

# INPLASY PROTOCOL

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**Conflicts of interest:**  
None declared.

## Metabolic syndrome and survival of hepatocellular carcinoma

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**Review question / Objective:** Metabolic syndrome (MetS) has been related to a high incidence of hepatocellular carcinoma (HCC). However, the influence of MetS on survival of patients with HCC is still unclear. We performed a systematic review and meta-analysis to evaluate the association between MetS and survival of HCC patients.

**Condition being studied:** As the sixth most commonly diagnosed cancer among adults and the third leading cause of cancer-related mortality globally, hepatocellular carcinoma represents the most common type of liver cancer. Although multiple treatments are available, responses of HCC patients to these treatments are varying, and the survival of some patients with HCC remains poor despite of these comprehensive treatments. Therefore, uncovering potential risk factors of poor prognosis in patients with HCC is important for risk stratification and development of adjunctive treatments in these patients.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 30 December 2022 and was last updated on 30 December 2022 (registration number INPLASY2022120113).

### INTRODUCTION

**Review question / Objective:** Metabolic syndrome (MetS) has been related to a high incidence of hepatocellular carcinoma (HCC). However, the influence of MetS on survival of patients with HCC is still unclear. We performed a systematic review and meta-analysis to evaluate the

association between MetS and survival of HCC patients.

**Rationale:** Metabolic syndrome (MetS) refers to a cluster of metabolic disorders which involve central obesity, insulin resistance, high blood pressure, and dyslipidemia. Pathophysiologically, MetS is characterized by insulin resistance and

systemic low-degree inflammation, which have been both related to carcinogenesis. Epidemiological studies have confirmed the role of MetS as a risk factor for the incidence of various cancers, including HCC. However, for patients with diagnosed HCC, the influence of MetS on their survival remains unclear. In this study, we performed a systematic review and meta-analysis to comprehensively investigate the association between MetS and survival of patients with HCC. In addition, the effect of different diagnostic criteria on the association was also explored in subgroup analyses.

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## METHODS

**Search strategy:** A combined search term was used, including (1) "metabolic syndrome" OR "insulin resistance syndrome" OR "syndrome X"; (2) "hepatocellular" OR "liver" OR "hepatic"; (3) "carcinoma" OR "cancer" OR "tumor" OR "malignancy" OR "malignant" OR "neoplasm"; and (4) "survival" OR "death" OR "mortality" OR "prognosis" OR "recurrence" OR "recurrent".

**Participant or population:** HCC patients.

**Intervention:** Patients with MetS at baseline.

**Comparator:** Patients without MetS at baseline.

**Study designs to be included:** Cohort studies, including prospective and retrospective cohorts.

**Eligibility criteria:** Cohort studies comparing OS and PFS between HCC patients with and without MetS.

**Information sources:** PubMed, Embase, and Web of Science.

**Main outcome(s):** A primary outcome was overall survival (OS), and a secondary outcome was progression-free survival (PFS), compared between HCC patients with and without MetS.

**Quality assessment / Risk of bias analysis:** An assessment of study quality was done using the Newcastle-Ottawa Scale based on criteria for participant selection, comparability of groups, and validity of results. A study's quality was determined by the number of stars between 1 and 9, with more stars representing a better study quality.

**Strategy of data synthesis:** The results were combined using a random-effects model incorporating heterogeneity's influence.

**Subgroup analysis:** Subgroup analyses were conducted to examine how study characteristics influenced the results.

**Sensitivity analysis:** A sensitivity analysis that omitted one study at a time was conducted to observe what effect each study has on the overall results.

**Language restriction:** No restriction.

**Country(ies) involved:** China.

**Keywords:** Metabolic syndrome; Hepatocellular carcinoma; Survival; Meta-analysis.

**Contributions of each author:**

Author 1 - Jia Fu.

Author 2 - Jinqiong Jiang.

Author 3 - Kanghan Liu.