



Review

High serum uric acid and risk of nonalcoholic fatty liver disease: A systematic review and meta-analysis



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ABSTRACT

Objectives: Emerging evidence connects serum uric acid (SUA) levels to nonalcoholic fatty liver disease (NAFLD). The objective of this study was to systematically evaluate the association between SUA levels and risk of NAFLD by conducting a meta-analysis of available observational studies.

Design and methods: We searched for relevant studies in PubMed, Embase, China National Knowledge Infrastructure, and Wanfang databases until October 2014. All observational studies that evaluated SUA levels and NAFLD risks were included. Pooled adjusted odds ratio (OR) and corresponding 95% confidence intervals (CI) were calculated comparing the highest to lowest SUA category.

Results: Four cross-sectional studies, two prospective studies, and three retrospective studies involving 55,573 participants were identified. In overall risk estimates, the pooled OR of NAFLD occurrence was 1.92 (95% CI: 1.59–2.31) comparing the highest to lowest SUA levels in a random effect model. Subgroup analysis showed that high SUA levels increased the risk of NAFLD in cross-sectional studies (OR: 2.18; 95% CI: 1.58–3.03), retrospective studies (OR 1.82; 95% CI: 1.43–2.33), and prospective studies (OR 1.43; 95% CI: 1.20–1.71). The risk of NAFLD seemed more pronounced among women (OR 1.85; 95% CI: 1.43–2.38) than among men (OR 1.56; 95% CI: 1.30–1.86).

Conclusion: This meta-analysis suggests that increased SUA level is associated with an exacerbated risk of NAFLD. This increased risk is probably independent of conventional NAFLD risk factors.

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Contents

1.	Introduction	636
2.	Methods	637
2.1.	Data sources and searches	637
2.2.	Study selection	639
2.3.	Data extraction and quality assessment	639
2.4.	Data synthesis and analysis	639
3.	Results	639
3.1.	Study characteristics	639
3.2.	Association of SUA levels with NAFLD	640
3.3.	Gender difference in high SUA levels and NAFLD occurrence	640
3.4.	Sensitivity analyses	640
4.	Discussion	640
	Author contributions	641
	Conflict of interest	641
	Appendix A. Supplementary data	641
	References	641

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1. Introduction

Non-alcoholic fatty liver disease (NAFLD) is one of the most common chronic liver diseases worldwide, affecting 20% to 30% of the general population [1] and up to 46% of the middle-aged group in Western countries [2]. The prevalence of ultrasonographic steatosis in Chinese populations is >30% [3]. NAFLD that includes simple steatosis and non-alcoholic steatohepatitis (NASH) that may lead to hepatocellular carcinoma [4] is identified as a hepatic manifestation of the metabolic syndrome linked to obesity [5,6].

Uric acid is an end-product of purine metabolism in humans [7]. Increased serum uric acid (SUA) levels have been associated with metabolic syndrome [8–11], type 2 diabetes [12,13], insulin resistance [14], and chronic kidney disease [15–17]. Numerous studies [18–27] have indicated that increased SUA levels were associated with the occurrence of NAFLD. Specially, elevated SUA levels even in a normal range also increased NAFLD risk [23]. However, whether SUA levels are an independent risk factor of NAFLD remains controversial.

To the best of our knowledge, no previous meta-analysis has specifically investigated the association between increased SUA levels and

risk of NAFLD. This study aimed to evaluate the association between SUA levels and NAFLD risk in a general population by conducting a meta-analysis.

2. Methods

2.1. Data sources and searches

This meta-analysis was conducted with the checklist of the Meta-Analysis of Observational Studies in Epidemiology [28]. A comprehensive literature search was conducted on literature published through October 2014 using the PubMed, Embase, China National Knowledge Infrastructure, and Wanfang databases. The following search keywords were used: uric acid OR hyperuricemia OR urate and NAFLD/non-alcoholic fatty liver disease OR NASH/non-alcoholic steatohepatitis OR fatty liver OR liver enzymes and observational study OR prospective study OR retrospective study OR cross-sectional study OR case-control study. Moreover, we also manually searched the reference lists of selected articles to identify potential additional studies. Two authors (Y Fan

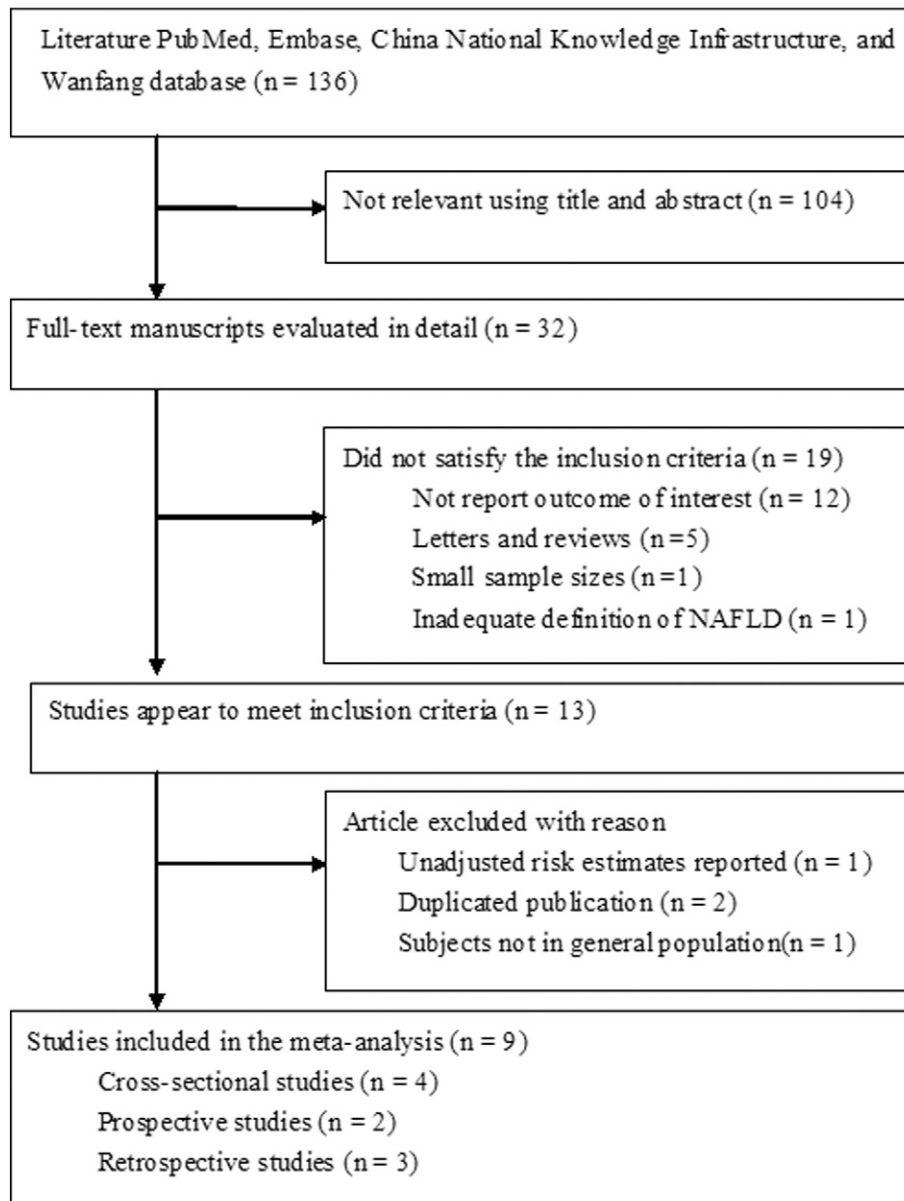


Fig. 1. Flow diagram of studies identified and selected.

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