

# INPLASY

## How effective is drinking natural mineral water against heartburn from functional dyspepsia, gastroesophageal reflux disease or other causes? A systematic review of clinical intervention studies

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### ADMINISTRATIVE INFORMATION

**Support** - None.

**Review Stage at time of this submission** - Completed but not published.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY202410007

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 03 January 2024 and was last updated on 03 January 2024.

### INTRODUCTION

**Review question / Objective** Our objective was to examine patient-relevant outcomes of drinking mineral waters in patients with heartburn (cardialgia, pyrosis, gastric reflux), a highly prevalent condition, by conducting a systematic review with methodological quality ratings of clinical intervention studies.

**Rationale** Despite the long history and numerous previous studies examining drinking natural mineral waters for various conditions, systematic summaries of clinical intervention studies with patient-relevant outcomes and stringent study quality assessments are lacking.

**Condition being studied** Heartburn, also known as pyrosis, cardialgia or acid indigestion, is a burning sensation in the central chest or upper central abdomen. It may be accompanied by

dyspeptic complaints such as bloating, distension, nausea, or lack of appetite. The etiology of heartburn is very complex and is mainly induced by acidic esophageal reflux, but non-acidic or duodeno-gastroesophageal reflux or motor abnormalities are also causes for heartburn. The prevalence of heartburn in Europe is high, ranging from 38% in Northern European countries to 9% in Italy.

Heartburn is a key symptom of several underlying upper gastrointestinal disorders among which gastroesophageal reflux disease (GERD) and functional dyspepsia are the most prevalent. GERD is described as reflux associated with troublesome symptoms or complications affecting up to 30% of adults with an increasing prevalence in high-income countries. Functional dyspepsia is best diagnosed based on symptoms outlined by the Rome committee in conjunction with a normal upper endoscopy. However, substantial overlap exists epidemiologically, symptomatically and even diagnostically. For many patients, dyspepsia and

GERD are interrelated so that the question arises whether the two can be treated as distinct diseases. Functional dyspepsia and heartburn also lead to substantial healthcare costs.

## METHODS

**Search strategy** The following free-text terms were used to search the MEDLINE (accessed by PubMed) database: "drinking cure", "drinking therapy", "hydrotherapy", "hydropinic", "hydropinotherapy", "balneo", "spa", "mineral water", "medicinal mineral water", "natural mineral water", "mineral waters", "Dyspepsia", "Gastroesophageal reflux disease", "Gastroesophageal Reflux", "Heartburn".

The search by PubMed was carried out in combination of free-text with Medical Subject Headings (MeSH) terms as well as without them as to maximize the possible results.

**Participant or population** Adult patients with heartburn (cardialgia, pyrosis, gastric reflux) regardless of their sex or age.

**Intervention** For this review, we focused on natural mineral waters and defined the intervention as a special complementary treatment in which patients ingest a certain amount (usually from 0.5 L up to 1.5 L) of mineral water daily for at least one week. Only trials that applied the intervention with natural mineral water were included. In most countries natural mineral water must contain at least 1000 mg/L of minerals in order to qualify as a pharmaceutical substance.

**Comparator** No or other intervention (care-as-usual, waiting list).

**Study designs to be included** The search was limited to intervention studies, i.e., randomized and non-randomized trials, with and without a comparison group. Furthermore, we searched for systematic reviews of intervention studies (with or without meta-analysis).

**Eligibility criteria** We included studies without any restriction by language or date of the publication.

**Information sources** We systematically searched the medical literature database MEDLINE (via PubMed), further relevant web sources (Google Scholar, Semantic Scholar, and Connected Papers) and gray literature. In addition, we conducted a comprehensive hand search, e.g. in balneological textbooks, to identify further studies.

**Main outcome(s)** We defined the reduction of heartburn symptoms and duration of disease episodes as primary outcomes.

**Additional outcome(s)** Quality of life was defined as a secondary outcome.

**Quality assessment / Risk of bias analysis** The risk of bias was assessed by two authors independently using the checklists developed by the US National Heart Lung and Blood Institute for controlled comparative trials and before-after (pre-post) trials without a control group, respectively.

**Strategy of data synthesis** Results were described narratively.

**Subgroup analysis** None.

**Sensitivity analysis** None.

**Language restriction** No restriction by language.

**Country(ies) involved** Germany.

**Keywords** functional dyspepsia, GERD, heartburn, mineral waters.

### Contributions of each author

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