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coffee & health topics

Intended for professional audiences

GI function

Contents

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1. Summary

- Studies suggest that there is no association between coffee consumption and the risk of dyspepsia, gastro oesophageal reflux disease, peptic ulcers, gastritis or stomach cancer. Furthermore, evidence suggests that drinking coffee does not worsen symptoms in those who suffer these conditions.
- Research indicates that drinking coffee does not increase the risk of duodenal ulcers and has no effect on fluid balance in the small intestine.
- Evidence suggests there is no association between coffee consumption and disorders of the large intestine, such as diarrhoea and colorectal cancer. Additionally, research has found no association between coffee consumption and intestinal conditions such as diverticulitis, ulcerative colitis or Crohn's Disease.
- Studies suggest that drinking coffee is associated with a reduced risk of gallbladder disease and liver cancer, and may help limit liver disease progression. Additional work suggests that drinking coffee is not linked to higher risk of pancreatic cancer or colorectal cancer.

2. Background

The gastro intestinal (GI) tract provides the means for the body to digest and absorb nutrients contained in food and drink and comprises the mouth, stomach, small intestine and large intestine. The digestive process is also dependent upon other organs including the pancreas, gallbladder and liver.

The process of digestion involves the enzymatic breakdown and absorption of nutrients and fluid in a systematic manner ensuring that the body is nourished with an adequate supply of nutrients for health. A healthy GI tract promotes healthy digestion. Damage, disease or infection in any part of the GI tract can limit the effectiveness of digestive processes and may have an impact on the nutritional status of the individual.

This topic discusses the impact of coffee consumption on the various functions of the GI tract.

3. Coffee and disorders of the stomach

Dyspepsia

Dyspepsia is a term covering a group of symptoms that include poor digestion, pain and discomfort in the upper digestive tract. Overall research suggests that coffee does not play a role in the development of dyspepsia

Research suggests that whilst 38% of people thought that coffee was a cause of dyspepsia[1] no association between drinking coffee and this condition was found[2]. These results are supported by further work in Norway[3] Australia[4] and the UK[5]. The UK study showed a significant relationship between the presence of Helicobacter pylori and dyspepsia.

Gastro oesophageal Reflux Disease (GERD)

Gastro oesophageal reflux disease (GORD) is an uncomfortable reflux condition caused by the return of stomach acid into the oesophagus. It is suggested that common causes are the consumption of spicy or fatty food and overeating[6]. There is no evidence that drinking coffee affects symptoms of GORD.

A 2006 review of 16 studies assessing the role of lifestyle factors in GORD showed that modifying eating habits, including coffee consumption, did not affect symptoms of acid reflux.[7] A further 2012 meta analysis also showed no association between coffee intake and GORD.[8]

Some research has suggested that coffee only has an impact on acid reflux when consumed on an empty stomach, and the effect was smaller than that observed following consumption of a full meal.[9]

Those who suffer from GORD often self-regulate their diet according to their own sensitivities and some patients may themselves choose to limit their coffee consumption

Peptic ulcers

Peptic ulcers are lesions that develop in the mucosa of the stomach wall causing pain and discomfort. In the past coffee was linked with the development of peptic ulcers. However, in recent years research has focused on understanding the role of the bacterium Helicobacter pylori (H. pylori) in the development of peptic ulcers. Evidence does not suggest that drinking coffee is associated with the development of peptic ulcers.

Research from Denmark[10] and Japan[11] did not show an association between coffee consumption and peptic ulcers, but did suggest that H. pylori, smoking and use of tranquilisers were risk factors.

Gastritis

Gastritis is a slight inflammation of the stomach wall, which is generally unnoticed. However, more serious gastritis can cause ulcers, with associated pain.

A prospective cohort study found no relationship between caffeine intake, or with the incidence of smoking or alcohol consumption, and the development of ulcers.[12]

Patients who suffer painful gastritis often choose to avoid certain foods or beverages if they experience discomfort, and self-management of such a condition is common.

Stomach Cancer

Research to date suggests that there is no evidence for an effect of coffee consumption on the risk of stomach cancer. A large review in 2006 found no association between coffee consumption and the development of stomach cancer.[13]

Further detailed information is available in the Cancer Section of the Coffee and Health website **here**

4. Coffee and disorders of the small intestine

Duodenal ulcers

The duodenum is regularly exposed to stomach acid and, whilst the wall of the duodenum is normally protected from stomach acid by a mucus covering, infection or use of certain drugs including painkillers and anti-inflammatories can affect the production of mucus and cause problems. The available evidence suggests there is no relationship between coffee consumption and development of duodenal ulcers.

Two large studies[8,12] have not shown an association between coffee drinking and the development of duodenal ulcers. A further study found similar results and also suggested that there was no difference in daily pattern of coffee drinking, or the pattern of complaints after drinking coffee, between sufferers and controls.[14]

Intestinal fluid discharge

Fluid is an important component of digestive juices, enabling nutrients to be broken down into a solution prior to absorption. Approximately nine litres of digestive juices are added to the first part of the digestive tract daily, the majority of which are reabsorbed during the process of digestion.

It is unlikely that the ingestion of any specific foods or beverages has a significant effect on the total volume of fluid secreted in the intestines, and there is no indication that drinking coffee affects fluid secretion.

Other intestinal disorders

There are many other disorders of the intestine that have a variety of causes including diverticulitis, and Inflammatory Bowel Disease of which the two main conditions are Crohn's Disease and ulcerative colitis.

There is no indication that coffee influences the course of these disorders.

5. Coffee and disorders of the large intestine

Intestinal peristalsis

Peristalsis is the process of muscular contraction in the intestines, which encourages the movement of food along the intestine. Coffee can stimulate peristalsis in some individuals, with one study suggesting that coffee stimulated intestinal movement in 29% of people.[15]

Research has suggested that drinking caffeinated coffee has a similar effect on peristalsis to a full meal, is 60% stronger than water and 23% stronger than decaffeinated coffee.[16] Further work has suggested that strong coffee and hot water both had a significant effect on bowel movement.[17]

Furthermore, there is no indication that coffee causes diarrhoea in healthy adults and it is not possible to draw conclusions about a role for coffee consumption in constipation since this will depend on the cause and severity of the constipation.

Irritable Bowel Syndrome

Irritable Bowel Syndrome (IBS) is described as a chronic disturbance of the intestine, but the cause is often difficult to specify. The symptoms that patients describe include abnormal bowel motions, stomach pain and bloating; complaints that may also be experienced by those who do not suffer IBS.

A screening exercise from the Netherlands suggested that there was no association between IBS and coffee consumption.[1] Further research found that 63% of IBS sufferers assumed that their symptoms were related to meals, especially foods rich in carbohydrates and fat. 10% of patients suggested that coffee was associated with GI complaints.[18]

As the cause of IBS is often difficult to specify, sufferers may choose to self manage their symptoms and select items to avoid that they consider impact their condition adversely. This may include avoiding certain foods or beverages, including coffee.

Colorectal Cancer

There appears to be a modest, favourable effect of moderate coffee consumption on colorectal cancer risk, shown in four large literature reviews.[19,20,21,22]

Further detailed information is available in the Cancer section of the Coffee and Health website **here**

6. Coffee and disorders of other intestinal organs

Gallbladder

The gallbladder stores bile, a fluid which is released into the small intestine where it emulsifies fats and assists their digestion. Gallstones are deposits that form in the gallbladder and in a minority of cases trigger severe abdominal pain (symptomatic gallstones) which can cause the gallbladder to become inflamed leading to gallbladder disease.

Two major studies[23,24] have shown an inverse association between coffee consumption and the risk of symptomatic gallstones.

Coffee and caffeine appear to trigger the contraction of the gallbladder and may prevent small crystals becoming large gallstones early in the disease. However, if large gallstones are already present such contraction of the gallbladder may cause pain.

Further detailed information is available in the Gallstones section of the Coffee and Health website **here**.

Liver

Epidemiological evidence suggests that moderate coffee consumption may help to reduce the risk of liver cancer and the risk falls as coffee consumption rises. [25,26]

Further detailed information is available in the Liver section of the Coffee and Health website **here**.

Pancreas

Pancreatic juice, secreted from the pancreas, contains enzymes that contribute to the breakdown of fats, carbohydrates and proteins in the gastrointestinal tract.

Research suggests that moderate coffee consumption is not linked to higher risk of pancreatic cancer. The World Cancer Research Fund[27] review found no increase in risk of developing pancreatic cancer with coffee consumption. Further studies have also confirmed the absence of a relationship and in fact some studies suggest that regular coffee drinking is associated with a lower risk of pancreatic cancer.[19,28,29,30,31]

Further detailed information is available in the Cancer section of the Coffee and Health website **here**.

7. Conclusion

Research suggests that coffee consumption does not have adverse effects on the functioning of the GI tract in healthy individuals. Some individuals who suffer GI problems may choose to avoid certain foods or drinks to manage their own symptoms, and this may include coffee.

In relation to other intestinal organs, evidence suggests that coffee consumption may be associated with reduced risk of gallbladder disease and liver disease, including liver cancer. Coffee is not associated with increased risk of pancreatic or colorectal cancer.

References

1. Boekema P.J. et al. (2001) Functional bowel symptoms in a general Dutch population and associations with common stimulants. Neth J Med, 59(1):23-30.
2. Boekema P.J. et al. (1999a) Chapter 4: Prevalence of functional bowel symptoms in a general Dutch population and associations with use of alcohol, coffee and smoking. Coffee and upper gastrointestinal motor and sensory functions, Zeist (the Netherlands).
3. Haug T.T. et al. (1995) What Are the Real Problems for Patients with Functional Dyspepsia? Scan J Gastroenterol, 30(2):97-100.
4. Nandurkar S. et al. (1998) Dyspepsia in the community is linked to smoking and aspirin use but not to Helicobacter pylori infection. Arch Intern Med, 158(13):1427-1433.
5. Moayyedi P. et al. (2000) The Proportion of Upper Gastrointestinal Symptoms in the community Associated With Helicobacter pylori, Lifestyle Factors, and Nonsteroidal Anti-inflammatory Drugs. Am J Gastroenterol, 95(6):1448-1455.
6. Bolin T.D. et al. (2000) Esophagogastroduodenal Diseases and Pathophysiology, Heartburn: Community perceptions. J Gastroenterol Hepatol, 15:35-39.
7. Kaltenbach T. et al. (2006) Review: sparse evidence supports lifestyle modifications for reducing symptoms of gastroesophageal reflux disease. Arch Intern Med, 166:965-971.
8. Kim J. et al. (2013) Association between coffee intake and gastroesophageal reflux disease: a meta-analysis, Diseases of the Esophagus, 27(4):311-317.
9. Boekema P.J. et al. (1999b) Effect of coffee on gastroesophageal reflux in patients with reflux disease and healthy controls. Eur J Gastroenterol Hepatol, 11:1271-1276.
10. Rosenstock S. et al. (2003) Risk factors for peptic ulcer disease: a population based prospective cohort study comprising 2,416 Danish adults. Gut, 52:186-193.
11. Shimamoto T. et al. (2013) No association of coffee consumption with gastric ulcer, duodenal ulcer, reflux esophagitis, and non-erosive reflux disease: a cross-sectional study of 8,013 healthy subjects in Japan, PLoS One, 8(6):e65996
12. Aldoori W.H. et al. (1997) A Prospective Study of Alcohol, Smoking, Caffeine, and the Risk of Duodenal Ulcer in Men. Epidemiology, 4(8):420-424.
13. Botelho F. et al. (2006) Coffee and gastric cancer: systematic review and meta-analysis. Cad Saude Publica, 22:889–900.
14. Elta G.H. et al. (1990) Comparison of coffee intake and coffee-induced symptoms in patients with duodenal ulcer, nonulcer dyspepsia, and normal controls. Am J Gastroenterol, 85:1339-1342.
15. Brown S.R. et al. (1990) Effect of coffee on distal colon function. Gut, 31:450-453.

16. Rao S.S.C. et al. (1998) Is coffee a colonic stimulant. Eur J Gastroenterol Hepatol, 10:113-118.

17. Sloots C.E.J. et al. (2005) Stimulation of defecation: Effects of coffee use and nicotine on rectal tone and visceral sensitivity. Scan J Gastroenterol, 40:808-813.

18. Simren M. et al. (2001) Food-Related Gastrointestinal Symptoms in the Irritable Bowel Syndrome. Digestion, 63:108-115.

19. Yu X. et al. (2011) Coffee consumption and risk of cancers: a meta-analysis of cohort studies. BMC Cancer, 15:11-96.

20. Tavani A. et al. (2004) Coffee, decaffeinated coffee, tea and cancer of the colon and rectum: a review of epidemiological studies 1990-2003. Cancer Causes Control, 15:743-57.

21. Giovannucci E. (1998) Meta-analysis of coffee consumption and risk of colorectal cancer. Am J Epidemiol ; 147:1043–52.

22. Galeone C. et al. (2010) Coffee consumption and risk of colorectal cancer: a meta-analysis of case–control studies. Cancer Causes Control, 21:1949-59.

23. Leitzmann M.F. et al. (1999) A prospective study of coffee consumption and risk of symptomatic gallstone disease in men. JAMA, 281:2106-2112.

24. Leitzmann M.F. et al. (2002) Coffee intake is associated with lower risk of symptomatic gallstone disease in women. Gastroenterol, 123:1823-1830.

25. Larsson S.C. et al. (2007). Coffee consumption and liver cancer: a meta-analysis. Gastroenterology, 132:1740-1745.

26. Bravi F. et al. (2007). Coffee drinking and hepatocellular carcinoma risk: a meta-analysis. Hepatology, 46:430-435.

27. WCRF: Food, Nutrition, Physical Activity and the Prevention of Cancer: A Global Perspective. (2007) Available from: http://www.dietandcancerreport.org/

28. Luo J. et al. (2007). Green tea and coffee intake and risk of pancreatic cancer in a large-scale, population-based cohort study in Japan (JPHC study). Eur J Cancer Prev, 16:542-8.

29. Dong J. et al. (2011) Coffee drinking and pancreatic cancer risk: a meta-analysis, World Journal of Gastroenterology, 17(9):1204-10.

30. Turati F. et al. (2011) A meta-analysis of coffee consumption and pancreatic cancer, Annals of Oncology, 23(2):311-8.

31. Turati F. et al. (2011) Coffee, decaffeinated coffee, tea, and pancreatic cancer risk: a pooled-analysis of two Italian case-control studies. Eur J Cancer Prevention, 20(4):287–292.

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