, there have been only a few studies published on HCV +. In part this is due to HCV + being considered highly treatable with established first line therapies.

Second, publication bias: studies with statistically significant results are more likely to receive publication over those with negative or inconclusive results. This leads to an inherent bias of the articles available for review and may lead to an overestimation of the impact of risk factors.

Third, study (design) quality: the validity of meta-analyses depends heavily on the quality of the methods of the studies reviewed. If the primary studies are poorly designed, executed, this will yield a skewed view of the influencing factors [24].

Fourth, data pooling variations: differences in how data is collected and reported across studies can pose challenges in pooling results. Variations in measurement tools, outcome definitions and statistical methods can introduce inconsistencies that hinder accurate synthesis [22-24].

Its should be noted that this is not a comprehensive list, and there are other potential sources of bias.

6. CONCLUSIONS

This meta-analysis identified studies which demonstrate the feasibility of decentralising care and providing local services with reach into communities for people infected with HCV. Such predictive pathways may increase uptake of treatment and can provide sustained viral responses equivalent to those attained in specialist centres.

Further studies are needed to confirm the promising start to the implementation of interferon free treatment regimens. The successful implementation of such pathways to deliver successful patient outcomes is a key requirement for a “treatment as prevention” strategy as a pathway to elimination of HCV.

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