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The role of smoking and alcohol behaviour in management of functional gastrointestinal disorders

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ABSTRACT

Functional gastrointestinal disorders (FGIDs) are common disorders in the population. Lifestyle habits have been suspected to influence the presence and degree of symptoms, and many studies have examined the role of food components and physical activity on the disease development. The role of smoking and alcohol intake on FGID has been less thoroughly examined. This systematic literature review, of a large amount of studies from different countries around the world with different design and application of FGID criteria, shows that smoking seems to be associated with a significant 50% increased risk of FD for current compared with never smokers. The associations between smoking and other FGIDs are weak, if present at all. A moderate alcohol intake is not associated with FGIDs. On the other hand, a high alcohol intake may lead to development and aggravation of FGID symptoms, especially functional dyspepsia.

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Functional gastrointestinal disorders (FGID) are gastrointestinal disorders without any obvious organic changes. These disorders of unknown aetiology are very common in the population. Since no organic changes are observed, the disease definition is based on symptoms experienced by the affected subject. Functional dyspepsia (FD) and irritable bowel syndrome (IBS) are the most common forms of FGID. FD is characterized by epigastric pain or burning, postprandial fullness, and/or early satiation. IBS is characterized by abdominal pain related to defecation and in association with altered bowel habits and bloating. The Manning criteria was the first definition of IBS and was published in 1978 [1]. Later on, the Rome criteria was introduced in 1988 [2]. This initial IBS criteria has then been further developed to define FD and IBS and are presented as Rome I in 1992 [3], Rome II in 1999 [4], and Rome III in 2006 [5]. According to the new Rome IV criteria which were presented in 2016, FGID can be divided into oesophageal disorders [6], gastroduodenal disorders [7], bowel disorders [8], centrally mediated disorders of gastrointestinal pain [9], gallbladder and Sphincter of Oddi disorders [10], and anorectal disorders [11] (Table 1).

Since the specificity of the various FGID criteria differ, the

prevalence of the diseases varies in the community. The prevalence of IBS in an Australian population was 13.6%, 4.4%, or 6.9%, based on the Manning criteria, Rome I criteria, or Rome II criteria, respectively [12]. Overall, the prevalence of IBS may vary between 2.5% and 22% in Western and Eastern populations, depending on the criteria used [13]. Between 44% and 80% of Spanish subjects who fulfilled the Rome I or Manning criteria for IBS did not fulfil the more stringent Rome II diagnostic criteria, where the frequency of symptoms are also considered [14]. The prevalence of IBS is reported to 5.7% according to the Rome IV criteria, compared to 10.7% when using the Rome III criteria [15]. Another confounding factor in this research field is the recruitment of patients from different sources, since recruitment methodology affects important characteristics of FGID [16].

This review includes all published studies available at PubMed, written in English, performed on smoking and alcohol habits and their influence on FGID. Thus, the FGID criteria applicable varies, and this may influence the outcome of the studies, which may explain some of the contradictory results. When more specific criteria are applied, the prevalence of the diseases are lower, and larger cohorts are needed to statistically ensure an association. The prevalence of the various FGIDs may differ among countries, and may be dependent on age and gender distributions in the cohorts [17]. It is described how dietary patterns influence the symptom burden in FGID [18], and that high physical activity is associated with less symptoms of FGID [19]. In most studies, adjustments for

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Table 1
The classification of functional gastrointestinal disorders according to Rome IV.

Oesophageal disorders	Gastrointestinal disorders	Bowel disorders	Centrally mediated disorders of GI pain	Gallbladder and Sphincter Oddi disorders	Anorectal disorders
Chest pain	Dyspepsia	IBS	Centrally mediated abdominal pain syndrome	Biliary pain	Incontinence
Heartburn	Belching disorders	Constipation	Narcotic bowel syndrome	Pancreatic sphincter dysfunction	Anorectal pain
Reflux hypersensitivity	Nausea and vomiting disorders	Diarrhoea			Defecation disorders
Globus	Rumination	Abdominal bloating/distension			
Dysphagia		Unspecified bowel disorders			
		Opioid-induced constipation			

IBS = irritable bowel syndrome. Rome IV is defined in reference No 6–11.

these confounders have not been performed, and this may also influence the study outcome. Concomitant diseases and medication may be another confounder [20,21]. The great comorbidity between FGID and affective and psychiatric disorders is seldom taken into account in lifestyle studies [17], although anxiety and smoking and alcohol consumption may be associated [22]. Nevertheless, the aim of the present review was to identify and describe the role of smoking and alcohol habits on the incidence, prevalence, and management of FGID. Although the studies published are performed when earlier versions of the Rome criteria were used, this review presents the data according to the actual Rome IV definitions [6–11].

1. Methods

The search term “smoking and functional bowel disorders” was used to search for publications in PubMed. The search term “functional bowel diseases” instead of functional bowel disorders rendered the same result ($n = 146$). After reading of all titles and abstracts and exclusion of articles not deemed to be relevant or written in another language than English, 39 full text articles were read. Of these, 15 studies were excluded because the topics were not relevant for the present review. Thus, 24 studies remained and were included in the systematic review (Fig. 1). From these studies, all references were considered, and further articles were included. The search term “smoking and functional gastrointestinal disorders” was also used, but rendered 8482 hits of irrelevant studies,

e.g., colon cancer and inflammatory bowel disease.

The search term “alcohol and functional bowel disorders” rendered 397 hits. After reading of all titles and abstracts and exclusion of articles already included or deemed not to be relevant or written in another language than English, additional 5 full text articles were read. Of these, 3 were included in the review (Fig. 1). To ascertain that studies of functional oesophageal disorders were found, additionally searching with the term “smoking and functional oesophageal disorders” and “alcohol and functional oesophageal disorders” were performed, without being able to include any further relevant studies.

A population-based study means that the subjects investigated were randomly identified and enrolled from the population. The information was most often collected through questionnaires sent by mail to the subjects, who had to complete and return the information to the study centre. Another alternative to collect information from participants was telephone calls, where the subjects were interviewed. In a few of these studies, subjects were also referred to an endoscopy examination after completion of the questionnaires or the interviews. Some cross-sectional studies included subjects who were part of a health screening program. These screening programs could be directed for the general population, but could also be selected for industrial workers, students, cadets, or employees at specific medical centres. In some studies, all outpatients from a defined region, a specific disease group, i.e., IBS patients or chronic liver disease patients, or relatives of patients were selected for inclusion. When the study design is called endoscopy study, all subjects with the diagnosis of FD had to undergo an oesophagogastroduodenoscopy before inclusion in the study. Some of the included studies have also examined the role of smoking and alcohol on gastro-oesophageal reflux disease (GERD) and peptic ulcer, in addition to the effect on functional disorders. These comparisons are reported when they are deemed relevant to give further information to the topic of functional disorders, but the study of GERD and ulcer and their associations with smoking and alcohol is otherwise beyond the scope of this review.

Random-effects meta-analyses were conducted to pool risk estimates for studies reporting on smoking and odds of FD and IBS. Corresponding heterogeneity was estimated using the I-squared test. Statistical analysis was conducted using Stata version 14.2 (StataCorp, College Station, TX, USA). Studies included in the meta-analyses are marked in Table 2 and Table 3.

1.1. Oesophageal disorders

No studies could be identified which had examined associations between smoking or alcohol habits and functional disorders of the oesophagus.

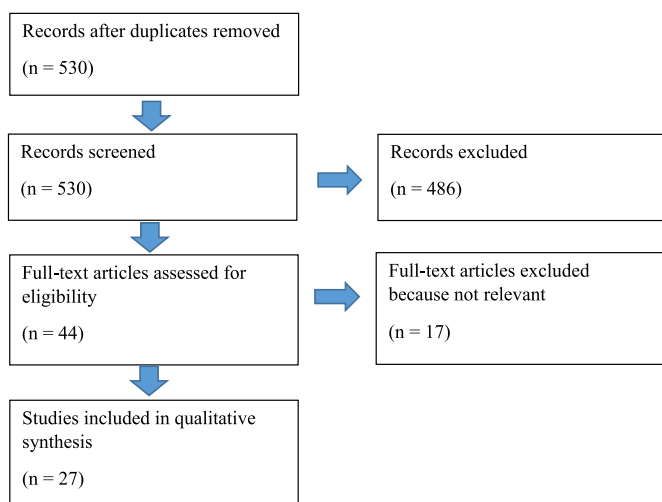


Fig. 1. Flow chart of the screening process of articles for the review.

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