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How appropriate are answers of online chat-based artificial intelligence (ChatGPT) to common questions on colon cancer?

ChatGPT is a large language model created by OpenAI that has been trained on a diverse set of text data to understand human language and respond to questions and prompts naturally. ChatGPT was designed to assist with various tasks, such as answering questions, generating text, and completing prompts to help people more effectively and efficiently communicate with natural language.

With the increasing popularity and use of ChatGPT, the general public may use it to gain information on various medical conditions. It is still unclear whether or not ChatGPT can provide accurate information concerning education questions. Therefore, the present study is aimed to assess the appropriateness and consistency of ChatGPT answers to questions on different aspects of colon cancer management.

The present study followed a similar methodology to that reported in a recent research letter that assessed the appropriateness of ChatGPT responses to fundamental questions on cardiovascular disease prevention.¹ Thirty-eight questions on the topics of prevention, diagnosis, and management of colon cancer were generated (Figure 1). These questions were based on our clinical experience and patient information handouts from the American Society of Colon and Rectal Surgeons (ASCRS).

Each question was asked twice to ChatGPT, and both answers were recorded to examine the consistency of answers. Three geographically diverse colorectal surgery experts were emailed the answers and an assessment form. The experts were 2 male and 1 female surgical consultants from Italy, Israel, and Brazil; they were selected based on their clinical expertise and publications on colon cancer. The experts were informed about the study design and purpose and were requested to rate the answers of ChatGPT as appropriate (consistent and factually accurate), inappropriate (consistent and factually inaccurate or contains incorrect information), or inconsistent. The first author reviewed the assessment forms returned by the experts, and the agreement between their ratings was assessed using inter-rater reliability. Two additional colorectal surgeons (S.E. and N.H.) assessed whether or not the answers of ChatGPT were consistent with the 2022 ASCRS practice parameters on colon cancer.^{2,3}

Twenty-seven answers of ChatGPT were rated as appropriate by the 3 experts, whereas 6 answers were rated as appropriate by 2 experts, and 4 were rated as appropriate by only 1 expert. All experts rated the answers to 1 question (number 15) as inconsistent. A sample of inappropriate answers of ChatGPT is shown in Figure 2.

The percentage of answers rated as appropriate varied among the experts (78.9%, 81.6%, and 97.4%). Overall, at least 2 of 3 experts rated the answers as appropriate for 86.8% (95% CI: 71.9%–95.6%) of questions. The inter-rater reliability was 79.8% (95% CI: 71.3%–86.8%). Nineteen (95%) of the 20 questions that applied to the 2022 ASCRS practice parameters for colon cancer were concordant. The answers to 1 question (number 15) showed some discordance.

Approximately 87% of the answers provided by ChatGPT to 38 questions on colon cancer management were deemed appropriate and consistent by at least 2 independent experts. This percentage is similar to the 84% reported in another study¹ that examined the appropriateness of ChatGPT answers to questions in a different medical discipline. Inappropriate ChatGPT answers involved incorrect information regarding the potential risk of hemorrhoids causing chronic colon inflammation that might increase the risk of colon cancer. It also incorrectly suggested that colorectal surgeons can deliver chemotherapy and radiotherapy and that radiation therapy may be used to shrink the tumor after surgery. Inconsistency of answers was noted by at least 1 expert for 8 questions, which involved 1 of the 2 answers missing some information related to preventive methods for colon cancer, screening methods, age to start screening, symptoms of colon cancer, multidisciplinary team management, and side effects of surgery for colon cancer.

The answers of ChatGPT were largely concordant with ASCRS practice parameters, except when answering the question on when and how often screening for colon cancer be done, as it did not include double-contrast barium enema as was stated in the ASCRS parameters. Most ChatGPT answers consistently recommended consulting health care providers and professionals. However, the guideline and practice parameters of medical associations were not implied. The role of professional surgical associations in vetting the medical information provided by the AI platform to patients and taking the lead should be considered. The main limitation of the present study is that ChatGPT is not meant for medical use. The current ChatGPT statistics in 2023 indicate that ChatGPT attained 100 million active users by January 2023 and grew by 9,900% in 2 months, rendering it the fastest-growing platform.⁴ However, there is no information on the specific use or type of questions ChatGPT is asked by its users. With growing research, future survey studies may shed light on the frequency of the use of ChatGPT by patients as a source of medical information.

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| <p>General</p> <ol style="list-style-type: none"> 1- What is colon cancer? 2- How common is colon cancer? 3- Who is at risk of colon cancer? 4- How does colon cancer start? 5- How do I get colon cancer? 6- Someone in my family had colon cancer, does colon cancer run in families? 7- Can hemorrhoids lead to colon cancer? 8- What is a colon and rectal surgeon? <p>Prevention</p> <ol style="list-style-type: none"> 9- Can colon cancer be prevented? 10-How can I avoid getting colon cancer? 11-Why should people be screened for colon cancer? 12-What screening tests are there for colon cancer? 13-Are screening tests based on stool examination good? 14-When should I get my first screening for colon cancer? 15-When and how often should screening for colon cancer be done? 16-How can I prepare for a colonoscopy? 17-Does colonoscopy hurt or have side effects? | <p>Diagnosis</p> <ol style="list-style-type: none"> 18-How do I know if I have colon cancer? 19-How dangerous is it to have blood in stool? 20-Is being constipated for some time a sign I may have colon cancer? 21-How can I make sure I don't have colon cancer if I have symptoms? 22-What tests do I need for diagnosis of colon cancer? 23-What are the stages of colon cancer on diagnosis? 24-Why did the doctor take biopsy during my colonoscopy? <p>Treatment</p> <ol style="list-style-type: none"> 25-How is colon cancer treated? 26-I was told I have stage III colon cancer, is that curable? 27-I was told I have stage IV colon cancer that has spread to the liver, is that curable? 28-Is there non-surgical treatment for colon cancer? 29-What is the best surgery for colon cancer? 30-Is having keyhole surgery for colon cancer better than open surgery? 31-Should I have my surgery performed by a robot? 32-What are the side effects of surgery for colon cancer? 33-When can I start eating normally after surgery for colon cancer? 34-Would I be able to go normally to the bathroom after colon cancer surgery? 35-When can I go home after surgery for colon cancer? 36-When can I return to work after surgery for colon cancer? 37- Do I need additional treatments like chemotherapy after surgery for colon cancer? 38-Which hospital should I go to for treatment of colon cancer? |
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Figure 1. Thirty-eight questions on the diagnosis and management of colon cancer that were asked to ChatGPT.

<p>Can hemorrhoids lead to colon cancer?</p> <p>Hemorrhoids themselves do not lead to colon cancer. Hemorrhoids are swollen veins in the anus or lower rectum that can cause discomfort, pain, and bleeding. They are a common condition, and while they can be bothersome, they are generally not considered to be a serious medical condition.</p> <p>However, in some cases, symptoms of hemorrhoids can be similar to symptoms of colon cancer, such as rectal bleeding. It's important to note that rectal bleeding can be a symptom of a number of different conditions, including hemorrhoids, but it can also be a symptom of colon cancer. Therefore, it's important to consult with a healthcare provider if you are experiencing rectal bleeding, particularly if it is persistent or accompanied by other symptoms such as changes in bowel habits, abdominal pain, or unexplained weight loss.</p> <p>Additionally, some studies have suggested that chronic inflammation in the colon, such as that associated with inflammatory bowel disease (IBD), may increase the risk of developing colon cancer. While hemorrhoids are not the same as IBD, they can both cause inflammation in the colon, and it is possible that long-term or chronic inflammation could contribute to an increased risk of developing colon cancer. However, more research is needed to fully understand the relationship between hemorrhoids and colon cancer.</p>	<p>What is a colon and rectal surgeon?</p> <p>A colon and rectal surgeon, also known as a proctologist or colorectal surgeon, is a medical doctor who specializes in the diagnosis and treatment of diseases and conditions that affect the colon, rectum, and anus. Colon and rectal surgeons receive specialized training beyond medical school in general surgery, with a focus on the diagnosis and treatment of conditions affecting the lower gastrointestinal tract.</p> <p>Colon and rectal surgeons are trained to perform a wide range of surgical procedures, including minimally invasive and robotic surgery, to treat conditions such as colon and rectal cancer, inflammatory bowel disease (IBD), diverticulitis, hemorrhoids, anal fissures, and other disorders of the colon, rectum, and anus.</p> <p>In addition to surgical treatment, colon and rectal surgeons may also provide non-surgical treatments, such as chemotherapy and radiation therapy for colon and rectal cancer, as well as advice on lifestyle changes, such as dietary modifications and exercise, to manage or prevent these conditions.</p> <p>Colon and rectal surgeons work as part of a multidisciplinary team that includes gastroenterologists, medical oncologists, radiation oncologists, and other healthcare professionals to provide the best possible care for their patients. If you are experiencing symptoms or have been diagnosed with a condition affecting the colon, rectum, or anus, your healthcare provider may refer you to a colon and rectal surgeon for evaluation and treatment.</p>	<p>How is colon cancer treated?</p> <p>The treatment for colon cancer depends on the stage and location of the cancer, as well as the individual's overall health and preferences. The main treatment options for colon cancer include surgery, radiation therapy, and chemotherapy, and in some cases, targeted therapy and immunotherapy may also be used.</p> <ol style="list-style-type: none"> 1. Surgery: Surgery is the most common treatment for colon cancer. It involves removing the cancerous tumor and surrounding tissue, as well as nearby lymph nodes to prevent the cancer from spreading. If the cancer is in an early stage and has not spread, surgery may be the only treatment needed. 2. Radiation therapy: Radiation therapy uses high-energy X-rays or other forms of radiation to kill cancer cells. It is sometimes used before or after surgery to shrink the tumor or to destroy any remaining cancer cells. 3. Chemotherapy: Chemotherapy uses drugs to kill cancer cells. It can be given before or after surgery, or in combination with radiation therapy. 4. Targeted therapy: This type of treatment targets specific proteins or genes that help cancer cells grow and divide. Targeted therapy may be used in combination with chemotherapy. 5. Immunotherapy: This type of treatment works by boosting the body's immune system to help fight cancer cells. <p>The treatment for colon cancer may be complex and may require a multidisciplinary team of healthcare professionals, including surgeons, oncologists, and radiologists. Your doctor will work with you to develop a treatment plan that is tailored to your individual needs and preferences. Regular follow-up tests and exams may also be necessary to monitor the cancer and ensure that it does not return.</p>
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Figure 2. A sample of inappropriate answers by ChatGPT.

In addition, although the study attempted to evaluate different aspects of colon cancer care, the current list of simple questions cannot fully assess this wide area. Nonetheless, the answers of ChatGPT to most questions were detailed and seemingly accurate. Therefore, ChatGPT may become a popular educational and informative tool in clinical practice.

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