The epidemiology of hepatitis C virus in Afghanistan: Systematic review and meta-analysis
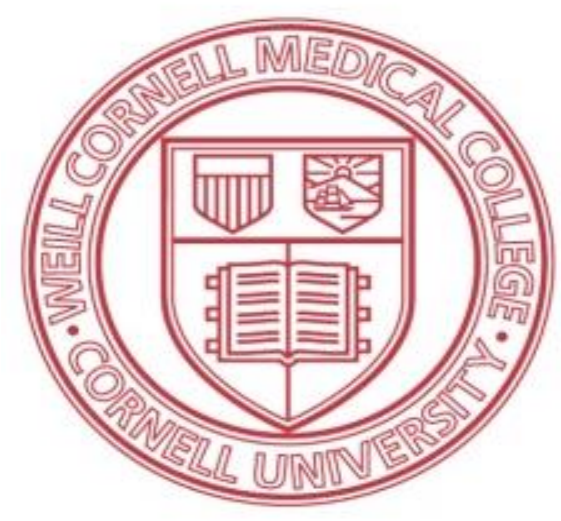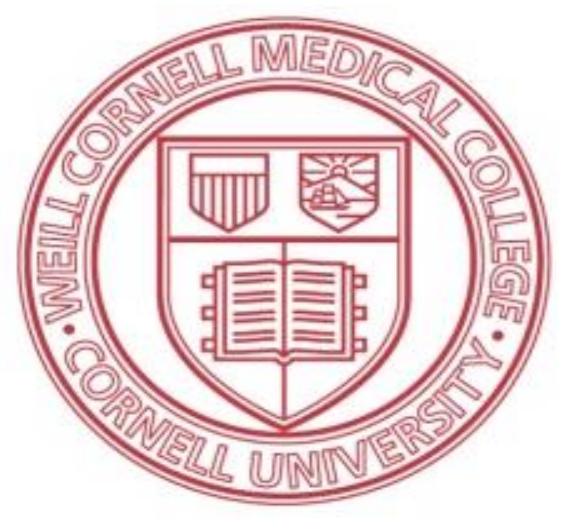
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OBJECTIVE

• To characterize hepatitis C virus (HCV) epidemiology and inform public health research, policy, and programming priorities in Afghanistan.

BACKGROUND

• There is potential for achieving substantial reductions in HCV transmission due to recent innovations in HCV treatment and prevention.
• HCV epidemiology in most countries in the Middle East and North Africa (MENA) including Afghanistan is poorly understood.
• Afghanistan may be vulnerable to the transmission of blood-borne infections including HCV due to decades of armed conflicts and opium cultivation and trade.
• This study is part of the MENA HCV Epidemiology Synthesis Project; an ongoing effort to characterize HCV epidemiology and inform key public health research, policy, and programming priorities in MENA.

METHODOLOGY

• We systematically reviewed and synthesized HCV incidence and prevalence data using a comprehensive search of literature and following PRISMA guidelines (Figure 1).
• HCV prevalence among various at risk populations were estimated through meta-analyses implemented using DerSimonian-Laird random effects models with inverse variance weighting (Table 1).
• Heterogeneity across studies was assessed using several measures (Table 1).
• A detailed assessment for the quality of HCV measures (risk of bias and precision) was conducted.

Figure 1. Flow chart of article selection for the systematic review of HCV incidence and prevalence in Afghanistan, adapted from the PRISMA 2009 guidelines
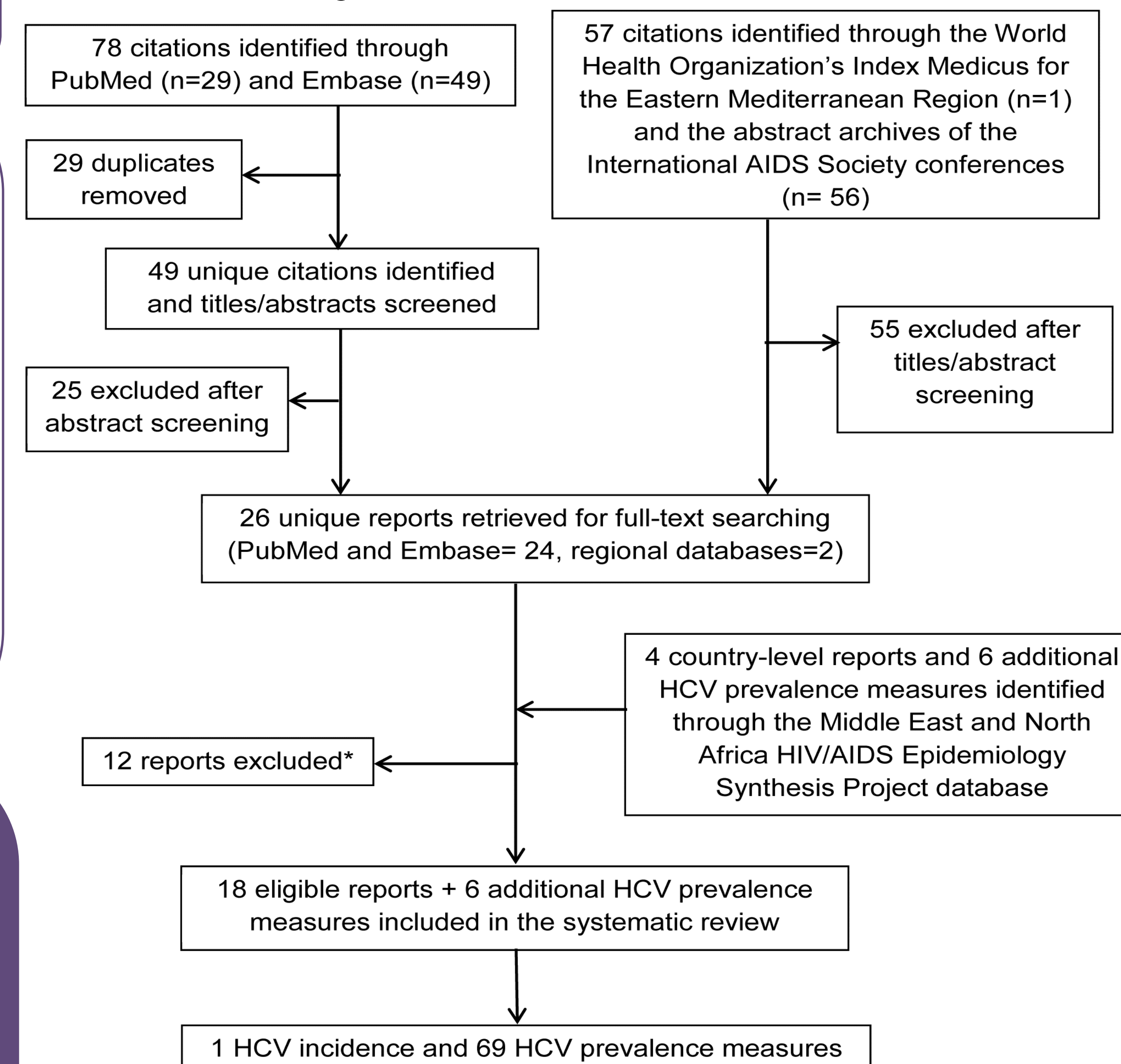
*Reasons for exclusion:
- Eligibility criteria not met (n=2)
- Full-text did not include data on relevant indicators (n=1)
- Conference abstract did not include data on relevant indicators (n=2)
- Duplicate data (n=7)

Table 1. Findings of the meta-analyses for HCV prevalence measures stratified by populations' risk of exposure in Afghanistan.

Populations at risk	Studies	Samples	Prevalence	Effect size (HCV prevalence)		Heterogeneity measures*			
	Total N	Total N	Range (%)	Mean (%)	95% CI	Q (p-value)	τ^2	I² (confidence limits)	Prediction interval (%)
Populations at low risk (general population)	40	215222	0-9.1	0.6	0.3-0.9	2434.3 (p<0.0001)	0.0123	98.4% (98.2-98.6%)	0.0-3.8
Populations at high risk (all studies were among people who inject drugs)	14	8139	9.5-70.0	32.6	24.5-41.3	669.6 (p<0.0001)	0.1276	97.8% (97.2-98.2%)	4.3-71.3
Populations at intermediate risk	16	6356	0-8.3	2.3	1.3-3.7	139.2 (p<0.0001)	0.0211	89.2% (84.1-92.7 %)	0.0-9.8

*Q: the Cochran's Q statistic is a measure assessing the existence of heterogeneity in effect size; τ^2 : the estimated between-study variance in the double arcsine transformed proportions of the true effect sizes. The back-transformed τ^2 was not calculated as the methodology to do so is not currently available; I²: a measure assessing the magnitude of between-study variation that is due to differences in effect size across studies rather than chance; Prediction interval: estimates the 95% interval in which the true effect size in a new HCV study will lie.

RESULTS

• Our search identified 1 HCV incidence and 69 HCV prevalence measures (Figure 1).
• HCV incidence was only assessed among people who inject drugs (PWID), and was reported at 66.7 per 100 person-years.
• Our meta-analyses estimated HCV prevalence at (Table 1):
  • 0.6% among the general population (range: 0-9.1%; 95% CI: 0.3-0.9%)
  • 32.6% among PWID (range: 9.5-70.0%; 95% CI: 24.5-41.3%)
  • 2.3% among populations at intermediate risk such as prisoners (range: 0.0-8.3%; 95% CI: 1.3-3.7%)
• No data was available for clinical populations at high risk such as hemodialysis, thalassemia, and hemophilia patients.
• HCV measures were of reasonable quality.

CONCLUSIONS

• HCV prevalence among the general population in Afghanistan is comparable to global levels (≈1%).
• There is an immediate need for expansion of harm reduction programs among PWID and prisoners.
• Data are needed for the level of infection among key clinical populations at high risk of infection.

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