INPLASY

Prevalence of Liver Cystic Echinococcosis in Turkiye: A Systematic Review of Ultrasound-Based Field Surveys

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 8 March 2026 and was last updated on 8 March 2026.

INTRODUCTION

R*eview question / Objective* Using the PICOS framework, the objective of this systematic review is to estimate the prevalence of liver cystic echinococcosis (CE) in Türkiye based exclusively on ultrasound-based epidemiological field surveys.
Participants (P): Human populations living in Türkiye, including both children and adults, regardless of gender.
Intervention (I): Abdominal ultrasonography used as a screening method for detecting liver cystic echinococcosis.
Comparison(C): Comparisons between rural and urban populations and between adults and children when available.
Outcome (O): Prevalence of liver cystic echinococcosis detected by ultrasound-based screening surveys.
Study design (S): Population-based ultrasound screening studies.

Rationale Cystic echinococcosis (CE) is a chronic zoonotic parasitic infection caused by Echinococcus granulosus and remains an important public health problem in many endemic regions. Humans act as accidental intermediate hosts after ingesting parasite eggs transmitted through the dog–livestock cycle. The disease often progresses slowly and may remain asymptomatic for years, making early detection challenging.

Türkiye is considered one of the endemic countries for CE due to widespread livestock breeding, close contact between humans and dogs, and traditional slaughtering practices. Although many clinical and hospital-based reports exist, these studies do not accurately reflect the real community prevalence because many infected individuals remain asymptomatic.

Ultrasound-based field surveys have emerged as a reliable epidemiological method for detecting liver CE in population-based studies. Ultrasonography allows direct visualization of hepatic cysts, is non-

invasive, radiation-free, and suitable for large-scale screening programs.

Despite several ultrasound-based epidemiological studies conducted in different regions of Türkiye, no systematic synthesis of these data has been performed specifically focusing on liver cystic echinococcosis. The liver is the most frequently affected organ in CE, making it a practical target for epidemiological screening.

Therefore, this systematic review aims to synthesize available ultrasound-based prevalence studies in Türkiye in order to estimate the overall prevalence of liver CE and to evaluate variations according to demographic characteristics such as age and rural or urban residence.

Condition being studied Cystic echinococcosis (CE), also known as hydatid disease, is a parasitic infection caused by the larval stage of Echinococcus granulosus. The parasite is transmitted through a life cycle involving carnivores, mainly dogs, as definitive hosts and livestock such as sheep or cattle as intermediate hosts. Humans become accidental hosts through ingestion of parasite eggs from contaminated food, water, or direct contact with infected animals.

After ingestion, the parasite larvae penetrate the intestinal wall and migrate through the bloodstream to different organs where they develop into hydatid cysts. The liver is the most commonly affected organ because it acts as the first filter in the portal circulation. Hepatic cystic echinococcosis accounts for approximately 70% of all human CE cases.

The disease often progresses slowly and may remain asymptomatic for years until cysts grow large enough to cause symptoms such as abdominal pain, hepatomegaly, or complications including rupture or infection.

In endemic countries like Türkiye, CE represents both a medical and socioeconomic burden. Early detection through community-based screening programs can identify asymptomatic individuals and help guide preventive and control strategies.

Ultrasound imaging is considered the most practical and reliable method for detecting liver CE in epidemiological surveys because it allows direct visualization of cyst morphology and staging according to the WHO-IWGE classification system. Ultrasound screening is non-invasive, radiation-free, and suitable for large population studies.

METHODS

Search strategy A systematic literature search will be conducted in major electronic databases including PubMed and Scopus. The search will include studies published from database inception until March 2025. The primary search terms will include the following keywords in the title, abstract or key-words of the articles: (echinococ* OR hydati*) AND (Turkey OR Turkiye) AND (ultraso*) AND (prevalence). Searches will be performed in the title, abstract, and keywords of articles. Reference lists of all included articles will also be manually screened to identify additional relevant studies that may not have been captured in the database search.

Two independent reviewers will conduct the literature search and study selection. Any discrepancies will be resolved through discussion and consensus.

If essential data are missing from eligible studies, attempts will be made to contact the study authors via email to obtain additional information.

Participant or population All population groups, regardless of age and gender, were included in the systematic review.
Studies were included if they:
• Were ultrasound-based epidemiological surveys conducted in Turkiye.
• Reported prevalence rates only in human populations.
• Provided sufficient data on sample size, methodology, and diagnostic criteria.

Intervention Studies that included ultrasound scanning along with serology were included in the review, but studies that screened only with serological studies were excluded. Single-arm screening studies with ultrasound or the relevant arm of multi-arm studies were included in the analyses.

Comparator Since the risk factors in individuals with and without the disease were not the subject of this study, we separated the living regions of the populations as rural and urban, because the expectation of prevalence of both places were different. Additionally we analyzed the children and adult prevalence due the time-dependent feature of CE.

Study designs to be included Cohort studies were included. Retrospective reports of hospital data were not included in this systematic review.

Eligibility criteria Inclusion criteria:

Ultrasound-based epidemiological surveys conducted in Türkiye

Studies reporting prevalence of liver cystic echinococcosis in humans

Community-based screening studies

Studies providing sufficient data on sample size and prevalence

Exclusion criteria:

Case reports, reviews, or questionnaire-based studies

Studies based solely on serological screening

Veterinary studies

Studies focusing only on alveolar echinococcosis

Studies conducted exclusively in high-risk subgroups such as household contacts of CE patients.

Information sources Information sources will include electronic databases such as PubMed and Scopus. Additional studies will be identified through manual screening of reference lists of eligible articles.

Main outcome(s) The primary outcome of the review will be the prevalence of liver cystic echinococcosis detected by ultrasound-based screening surveys in human populations in Türkiye.

Prevalence will be calculated as the proportion of individuals diagnosed with liver CE among the total number of screened participants.

Additional outcome(s) Prevalence differences between rural and urban populations

Prevalence differences between children and adults

Distribution of screened populations according to demographic characteristics

Geographic distribution of screening studies within Türkiye.

Data management All retrieved records will be managed using spreadsheet software (Microsoft Excel). After removing duplicates, titles and

abstracts will be screened to identify potentially relevant studies.

Eligible studies will undergo full-text review and extracted data will be organized in standardized tables including sample size, population characteristics, screening methods, and prevalence outcomes.

Quality assessment / Risk of bias analysis The methodological quality of included studies will be assessed using established tools for observational studies. The risk of bias will be evaluated based on factors such as sampling methods, diagnostic confirmation using ultrasound, completeness of reporting, and representativeness of the screened population.

Two reviewers will independently perform quality assessment and disagreements will be resolved through discussion.

Strategy of data synthesis Extracted data will be summarized descriptively and presented in tables. Prevalence rates from individual studies will be pooled to estimate overall prevalence of liver CE in Türkiye.

Statistical analysis will include calculation of pooled prevalence proportions and confidence intervals using appropriate statistical software.

Subgroup analysis Subgroup analyses will be performed based on:

Age group (children vs adults)

Living area (urban vs rural)

Geographic region where data are available.

Sensitivity analysis Sensitivity analysis will be conducted by excluding studies with potential methodological limitations to evaluate the robustness of pooled prevalence estimates.

Language restriction No language restriction will be applied.

Country(ies) involved Turkey.

Other relevant information This systematic review focuses specifically on ultrasound-based screening studies because ultrasonography is considered the most reliable and practical method for detecting liver cystic echinococcosis in field epidemiological surveys.

Keywords hepatic; hydatid,;Turkey; epidemiology.

Dissemination plans The results of this systematic review will be submitted for publication in an international peer-reviewed journal and presented at relevant scientific conferences.

Contributions of each author
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