

# The relationships between Sugar consumption and Anxiety: A systematic review

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## Background

Anxiety disorders are characterized by the anticipation of danger accompanied by the feeling of worry and distress.

It affects approximately 7.3% worldwide (1) and the prevalence was estimated to be ~15% in primary care setting (2).

Dietary patterns were found to be associated with mental health where dietary sugar consumption was found to be associated with mental health problems (e.g., depression) (3-5).

Due to the inconsistency in current evidence, a systematic review is warranted.

## Aim

Synthesize and evaluate the quantitative human studies addressing the association between dietary sugar and anxiety disorders.

Further discuss the roles of dietary sugar categories demographic characteristics (e.g., age) in such association.

## Method

### Inclusion criteria:

- Conducted dietary measure
- Anxiety disorder measured by diagnosis or validated questionnaire
- Investigated the relationship between dietary sugar and anxiety disorder

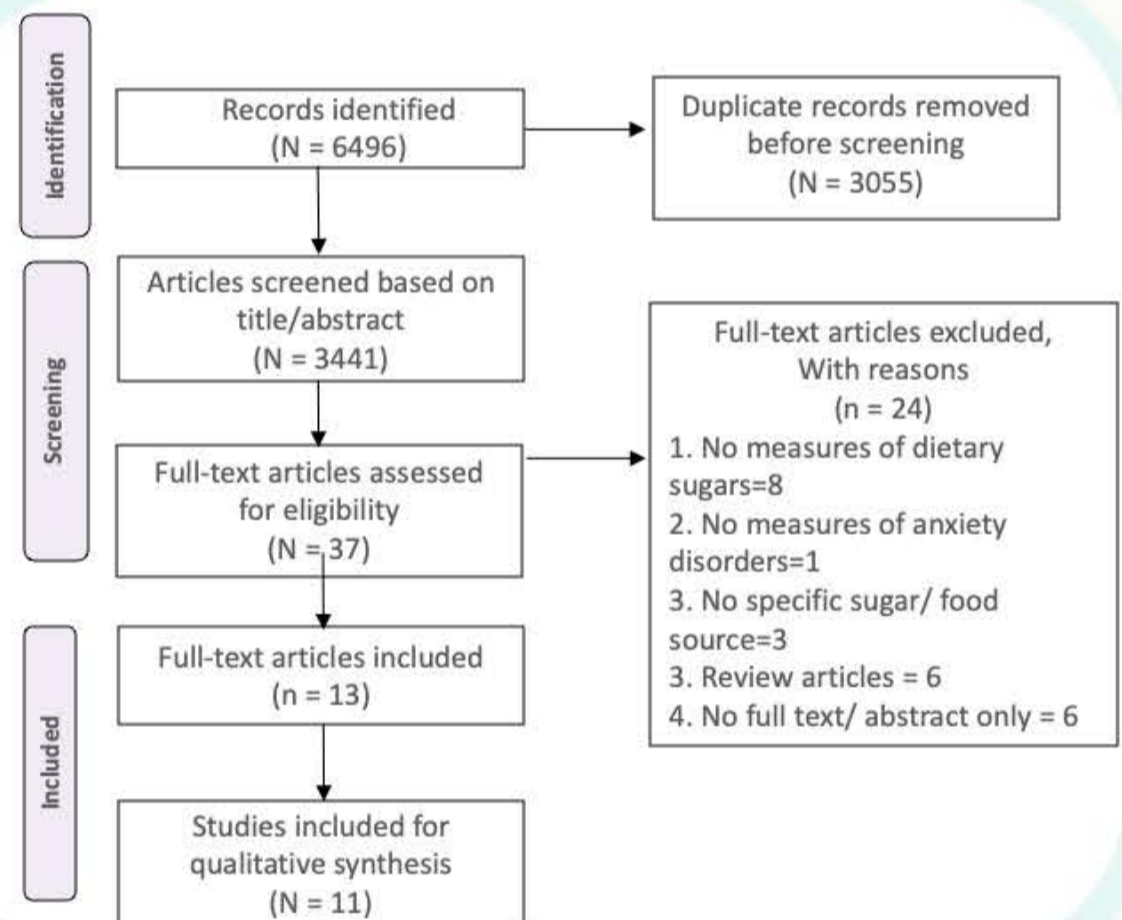
Articles included were limited to human studies and in English language

### Exclusion criteria:

- Lack description of type of sugar/ food
- Abstract and reviews articles

## Results

Author, year, country	Study population (Age range /mean)	Study design	Sample size	Dietary sugar category (measure)	Anxiety disorder measure
<b>Cross-sectional studies</b>					
(Sangsefidi et al., 2020) Iran	Adults (20-70)	CS	9,965	SSB/ Sweets	DASS 21
(Zahedi et al., 2014) Iran	Adolescents (12.47)	CS	13,486	SSB/ Sweets	GSHS
(Gao et al., 2021) China	College students (19)	CS	1,017	SSB/ Sweets	GAD-7
(Vassou et al., 2021) Greece	Adults (40-45)	CS	853	SSB/ Sweets	STAI
(Zhang et al., 2019) China	Adolescents (18.4)	CS	8,085	SSB / Added sugar	GAD-2
(Liu et al., 2022) China	Children (12.07)	CS	1,311	SSB	SASC
(Shi et al., 2010) Australia	Adults (46.7)	CS	4,741	SSB	GHQ-28
*(Kose, Cheung, et al., 2021) France	Adults without diabetes and pregnancy (53.68)	CS	20,231	Sweet food & beverages/ Added sugar / Simple sugar	STAI
*(Kose, Fezeu, et al., 2021) France		CS		Simple sugar	
*(Kose et al., 2022) France	53.2		24,771	Added sugar	
(Keck et al., 2020) US	College students (18.9)	CS	225	Added Sugar	GAD-7
(Wattick et al., 2018)	College students (19-21)	CS	1956	Added Sugar	Healthy Days Measures (CDC)
<b>Clinical trials</b>					
(Scholey et al., 2014) Australia	Adults (34.78)	RCT	N <sub>intervention</sub> =113 N <sub>control</sub> =37	Added Sugar	STAI



## Added sugar

The results suggested a positive correlation between added sugar consumption and anxiety disorders.

The association can be bidirectional based on the cross-sectional evidence.

Age difference may exist in the association.

## Sweetened beverages

Mixed results showed in seven studies in both adults & children.

Different types of sugar-sweetened beverages may influence the results (e.g., beverages with fresh ingredients versus with added sugar).

## Sweets

One study found negative association while others found no association.

The measure of exposure were inconsistent across studies.

The limited number and quality of the studies may have precluded the results.

## Conclusions

Consumption of added sugar could be positively associated with anxiety disorder, yet no solid conclusion could be drawn in the current review due to the limited number and quality of studies. Factors such as age and sweetened food/ beverages categories may influence the associations. Future studies should standardise exposure and outcome measures, conduct longitudinal studies to explore the mechanism in humans and potential causal direction of sugar consumption and anxiety for better understanding.

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