East African Scholars Journal of Medical Sciences
Abbreviated Key Title: East African Scholars J Med Sci
ISSN: 2617-4421 (Print) & ISSN: 2617-7188 (Online)
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-5 | Issue-2 | Feb-2022 | DOI: 10.36349/easms.2022.v05i02.006

Review Article

Lifestyles and their Close Relationship with Gastrointestinal Diseases, Part II: Smoking, Obesity, Exercise and Alcohol

Shashi K. Agarwal, MD[1*]

[1]2227 US Highway 1, Suite 309, North Brunswick, NJ 08902, USA. **ORCID:** 0000-0003-0007-5582

Article History
Received: 07.01.2022
Accepted: 11.02.2022
Published: 18.02.2022

Journal homepage:
https://www.easpublisher.com

Quick Response Code

Abstract: The gastrointestinal (GI) tract is responsible for ingestion of food and beverages, its propulsion, digestion, absorption, and finally excretion of its unabsorbed waste products. It is one continuous tube, measuring about 7-11 meters. Different sections have different structures, pH, and functions. Symptoms of a GI disease may differ according to the location and type of lesion. In the oral cavity, the patient may have trouble eating and swallowing. Esophageal reflux may cause heartburn, peptic ulcer disease and pancreatitis may cause stomach pain, while ailments of the intestines may cause malabsorption and diarrhea. GI ailments can greatly reduce the quality of life. They can also hasten mortality. The GI system is strongly affected by lifestyle factors, with unhealthy lifestyles increasing the risk and progression of various GI ailments. This manuscript looks at its relationship with four lifestyle factors, namely smoking, alcohol intake, exercise, and obesity. Its relationship with diet was discussed in part I of this two-part manuscript.

Keywords: Gastrointestinal diseases, smoking, exercise, alcohol, obesity, lifestyles.

INTRODUCTION

The gastrointestinal (GI) tract (alimentary canal or gut) is an extensive tubular track (about 7–11 meters long) consisting of the oral cavity, pharynx, esophagus, stomach, small intestine, large intestine, and ending in the anus [1]. The accessory glandular organs include salivary glands, liver, gallbladder, and pancreas. The main functions are ingestion, propulsion, digestion, absorption, and excretion of waste products [2]. Gastrointestinal diseases affect the gastrointestinal (GI) tract from the mouth to the anus. The major GI diseases are oral lesions [3], esophagitis [4], esophageal reflux [5], peptic ulcer [6], irritable bowel syndrome [7], inflammatory bowel disease [8], and GI cancers [9]. They commonly manifest as oral discomfort, heartburn, abdominal pain, abdominal distention, gastrointestinal bleeding, intestinal obstruction, malabsorption, malnutrition, and diarrhea [10]. The GI tract is extremely susceptible to lifestyles. This manuscript limits the discussion to the common GI diseases. Hepatic disorders and their relationship with lifestyles have been discussed in a separate publication [11]. Part I of this two-part manuscript discussed the role of diet on gastrointestinal diseases. Part II of this manuscript discusses the role of four other lifestyle factors, namely smoking, obesity, alcohol consumption, and exercise, and their impact on gastrointestinal diseases.

DISCUSSION

Diseases depend on several factors, which include genetics, environmental and social factors [12]. Lifestyles are increasingly becoming known as a modifiable risk factor for most chronic diseases. The five most impactive lifestyles are smoking, alcohol intake, obesity, exercise, and diet [13]. Healthy lifestyles not only help prevent most non-communicable diseases but also help mitigate their progression and reduce mortality [14]. Li *et al*. in a recent study from Harvard University in the USA reported that at age 50, adopting all five healthy lifestyles can potentially provide another 43.1 years of life in females and 37.6 years in males1 [5].

Smoking

The upper aerodigestive tract is the first to be exposed to the gaseous and particulate chemicals present in tobacco smoke (cigarette, cigar, or water pipe). Besides the damage to the dental structures, it causes inflammation of the oral cavity, increases susceptibility to candida infections, may induce premalignant lesions, and increase the tendency to develop oral, laryngeal, and pharyngeal cancer [16, 17]. Vaping is also associated with increased development of oral ulceration [18]. It also increases the incidence of esophagitis [19]. It weakens the esophageal valve,

***Corresponding Author:** Shashi K. Agarwal, MD
2227 US Highway 1, Suite 309, North Brunswick, NJ 08902, USA

encouraging reflux esophagitis and gastroesophageal reflux disease (GERD). Since bile salts tend to move more rapidly from the intestine to the stomach in smokers, and by directly injuring the esophageal mucosa, the reflux in smokers is more serious [20]. The reflux events are also increased in smokers [21]. Several studies have shown that cigarette smoking increases the incidence of peptic ulcers and their progression [22, 23]. Besides decreasing the bicarbonate production by the pancreas and stimulating the retrograde influx of bile acids into the stomach, smoking also interferes with antioxidant and immunity activity protecting the gastric mucosa [24]. The amount of nicotine in the gastric fluid is 10 times higher than in the arterial blood and 80 times higher than in venous blood [25]. Smoking also increases the secretion of gastric acid and lowers the stomach pH [20]. Studies show that the esophagus in smokers is subject to a greater acid exposure time on ambulatory pH monitoring [26]. Smoke also has vasoconstrictor and procoagulant effects, deleteriously affecting gastric microcirculation [27]. These changes contribute to the increased susceptibility to H. Pylori [28] – the main cause of peptic ulcer disease [29]. H. pylori infiltration has been found to be denser in the gastric antrum of smokers [30]. These mechanisms also increase the failure rate of ulcer healing [22] and encourage relapse [31]. The risk of H. pylori eradication failure in smokers increases with the continuation of smoking and a high smoking dose [32]. The effects of smoking on duodenal ulcers are unclear. Smoking increases gastric emptying rates and disturbs duodenal prostaglandins. However, no causal effect of smoking was noted, when investigated prospectively in more than 47,000 men with duodenal ulcers [33]. Tobacco smoking increases the risk of acute (AP) and chronic (CP) pancreatitis and these two combined [34]. There is a dose-response relationship between the increasing number of cigarettes and pack-years smoked and pancreatitis risk. A systemic review and meta-analysis of ten studies revealed that the summary risk ratio (RR) for acute pancreatitis was 1.49, for current smokers, 1.24. For former -smokers and 1.39 for ever-smokers compared to never-smokers [34]. The two main metabolites from cigarette smoke, namely nicotine and NNK 4-(methylnitrosamino)-1-(3- pyridyl-1- butanone are acutely harmful to the pancreas, as seen in cases of AP [35].

Self-reported irritable bowel syndrome (IBS) in the general population shows a strong association with smoking [36]. Cigarette smoking also significantly increases the risk of Crohn's disease [37]. These patients also experience poor outcomes. They are more likely to develop complications, are more likely to get hospitalized, have a worse response to treatment, and need surgery more often [38]. Ironically, epidemiological observations indicate that cigarette smoking confers some protection against ulcerative colitis [39, 40]. A meta-analysis found an odds ratio of 0.58 in smokers for the development of ulcerative colitis [41]. As a matter of fact, nicotine has been tried therapeutically in these patients [42, 43]. Besides the increased risk of oral, pharyngeal, and laryngeal cancer [44-46], smoking also increases the incidence of cancer of the esophagus, mainly due to the higher rates of Barret's esophagus seen in this population [47,48]. An increased risk for gastric cardia and other stomach/intestinal cancers has also been noted in smokers [49]. It also increases the risk of colorectal polyps [50] and colorectal cancer [51]. These patients have a poorer prognosis when compared to non-smokers [52]. Smoking cessation is associated with reductions in cancer [53, 54]. And finally, smoking may also be linked with a higher risk of developing gallstones [55].

Obesity

According to World Health Organization (WHO) in 2016, based on a body mass index (BMI) of ≥25 Kg/m^2, more than 1.9 billion adults were overweight, and based on a BMI based of≥30 Kg/m^2, almost 650 million people were obese [56]. Overweight and obesity are well-known risk factors for a variety of GI disorders. It is established to be a strong risk factor for reflux esophagitis and Barrett's esophagus [57, 58]. The association of esophagitis with overweight has an odds ratio of 1.33, and with obesity, an odds ratio of 1.70 [59]. Increased intra-abdominal fat induces the reflux of the stomach contents into the esophagus. Obesity has been reported as a risk factor of peptic ulcer disease (PUD) in many studies [60-63]. However, Tsai *et al.* reported conflicting data [64]. In a recent study on 32,472 individuals without PUD at baseline, Pyo *et al.* found a significantly higher cumulative incidence of PUD in obese subjects compared to non-obese subjects [65]. However, when adjusted for possible confounding factors, the association was no more significant. Overall, the association between obesity and PUD remains inconclusive. Overweight and obese patients have a higher incidence of biliary disease [66, 67] and pancreatitis [67]. The biliary disease causes acute pancreatitis by stones, sludge, or micro-lithiasis in the biliopancreatic passages, either by causing bile reflux or increasing pancreatic duct pressure [68]. Obesity is also associated with hypertriglyceridemia (HTG) [69]. Obesity can unmask primary HTG from genetic causes [70] and is a risk factor for secondary HTG [71]. Obesity is also associated with type 2 diabetes mellitus (T2DM) which can increase the risk of pancreatitis by increasing triglycerides [69], cholelithiasis [72], or beta cell hypertrophy [73]. Certain surgical interventions to treat obesity may also increase the risk of pancreatitis [74, 75]. These include Roux-en-Y gastric bypass surgery [76], duodeno-jenunal bypass [77], and gastric balloon insertion [78]. Obesity is also associated with colonic diverticuloris [79]. In an endoscopy-based prospective study, the multivariable-adjusted odd ratios for diverticulosis were 3.02 in individuals with a BMI of 25.0–29.9 kg/m2 and 4.43 in individuals with a BMI

of 30.0 kg/m2 or greater [80]. The disease is also more complicated during its course in obese individuals [81]. Data from the scientific literature have failed to show a possible association between obesity and the incidence of irritable bowel syndrome (IBS) [82]. However, those with abdominal obesity appear to have more frequent symptoms [83]. Obese individuals have a higher risk of inflammatory bowel disease (IBD) [84], especially Crohn's disease (CD) when compared to ulcerative colitis (UC) [85]. Visceral obesity, when associated with IBD is more harmful – patients with CD have a higher probability of surgery and of penetrating disease while those with ulcerative colitis are at an increased risk of relapse [86]. Obesity is also associated with an increased risk of several GI cancers, including esophageal adenocarcinoma, proximal gastric carcinoma, pancreatic cancer, and colorectal cancer [87]. Islami *et al*. reported that in the USA, in 2014, extra body weight accounted for 32% of esophageal, 17.5% of gastric, and 17% of pancreatic cancers in adults aged 30 years and older [88]. A meta-analysis showed that an increase of 5 kg/m^2 in BMI in men correlates with a relative risk of 1.24 for colon cancer [89]. A causal association between obesity and different types of GI cancer is well documented. Moreover, excess weight is also well-known as a risk factor for cancer mortality [90]. Cancer is enhanced by obesity primarily due to increased inflammation and increased insulin resistance [91, 92].

Alcohol

Several studies have shown that alcohol consumption is a trigger factor for GERD [93-95]. Heavy drinking also appears to be associated with PUD. Anderson *et al*. reported that drinking more than 42 drinks per week increased the risk of a bleeding ulcer fourfold (Risk Ratio=4.4) when compared with drinking less than one drink per week. On the other hand, several large-scale prospective studies have suggested a protective effect of moderate alcohol consumption (one or two drinks a day) on the development of gastric ulcer [97, 98]. Some studies report that wine drinkers have a reduced risk of ulceration, while spirits drinkers have an increased risk [99]. It is unclear if alcohol intake increases duodenal ulcers. No causal association was found in a prospective study of more than 47,000 men [100]. Alcohol is a primary cause of both AP and CP in most developed countries [101]. Chronic alcohol consumption causes 17% to 25% of AP cases worldwide and is the second most common cause of AP after gallstones. It is estimated that globally, 40% to 70% of CP is alcohol induced [102]. Chronic abusers of alcohol with pancreatitis have a poor prognosis [103].

There is limited data available on the role of alcohol in IBS [104]. Studies seem to indicate that alcohol consumption in low to moderate amounts has no demonstrable effect on IBS [105, 106]. However, heavy intake appears to increase symptoms associated with IBS [107]. The evidence linking the consumption of alcoholic beverages and the development of new-onset IBD is not clear [108]. Zutshi *et al*. found no effect of alcohol intake on IBD [109]. Hsu *et al*., on the other hand, reported that the risk of IBD was higher in patients with alcohol intoxication [110]. It has however been noted that IBD patients experience more gastrointestinal symptoms following alcohol consumption [111]. Further, alcohol use appears to increase the risk of relapse [112]. The use of alcohol can also interfere with several medications used to treat IBD (such as mesalamine, azathioprine, methotrexate, and biologic drugs), leading to increased adverse events or even loss of efficacy [113,114]. Alcohol consumption also increases the risk of several GI cancers. Yoo *et al*. in a study of 319,202 individuals found that compared with nondrinkers, the risk for GI cancer was elevated in all alcohol drinkers - mild drinkers (adjusted hazard ratio [aHR], 1.04), moderate drinkers (aHR, 1.14), and heavy drinkers (aHR, 1.28) [115]. These include cancers of the upper aerodigestive tract (including the esophagus), stomach, colon-rectum and pancreas [116-118]. Alcohol intake is also detrimental to lower GI tract cancer. According to the National Cancer Institute, there is a 1.2-to-1.5-fold increased risk of cancer of the colon and the rectum in alcohol drinkers [119].

Exercise

Exercise, especially in athletes. Appears to lead to an increase in the frequency and duration of GERD [120]. The relationship appears to be dependent on the intensity of exercise [121]. Runners frequently report heartburn/reflux [122]. Postulated mechanisms for this increase may include decreased GI blood flow, alterations in hormone secretion. Changes in the motor function of the esophagus, and the constrained body position during exercise. However, in a recent systemic review of 72 articles, Zhang *et al*. concluded that exercise (physical exercise >30 minutes (>3 times/week) was in general beneficial (odds ration=0.7) for GERD [123]. It appears that although moderate degree of exercise is beneficial, higher intensity of exercise may lead to a worsening of GERD [124]. Physical exercise appears to have a similar association with PUD. A moderate amount of exercise has a favorable impact on several risk factors for peptic ulceration, including a reduction in gastric secretions, enhanced immunity, and a reduction in stress [125, 126]. Results suggest that the benefits may be more with duodenal ulcer, with regular exercise helping in the healing and maintenance of remission [127-130]. Further, regular physical activity is associated with a decreased risk for severe GI hemorrhage in older subjects with gastroduodenal ulcers or gastritis (RR = 0.4) [131]. Low-intensity exercise also appears to help both IBS and IBD [132-134]. As noted with GERD and PUD, GI symptoms may be aggravated with increasing intensity and duration of the exercise [135,136]. There is strong evidence that physical activity of moderate to vigorous intensity protects against several GI cancers.

In a large study (1.44 million people, ages 19 to 98) Moore *et al*. examined several cancers and concluded that leisure-time physical activity was associated with a significantly decreased risk of esophageal adenocarcinoma, gastric cardia cancer, and colon cancer [137]. Pre-rehabilitation exercise helps decrease postoperative complications in GI cancer patients [138] and is associated with long-term benefits [139]. Exercise in GI cancer patients also helps reduce fatigue and improve functional capacity [140]. The quality of life is also improved during cancer treatment [141]. Overall, exercise during all phases of GI cancer helps improve outcomes in these patients [142, 143].

CONCLUSIONS

Healthy lifestyles can dramatically reduce the development and progression of major gastrointestinal diseases. These include GERD, PUD, IP and CP, IBS and IBD, and several GI cancers. Smoking, whether active or passive, is invariably harmful (except maybe for UC). Low to moderate alcohol intake and exercise is helpful for many GI conditions. In excessive amounts, however, both alcohol intake and exercise may cause harm. Obesity worsens all GI diseases, including increasing the risk of several cancers. And finally, a prudent diet, as discussed in part I of this manuscript, is beneficial. Certain dietary components may aggravate GI disorders and should be avoided depending upon the nature of the disease, and the experience of the patient. Overall, the five lifestyles discussed in this two-part manuscript, if followed in a healthy way, greatly help reduce GI morbidity and mortality.

REFERENCES

1. Bioactive Food as Dietary Interventions for Liver and Gastrointestinal Disease, 2013).
2. Ogobuiro I, Gonzales J, Tuma F. Physiology, Gastrointestinal. [Updated 2021 Apr 25]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK537103/.
3. Mohammed F, Fairozekhan AT. Oral Leukoplakia. 2021 Jul 27. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan–.
4. Kang HH, Seo M, Lee J, Ha SY, Oh JH, Lee SH. Reflux esophagitis in patients with chronic obstructive pulmonary disease. Medicine (Baltimore). 2021 Aug 27;100(34):e27091. doi: 10.1097/MD.0000000000027091.
5. Pandolfino JE, Kahrilas PJ. Smoking and gastro-oesophageal reflux disease. Eur J Gastroenterol Hepatol. 2000 Aug;12(8):837-42. doi: 10.1097/00042737-200012080-00002.
6. Eastwood GL. The role of smoking in peptic ulcer disease. J Clin Gastroenterol. 1988;10 Suppl 1:S19-23. doi: 10.1097/00004836-198812001-00005.
7. Talley NJ, Powell N, Walker MM, Jones MP, Ronkainen J, et al. Role of smoking in functional dyspepsia and irritable bowel syndrome: three random population-based studies. Aliment Pharmacol Ther. 2021 Jul;54(1):32-42. doi: 10.1111/apt.16372.
8. Nicolaides S, Vasudevan A, Long T, van Langenberg D. The impact of tobacco smoking on treatment choice and efficacy in inflammatory bowel disease. Intest Res. 2021 Apr;19(2):158-170. doi: 10.5217/ir.2020.00008.
9. Praud D, Rota M, Pelucchi C, Bertuccio P, Rosso T, et al. Cigarette smoking and gastric cancer in the Stomach Cancer Pooling (StoP) Project. Eur J Cancer Prev. 2018 Mar;27(2):124-133. doi: 10.1097/CEJ.0000000000000290.
10. https://my.clevelandclinic.org/health/articles/7040-gastrointestinal-diseases.
11. Agarwal SK (2021). Lifestyles and Diseases of the Liver. East African Scholars J Med Sci, 4(10), 239-249
12. Rappaport SM. Discovering environmental causes of disease. J Epidemiol Community Health. 2012 Feb;66(2):99-102. doi: 10.1136/jech-2011-200726.
13. Sheng B, Li X, Nussler AK, Zhu S. The relationship between healthy lifestyles and bone health: A narrative review. Medicine (Baltimore). 2021 Feb 26;100(8):e24684. doi: 10.1097/MD.0000000000024684
14. Martin Loef, Harald Walach. The combined effects of healthy lifestyle behaviors on all cause mortality: A systematic review and meta-analysis. Preventive Medicine. Volume 55. Issue 3,2012. Pages 163-170. https://doi.org/10.1016/j.ypmed.2012.06.017.
15. Li Y, Pan A, Wang DD, Liu X, Dhana K. Impact of Healthy Lifestyle Factors on Life Expectancies in the US Population. Circulation. 2018 Jul 24;138(4):345-355. doi: 10.1161/CIRCULATIONAHA.117.032047.
16. Blot WJ, McLaughlin JK, Winn DM, Austin DF, Greenberg RS, et al. Smoking and drinking in relation to oral and pharyngeal cancer. Cancer Res. 1988 Jun 1;48(11):3282-7.
17. Chaturvedi P, Singh A, Chien CY, Warnakulasuriya S. Tobacco related oral cancer. BMJ. 2019 Jun 5;365:l2142. doi: 10.1136/bmj.l2142.
18. Ali NS, Billings ML, Tollefson MM, Davis DMR, Hand JL. Oral erosions associated with surreptitious marijuana vaping in an adolescent boy. Pediatr Dermatol. 2020;37(2):347–349. doi: 10.1111/pde.14101.
19. Pasricha, T.S., Kochar, B. Vaping-associated esophagitis. BMC Gastroenterol 21, 106 (2021). https://doi.org/10.1186/s12876-021-01695-8.
20. Li LF, Chan RL, Lu L, Shen J, Zhang L, Wu WK, et al. Cigarette smoking and gastrointestinal diseases: the causal relationship and underlying molecular mechanisms (review). Int J Mol Med (2014) 34:372–80.10.3892/ijmm.2014.1786.
21. Eusebi LH, Ratnakumaran R, Yuan Y, Solaymani-Dodaran M, Bazzoli F, Ford AC. Global

prevalence of, and risk factors for, gastro-oesophageal reflux symptoms: a meta-analysis. Gut. 2018;67(3):430–440. doi: 10.1136/gutjnl-2016-313589.
22. Zhang L, Ren JW, Wong CC, Wu WK, Ren SX, Shen J, et al. Effects of cigarette smoke and its active components on ulcer formation and healing in the gastrointestinal mucosa. Curr Med Chem (2012) 19:63–9.10.2174/092986712803413926.
23. Ogihara A, Kikuchi S, Hasegawa A, Kurosawa M, Miki K, Kaneko E, et al. Relationship between Helicobacter pylori infection and smoking and drinking habits. J Gastroenterol Hepatol (2000) 15:271–6.10.1046/j.1440-1746.2000.02077.x.
24. Hersey P, Prendergast D, Edwards A. Effects of cigarette smoking on the immune system. Follow-up studies in normal subjects after cessation of smoking. Med J Aust. 1983 Oct 29;2(9):425-9.
25. Lindell G, Farnebo LO, Chen D, Nexø E, Rask Madsen J, Bukhave K, et al. Acute effects of smoking during modified sham feeding in duodenal ulcer patients. An analysis of nicotine, acid secretion, gastrin, catecholamines, epidermal growth factor, prostaglandin E2, and bile acids. Scand J Gastroenterol (1993) 28:487–94.10.3109/00365529309098254.
26. Kadakia SC, Kikendall JW, Maydonovitch C, Johnson LF. Effect of cigarette smoking on gastroesophageal reflux measured by 24-h ambulatory esophageal pH monitoring. Am J Gastroenterol. 1995;90(10):1785–1790.
27. Hunsballe JM, Rittig S, Pedersen EB, Djurhuus JC. Smokeless nicotinergic stimulation of vasopressin secretion in patients with persisting nocturnal enuresis and controls. Scand J Urol Nephrol (2001) 35:117–21.10.1080/003655901750170489.
28. Parasher, Gulshan; Eastwood, Gregory L. Smoking and peptic ulcer in the Helicobacter pyloriera. European Journal of Gastroenterology & Hepatology: August 2000 - Volume 12 - Issue 8 - p 843-853.
29. Sugano K. [Causal relationship between Helicobacter pylori infection and upper gastroduodenal diseases]. Nihon Rinsho. 2001 Feb;59(2):239-45. Japanese.
30. Koivisto TT, Voutilainen ME, Farkkila MA. Effect of smoking on gastric histology in Helicobacter pylori-positive gastritis. Scand J Gastroenterol. 2008. 43(10):1177-83.
31. Sonnenberg A, Muller-Lissner SA, Vogel E, et al. Predictors of duodenal ulcer healing and relapse. Gastroenterology. 1981 Dec. 81(6):1061-7)65.
32. Yu J, Yang P, Qin X, Li C, Lv Y, Wang X. Impact of smoking on the eradication of Helicobacter pylori. Helicobacter. 2021 Oct 27:e12860. doi: 10.1111/hel.12860).
33. Aldoori WH, Giovannucci EL, Stampfer MJ, Rimm EB, Wing AL, Willett WC. A prospective study of alcohol, smoking, caffeine, and the risk of duodenal ulcer in men. Epidemiology. 1997 Jul. 8(4):420-4.
34. Aune D, Mahamat-Saleh Y, Norat T, Riboli E. Tobacco smoking and the risk of pancreatitis: A systematic review and meta-analysis of prospective studies. Pancreatology. 2019 Dec;19(8):1009-1022. doi: 10.1016/j.pan.2019.09.004.
35. Barreto SG. How does cigarette smoking cause acute pancreatitis? Pancreatology. 2016 Mar-Apr;16(2):157-63. doi: 10.1016/j.pan.2015.09.002.
36. Nilsson D, Ohlsson B. Gastrointestinal Symptoms and Irritable Bowel Syndrome Are Associated With Female Sex and Smoking in the General Population and With Unemployment in Men. Front Med (Lausanne). 2021 Sep 1;8:646658. doi: 10.3389/fmed.2021.646658.
37. Calkins BM. A meta-analysis of the role of smoking in inflammatory bowel disease. Dig Dis Sci (1989) 34:1841–54.10.1007/BF01536701)].
38. Cosnes J, Carbonnel F, Carrat F, Beaugerie L, Cattan S, Gendre J. Effects of current and former cigarette smoking on the clinical course of Crohn's disease. Aliment Pharmacol Ther (1999) 13:1403–11.10.1046/j.1365-2036.1999.00630.x.
39. Cosnes J, Gower-Rousseau C, Seksik P, Cortot A. Epidemiology and natural history of inflammatory bowel diseases. Gastroenterology (2011) 140:1785–94.10.1053/j.gastro.2011.01.055.
40. Cosnes J. What is the link between the use of tobacco and IBD? Inflamm Bowel Dis (2008) 14(Suppl 2):S14–5.10.1002/ibd.20555.
41. Mahid SS, Minor KS, Soto RE, Hornung CA, Galandiuk S. Smoking and inflammatory bowel disease: a meta-analysis. Mayo Clin Proc (2006) 81:1462–71.10.4065/81.11.1462)81.
42. Lunney PC, Leong RWL. Review article: ulcerative colitis, smoking and nicotine therapy. Aliment Pharmacol Ther (2012) 36:997–1008.10.1111/apt.12086.
43. Ingram JR, Thomas GA, Rhodes J, Green JT, Hawkes ND, Swift JL, et al. A randomized trial of nicotine enemas for active ulcerative colitis. Clin Gastroenterol Hepatol (2005) 3:1107–14.10.1016/S1542-3565(05)00849-9.
44. Watters C, Brar S, Pepper T. Oral Mucosa Cancer. 2021 Apr 13. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan–.
45. Zhang QW, Wang JY, Qiao XF, Li TL, Li X. Variations in disease burden of laryngeal cancer attributable to alcohol use and smoking in 204 countries or territories, 1990-2019. BMC Cancer. 2021 Oct 7;21(1):1082. doi: 10.1186/s12885-021-08814-4.
46. Lin JH, Wen CP, Jiang CQ, Yuan JM, Chen CJ, et al. Smoking and nasopharyngeal cancer: individual data meta-analysis of six prospective studies on 334 935 men. Int J Epidemiol. 2021 Jul 9;50(3):975-986. doi: 10.1093/ije/dyab060.
47. Cook MB, Shaheen NJ, Anderson LA, Giffen C, Chow WH, Vaughan TL, Whiteman DC, Corley

DA. Cigarette smoking increases risk of Barrett's esophagus: an analysis of the Barrett's and Esophageal Adenocarcinoma Consortium. Gastroenterology. 2012;142(4):744–753. doi: 10.1053/j.gastro.2011.12.049.

48. Barrett JR, Cherney-Stafford L, Alagoz E, et al. Smoking and gastrointestinal cancer patients-is smoking cessation an attainable goal? *J Surg Oncol*. 2019;120(8):1335-1340. doi:10.1002/jso.25749.
49. Nomura AM, Wilkens LR, Henderson BE, Epplein M, Kolonel LN. The association of cigarette smoking with gastric cancer: the multiethnic cohort study. Cancer Causes Control. 2012;23(1):51-58. doi:10.1007/s10552-011-9854-0.
50. Fagunwa IO, Loughrey MB, Coleman HG. Alcohol, smoking and the risk of premalignant and malignant colorectal neoplasms. Best Pract Res Clin Gastroenterol. 2017 Oct;31(5):561-568. doi: 10.1016/j.bpg.2017.09.012.
51. Akter S, Islam Z, Mizoue T, Sawada N, Ihira H, et al. Smoking and colorectal cancer: A pooled analysis of 10 population-based cohort studies in Japan. Int J Cancer. 2021 Feb 1;148(3):654-664. doi: 10.1002/ijc.33248.
52. Le Marchand L, Wilkens LR, Kolonel LN, Hankin JH, Lyu LC. Associations of sedentary lifestyle, obesity, smoking, alcohol use, and diabetes with the risk of colorectal cancer. Cancer Res 1997; 57:4787-94.
53. Massarrat S. Smoking and gut. Arch Iran Med. 2008 May;11(3):293-305.
54. Li LF, Chan RL, Lu L, Shen J, Zhang L, Wu WK, et al. Cigarette smoking and gastrointestinal diseases: the causal relationship and underlying molecular mechanisms (review). Int J Mol Med (2014) 34:372–80.10.3892/ijmm.2014.1786.
55. Colvin HS, Kimura T, Iso H, Ikehara S, Sawada N, Tsugane S. Risk Factors for Gallstones and Cholecystectomy: A Large-Scale Population-Based Prospective Cohort Study in Japan. Dig Dis. 2021 May 21. doi: 10.1159/000517270.
56. Organization WH. Obesity and overweight World Health Organization Website. World Health Organization Website. 2018.
57. Fujimoto A, Hoteya S, Iizuka T, et al. Obesity and gastrointestinal diseases. Gastroenterol Res Pract. 2013;2013:760574. doi:10.1155/2013/760574.
58. Chang P, Friedenberg F. Obesity and GERD. Gastroenterol Clin North Am. 2014 Mar;43(1):161-73.
59. Stein DJ, El-Serag HB, Kuczynski J, Kramer JR, Sampliner RE. The association of body mass index with Barrett's oesophagus. Aliment Pharmacol Ther. 2005 Nov 15;22(10):1005-10.
60. Garrow D., Delegge M.H. Risk factors for gastrointestinal ulcer disease in the us population. Dig. Dis. Sci. 2010;55:66–72. doi: 10.1007/s10620-008-0708-x.
61. Wang F.W., Tu M.S., Mar G.Y., Chuang H.Y., Yu H.C., Cheng L.C., Hsu P.I. Prevalence and risk factors of asymptomatic peptic ulcer disease in Taiwan. World J. Gastroenterol. 2011;17:1199–1203. doi: 10.3748/wjg.v17.i9.1199.
62. Boylan M.R., Khalili H., Huang E.S., Chan A.T. Measures of adiposity are associated with increased risk of peptic ulcer. Clin. Gastroenterol. Hepatol. 2014;12:1688–1694. doi: 10.1016/j.cgh.2014.03.021.
63. Lee B.J., Kim J., Kim K.H. Association of gastric and duodenal ulcers with anthropometry and nutrients: Korean national health and nutrition examination survey (knhanes ii–iv) 2001–2009. PLoS ONE. 2018;13:e0207373. doi: 10.1371/journal.pone.0207373.) 96-99.
64. Tsai W.L., Yang C.Y., Lin S.F., Fang F.M. Impact of obesity on medical problems and quality of life in Taiwan. Am. J. Epidemiol. 2004;160:557–565. doi: 10.1093/aje/kwh251.
65. Pyo JH, Lee H, Kim JE, et al. Obesity and Risk of Peptic Ulcer Disease: A Large-Scale Health Check-Up Cohort Study. Nutrients. 2019;11(6):1288. Published 2019 Jun 6. doi:10.3390/nu11061288.
66. Radmard AR, Merat S, Kooraki S, et al. Gallstone disease and obesity: a population-based study on abdominal fat distribution and gender differences. Ann Hepatol 2015; 14:702–709.
67. Flint R Differences in acute general surgical admissions between obese or overweight patients compared to normal-sized patients. N Z Med J 2015;128:35–41.
68. Lerch MM, Gorelick FS. Models of acute and chronic pancreatitis. Gastroenterology 2013; 144:1180–1193.
69. Albai O, Roman D, Frandes M Hypertriglyceridemia, an important and independent risk factor for acute pancreatitis in patients with type 2 diabetes mellitus. Ther Clin Risk Manag 2017; 13:515–522.
70. Shah AS, Wilson DP. Primary hypertriglyceridemia in children and adolescents. J Clin Lipidol 2015; 9:S20–S28.
71. Blackett PR, Wilson DP, McNeal CJ. Secondary hypertriglyceridemia in children and adolescents. J Clin Lipidol 2015; 9:S29–S40.
72. Monami M, Nreu B, Scatena A, et al. Safety issues with glucagon-like peptide-1 receptor agonists (pancreatitis, pancreatic cancer, and cholelithiasis): data from randomized controlled trials. Diabetes Obes Metab 2017.
73. Mondragon A, Davidsson D, Kyriakoudi S, et al. Divergent effects of liraglutide, exendin-4, and sitagliptin on beta-cell mass and indicators of pancreatitis in a mouse model of hyperglycaemia. PLoS One 2014; 9:e104873.
74. Kumaravel A, Zelisko A, Schauer P, et al. Acute pancreatitis in patients after bariatric surgery:

incidence, outcomes, and risk factors. Obes Surg 2014; 24:2025–2030.
75. Chang J, Corcelles R, Boules M, et al. Predictive factors of biliary complications after bariatric surgery. Surg Obes Relat Dis 2016; 12:1706–1710.
76. Warschkow R, Tarantino I, Ukegjini K, et al. Concomitant cholecystectomy during laparoscopic Roux-en-Y gastric bypass in obese patients is not justified: a meta-analysis. Obes Surg 2013; 23:397–407.
77. Betzel B, Homan J, Aarts E, et al. Acute pancreatitis as an adverse event in patients with the duodenal-jejunal bypass liner. Endoscopy 2015; 47:1050–1053.
78. Issa I, Taha A, Azar C. Acute pancreatitis caused by intragastric balloon: a case report. Obes Res Clin Pract 2016; 10:340–343.
79. Violi A., Cambiè G., Miraglia C., Barchi A., Nouvenne A., et al. Epidemiology and risk factors for diverticular disease. Acta Biomed. 2018;89(Suppl. S9):107–112.
80. Mashayekhi R., Bellavance D.R., Chin S.M., Maxner B., Staller K., et al. Obesity, but Not Physical Activity, is Associated with Higher Prevalence of Asymptomatic Diverticulosis. Clin. Gastroenterol. Hepatol. 2018;16:586–587. doi: 10.1016/j.cgh.2017.09.005.
81. Rodríguez-Wong U., Cruz-Rubin C., Pinto-Angulo V.M., Álvarez J.G. Obesity and complicated diverticular disease of the colon. Cir. Cir. 2015;83:292–296. doi: 10.1016/j.circen.2015.09.013.
82. Talley N., Quan C., Jones M., Horowitz M. Association of upper and lower gastrointestinal tract symptoms with body mass index in an Australian cohort. Neurogastroenterol. Motil. 2004;16:413–419. doi: 10.1111/j.1365-2982.2004.00530.x.
83. Aasbrenn M., Høgestøl I., Eribe I., Kristinsson J., Lydersen S., Mala T., Farup P.J. Prevalence and predictors of irritable bowel syndrome in patients with morbid obesity: A cross-sectional study. BMC Obes. 2017;4:22. doi: 10.1186/s40608-017-0159-z.
84. Singh S., Dulai P.S., Zarrinpar A., Ramamoorthy S., Sandborn W.J. Obesity in IBD: Epidemiology, pathogenesis, disease course and treatment outcomes. Nat. Rev. Gastroenterol. Hepatol. 2017;14:110–121. doi: 10.1038/nrgastro.2016.181.
85. Khalili H., Ananthakrishnan A.N., Konijeti G.G., Higuchi L.M., Fuchs C.S., et al. Measures of obesity and risk of Crohn's disease and ulcerative colitis. Inflamm. Bowel Dis. 2015;21:361–368. doi: 10.1097/MIB.0000000000000283.
86. Van Der Sloot KW, Joshi AD, Bellavance DR, Gilpin KK, Stewart KO, et al. Visceral Adiposity, Genetic Susceptibility, and Risk of Complications Among Individuals with Crohn's Disease. Inflamm Bowel Dis. 2017 Jan;23(1):82-88. doi: 10.1097/MIB.0000000000000978.
87. Lauby-Secretan B, Scoccianti C, Loomis D, Grosse Y, Bianchini F, Straif K. Body fatness and cancer—Viewpoint of the IARC Working Group. N Eng J Med. 2016;375:794–8.
88. Islami F, Goding Sauer A, Miller KD, Siegel RL, Fedewa SA, Jacobs EJ, et al. Proportion and number of cancer cases and deaths attributable to potentially modifiable risk factors in the United States. CA Cancer J Clin. 2018 Jan;68((1)):31–54.
89. Renehan AG, Tyson M, Egger M, Heller RF, Zwahlen M. Body-mass index and incidence of cancer: A systematic review and meta-analysis of prospective observational studies. Lancet. 2008;371:569–78.
90. Lauby-Secretan B., Scoccianti C., Loomis D., Grosse Y., Bianchini F., Straif K. Body fatness and cancer–viewpoint of the IARC Working Group. N. Engl. J. Med. 2016;8:794–798. doi: 10.1056/NEJMsr1606602.
91. Kolb R, Sutterwala FS, Zhang W. Obesity and cancer: inflammation bridges the two. Curr Opin Pharmacol. 2016 Aug;29:77-89. doi: 10.1016/j.coph.2016.07.005.
92. Chiefari E, Mirabelli M, La Vignera S, Tanyolaç S, Foti DP, Aversa A, Brunetti A. Insulin Resistance and Cancer: In Search for a Causal Link. Int J Mol Sci. 2021 Oct 15;22(20):11137. doi: 10.3390/ijms222011137.
93. Andrici J, Cox MR, Eslick GD. Cigarette smoking and the risk of Barrett's esophagus: a systematic review and meta-analysis. J Gastroenterol Hepatol. 2013;28(8):1258–1273. doi:10.1111/jgh.12230.
94. Pan J, Cen L, Chen W, Yu C, Li Y, Shen Z. Alcohol consumption and the risk of gastroesophageal reflux disease: a systematic review and meta-analysis. Alcohol Alcohol. 2019;54(1):62–69. doi:10.1093/alcalc/agy063.
95. Ness-Jensen E, Lagergren J. Tobacco smoking, alcohol consumption and gastro-oesophageal reflux disease. Best Pract Res Clin Gastroenterol. 2017 Oct;31(5):501-508.
96. Andersen IB, Jørgensen T, Bonnevie O, Grønbaek M, Sørensen TI. Smoking and alcohol intake as risk factors for bleeding and perforated peptic ulcers: a population-based cohort study. Epidemiology. 2000 Jul;11(4):434-9. doi: 10.1097/00001648-200007000-00012.
97. Everhart JE, Byrd-Holt D, Sonnenberg A. Incidence and risk factors for self-reported peptic ulcer disease in the United States. Am J Epidemiol 1998;147:529–36.
98. Everhart JE, Kruszon-Moran D, Perez-Peres GI, et al. Seroprevalence and ethnic differences in Helicobacter pylori infection among adults in the Unites States. J Infect Dis 2000;181:1359–63.
99. Rosenstock SJ, Jørgensen T, Andersen LP, et al. Association of Helicobacter pylori infection with lifestyle, chronic disease, body-indices, and age at menarche in Danish adults. Scand J Public Health 2000;28:32–40.

100. Aldoori WH, Giovannucci EL, Stampfer MJ, Rimm EB, Wing AL, Willett WC. A prospective study of alcohol, smoking, caffeine, and the risk of duodenal ulcer in men. Epidemiology. 1997 Jul. 8(4):420-4.
101. Dufour MC, Adamson MD. The epidemiology of alcohol-induced pancreatitis. Pancreas. 2003 Nov;27(4):286-90. doi: 10.1097/00006676-200311000-00002.
102. Herreros-Villanueva M, Hijona E, Bañales JM, Cosme A, Bujanda L. Alcohol consumption on pancreatic diseases. World J Gastroenterol. 2013 Feb 07;19(5):638-47.
103. Lankisch PG, Apte M, Banks PA. Acute pancreatitis. Lancet. 2015 Jul 04;386(9988):85-96.
104. Heizer WD, Southern S, McGovern S. The role of diet in symptoms of irritable bowel syndrome in adults: a narrative review. J Am Diet Assoc. 2009;109:1204–1214.
105. Saito YA, Locke GR, Weaver AL, Zinsmeister AR, Talley NJ. Diet and functional gastrointestinal disorders: a population-based case-control study. Am J Gastroenterol. 2005;100:2743–2748.
106. Halder SL, Locke GR, Schleck CD, Zinsmeister AR, Talley NJ. Influence of alcohol consumption on IBS and dyspepsia. Neurogastroenterol Motil. 2006;18:1001–1008.
107. Reding KW, Cain KC, Jarrett ME, Eugenio MD, Heitkemper MM. Relationship between patterns of alcohol consumption and gastrointestinal symptoms among patients with irritable bowel syndrome. Am J Gastroenterol. 2013;108:270–276.
108. Piovezani Ramos G, Kane S. Alcohol Use in Patients With Inflammatory Bowel Disease. Gastroenterol Hepatol (N Y). 2021 May;17(5):211-225.
109. Zutshi M, Hull TL, Hammel J. Crohn's disease: a patient's perspective. International Journal of Colorectal Disease. 2007;22: 1437–1444. 10.1007/s00384-007-0332-9.
110. Hsu TY, Shih HM, Wang YC, Lin LC, He GY, et al. Effect of Alcoholic Intoxication on the Risk of Inflammatory Bowel Disease: A Nationwide Retrospective Cohort Study. PLoS One. 2016 Nov 1;11(11):e0165411. doi: 10.1371/journal.pone.0165411.
111. Swanson GR, Sedghi S, Farhadi A, Keshavarzian A. Pattern of alcohol consumption and its effect on gastrointestinal symptoms in inflammatory bowel disease. Alcohol. 2010;44(3):223–228.
112. Jowett SL, Seal CJ, Pearce MS et al. Influence of dietary factors on the clinical course of ulcerative colitis: a prospective cohort study. Gut. 2004;53(10):1479–1484.
113. Vena GA, Cassano N. The effects of alcohol on the metabolism and toxicology of anti-psoriasis drugs. Expert Opin Drug Metab Toxicol. 2012;8(8):959–972.
114. Elsing C, Placke J, Herrmann T. Alcohol binging causes peliosis hepatis during azathioprine therapy in Crohn's disease. World J Gastroenterol. 2007;13(34):4646–4648.
115. Yoo JE, Shin DW, Han K, et al. Association of the frequency and quantity of alcohol consumption with gastrointestinal cancer. JAMA Netw Open. 2021;4(8):e2120382. doi: 10.1001/jamanetworkopen.2021.20382.
116. Haas SL, Ye W, Löhr JM. Alcohol consumption and digestive tract cancer. Curr Opin Clin Nutr Metab Care. 2012 Sep;15(5):457-67. doi: 10.1097/MCO.0b013e3283566699.
117. Wang YT, Gou YW, Jin WW, Xiao M, Fang HY. Association between alcohol intake and the risk of pancreatic cancer: a dose-response meta-analysis of cohort studies. BMC Cancer. 2016 Mar 12;16:212.
118. Vanella G, Archibugi L, Stigliano S, Capurso G. Alcohol and gastrointestinal cancers. Curr Opin Gastroenterol. 2019 Mar;35(2):107-113. doi: 10.1097/MOG.0000000000000502.
119. https://www.cancer.gov/.
120. Herregods TV, van Hoeij FB, Oors JM, Bredenoord AJ, Smout AJ. Effect of Running on Gastroesophageal Reflux and Reflux Mechanisms. Am J Gastroenterol. 2016;111(7):940–946. doi:10.1038/ajg.2016.122.
121. Collings K.L., Pratt F.P., Rodriguez-Stanley S., Bemben M., Miner P.B. Esophageal reflux in conditioned runners, cyclists, and weightlifters. Med. Sci. Sport. Exerc. 2003;35:730–735. doi: 10.1249/01.MSS.0000064937.99001.56.
122. Parnell J.A., Wagner-Jones K., Madden R.F., Erdman K.A. Dietary restrictions in endurance runners to mitigate exercise-induced gastrointestinal symptoms. J. Int. Society Sports Nutr. 2020;17:1–10. doi: 10.1186/s12970-020-00361-w.
123. Zhang M, Hou ZK, Huang ZB, Chen XL, Liu FB. Dietary and Lifestyle Factors Related to Gastroesophageal Reflux Disease: A Systematic Review. Ther Clin Risk Manag. 2021 Apr 15;17:305-323. doi: 10.2147/TCRM.S296680.
124. Herregods TV, van Hoeij FB, Oors JM, Bredenoord AJ, Smout AJ. Effect of Running on Gastroesophageal Reflux and Reflux Mechanisms. Am J Gastroenterol. 2016;111(7):940–946. doi:10.1038/ajg.2016.122.
125. Aldana SG, Sutton LD, Jacobson BH, et al. Relationships between leisure time physical activity and perceived stress. Percept MotSkills 1996;82:315-321.
126. Levenstein S, Ackerman S, Kiecolt-Glaser JK, Dubois A. Stress and peptic ulcer disease. JAMA. 1999 Jan 6;281(1):10-1. doi: 10.1001/jama.281.1.10.
127. Markiewicz K, Cholewa M, Gorski L, et al. Effective physical exercise on gastric basal secretion of healthy men. Acta Hepato-gastroenterolica1977;24:377–80.

128. Ramsbottom N, Hunt JN. Effective exercise on gastric emptying and gastric secretion. Digestion1974;10:1–8.
129. Meeroff JC. Aerobic training: an esoteric treatment for ulcer disease? [abstract] Am J Gastroenterol1985;80:A843.
130. Cheng Y, Macera CA, Davis DR, Blair SN. Physical activity and peptic ulcers. Does physical activity reduce the risk of developing peptic ulcers?. West J Med. 2000;173(2):101-107. doi:10.1136/ewjm.173.2.101.
131. Pahor M, Guralnik JM, Salive ME, et al. Physical activity and risk of gastrointestinal hemorrhage in older persons. JAMA 1994;272:595-599.
132. Lustyk K., Jarrett M., Bennett J., Heitkemper M. Does a physically active lifestyle improve symptoms in women with irritable bowel syndrome? Gastroenterol. Nurs. 2001;24:129–137. doi: 10.1097/00001610-200105000-00007.
133. Engels M., Cross R.K., Long M.D. Exercise in patients with inflammatory bowel diseases: Current perspectives. Clin. Exp. Gastroenterol. 2018;11:1–11. doi: 10.2147/CEG.S120816.
134. Maleki B.H., Tartibian B., Mooren F.C., FitzGerald L.H., Kruger K., Chehrzai M., Malandish A. Low-to-moderate intensity aerobic exercise training modulates irritable bowel syndrome through antioxidative and inflammatory mechanisms in women: Results of a randomized controlled trial. Cytokine. 2018;102:18–25. doi: 10.1016/j.cyto.2017.12.016.
135. Wilson P.B. Frequency of chronic gastrointestinal distress in runners: Validity and reliability of a retrospective questionnaire. Int. J. Sport Nutr. Exerc. Metab. 2017;27:370–376. doi: 10.1123/ijsnem.2016-0305.
136. De Oliveira E.P., Burini R.C., Jeukendrup A. Gastrointestinal complaints during exercise: Prevalence, etiology, and nutritional recommendations. Sport. Med. 2014;44:S79–S85. doi: 10.1007/s40279-014-0153-2.
137. Moore SC, et al. Leisure-time physical activity and risk of 26 types of cancer in 1.44 million adults. JAMA Internal Medicine. May 16, 2016. DOI:10.1001/jamainternmed.2016.1548.
138. Halliday LJ, Doganay E, Wynter-Blyth V, Osborn H, Buckley J, Moorthy K. Adherence to Pre-operative Exercise and the Response to Prehabilitation in Oesophageal Cancer Patients. J Gastrointest Surg. 2021 Apr;25(4):890-899. doi: 10.1007/s11605-020-04561-2**.**
139. Aoyama T, Nakazono M, Nagasawa S, Segami K. Clinical Impact of a Perioperative Exercise Program for Sarcopenia and Overweight/Obesity Gastric Cancer. In Vivo. 2021 Mar-Apr;35(2):707-712. doi: 10.21873/invivo.12311.
140. Minnella E.M., Awasthi R., Loiselle S.-E., Agnihotram R.V., Ferri L.E., Carli F. Effect of exercise and nutrition prehabilitation on functional capacity in esophagogastric cancer surgery: A randomized clinical trial. JAMA Surg. 2018;153:1081–1089. doi: 10.1001/jamasurg.2018.1645.
141. Luo H, Galvão DA, Newton RU, Lopez P, Tang C, Fairman CM, Spry N, Taaffe DR. Exercise Medicine in the Management of Pancreatic Cancer: A Systematic Review. Pancreas. 2021 Mar 1;50(3):280-292. doi: 10.1097/MPA.0000000000001753.
142. Guinan E.M., Bennett A.E., Doyle S.L., O'Neill L., Gannon J., Foley G., Elliott J.A., O'Sullivan J., Reynolds J.V., Hussey J. Measuring the impact of oesophagectomy on physical functioning and physical activity participation: A prospective study. BMC Cancer. 2019;19:682. doi: 10.1186/s12885-019-5888-6.
143. O'Connor D, Brown M, Eatock M, Turkington RC, Prue G. Exercise efficacy and prescription during treatment for pancreatic ductal adenocarcinoma: a systematic review. BMC Cancer. 2021 Jan 9;21(1):43. doi: 10.1186/s12885-020-07733-0.

Cite This Article: Shashi K. Agarwal (2022). Lifestyles and their Close Relationship with Gastrointestinal Diseases, Part II: Smoking, Obesity, Exercise and Alcohol. *East African Scholars J Med Sci*, *5*(2), 58-66.