

Medical Professionals Have Higher Risk for Colorectal Adenoma But Lower Risks for Reflux Esophagitis and Atrophic Gastritis: A Propensity Score-Based Analysis

Chen Qiao

Shandong University Qilu Hospital

Min Zhang

Shandong University Qilu Hospital

Zhen Li

Shandong University Qilu Hospital

Xiu-Li Zuo (✉ zuoxiuli@sdu.edu.cn)

Shandong University Qilu Hospital

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Abstract

Background: Previous studies had indicated that medical professionals' lifestyles were not as healthy as recommended. Whether these lifestyles lead to higher incidences of gastrointestinal diseases is unknown.

Objectives: To compare the incidences of gastrointestinal diseases between medical professionals and general populations.

Methods: Subjects who underwent endoscopy examination for physical examination in Qilu Hospital from January 2017 to September 2019, were retrospectively reviewed. Propensity score based analysis was used to generate two age- and sex-matched groups, Medical Professional Group and General Population Group. The positive rates of gastrointestinal disorders in two groups, were analyzed by Pearson's Chi-square test. Subgroup analysis within Medical Professional Group was performed to identify risk factors for medical staffs.

Results: 1534 records were enrolled, 791 for gastroscopy and 743 for colonoscopy. Among upper gastrointestinal diseases, the detection rates of atrophic gastritis and reflux esophagitis showed significant differences, which were 19.8% in Medical Professional Group and 25.9% in General Population Group ($p=.04$) for atrophic gastritis, 4.0% in Medical Professional Group and 12.6% in General Population Group ($p<0.001$) for reflux esophagitis. Among the subjects who received colonoscopy, the adenoma detection rate of the Medical Professional Group (17.5%) was statistically distinguished from the General Population Group (11.5%) ($p = .02$).

Conclusion: In a provincial comprehensive hospital in China, medical Professional Group has significantly higher risk for colorectal adenoma, but lower risks for atrophic gastritis and reflux esophagitis.

Introduction

Recently, there is increasing recognition that the health conditions of medical professionals require more attention.¹ Many medical professionals lost sight of their own personal health while they confront the stresses of increased workload to deliver daily care and services to patients. In this context, enhancing their personal health practice becomes very essential. It does not only improve their overall work performance but also helps them to better guide patients.²⁻⁴ It has been reported that physicians' personal health practice is one of the strongest predictors of whether they are capable to offer helpful lifestyle advice to patients.⁵ Indeed, one study in Canada confirmed a positive association between preventive health practices of physicians and that of patients.⁶

In fact, lifestyles of physicians have attracted more and more attentions. An international review of tobacco smoking in medical professionals has shown a steady decline of it in most developed countries, but doctors in newly developing and several other developed countries were still holding on smoking at

high rates.⁷ Other studies have also shown smoking ranges in different countries from 2% in the US to 49% in Greece.⁷ Another focus on physicians' lifestyles is alcohol using. In a cross-sectional survey in the UK, many clinical staffs took more alcohol than recommendation.⁸ A nationwide study in Denmark found the risky alcohol use rates in physicians were from 17.2–20.3%.⁹ Another national cross-sectional study in Ireland compared the alcohol consuming rates between physicians and general populations, and found that physicians were more likely to consume alcohol than general population but less likely to engage in binge drinking.¹⁰ Apart from these problems, physical activities and burnout of physicians have also been well studied. Researches have shown that many medical staffs do inadequate physical exercises.^{8,10} And burnout is common among medical workers, especially young medical staffs.¹¹ They often live in reverse life around the clock.¹² Long working hours coupled with psychological stress are also barriers to a healthy life.^{8,13}

In a word, the medical professional's lifestyles do not always meet the requirements, even some of them are unhealthy. These lifestyles are exactly the potential risk factors for gastrointestinal diseases. For example, both physical activity and psychological stress are associated with a variety of digestive diseases.^{14–19}

Do physicians have a higher risk for gastrointestinal diseases? Until now, statistics are lacking and the answer is unclear to us. So, we conducted this retrospective study to compare the incidence of gastrointestinal diseases diagnosed by endoscopy between medical professionals and general populations. Our study aims to provide new evidences in the epidemiology of gastrointestinal diseases of medical professionals, and trying to give some reasonable suggestions based on these data.

Materials And Methods

Subjects

This is a single center, retrospective, propensity score-matched analyzed study. Subjects who underwent gastroscopy or colonoscopy for physical examinations in Qilu Hospital of Shandong University, China, from January 2017 to September 2019, were retrospectively analyzed. Exclusion criteria included: (1) age less than 50 years old or more than 79 years old, (2) a history of gastric cancer or colonrectal cancer, (3) a history of gastrointestinal surgical or endoscopic operations, (4) unfinished endoscopy procedures due to poor coordination, poor bowel or gastric preparations or high operating difficulties (Uncompleted procedures caused by newly diagnosed severe diseases were not ruled out.), and (5) records with incomplete information.

All the included subjects were divided into two groups, Medical Professional Group and General Population Group. Medical professionals referred to all permanent staffs in Qilu Hospital, including doctors, assistant personnel and administrative staffs. General population referred to all those who visited the Health Screening Center of Qilu Hospital for gastrointestinal examinations or who visited

gastrointestinal clinic for healthy screening endoscopic examinations. Subjects in the two groups were age- and sex- matched.

Endoscopic procedures

Informed consents for gastroscopy or colonoscopy were granted from all the subjects before the procedures. For gastroscopy, intubation of duodenal descending part was required and described in the reports with words and pictures. And for colonoscopy, the bowel preparation agents used were all polyethylene glycol-based regimens. Polyethylene glycol was Polyethylene Glycol Electrolytes Powder (Wanhe Pharmaceutical Co. Ltd., Shenzhen, China). Depth of insertion and cecal intubation were required fields for report completion. Cecal intubation was documented by the endoscopist using landmark descriptions including “ileocecal valve” and “appendiceal orifice” with an associated photograph. The endoscopic procedures and diagnosis were completed by experienced endoscopists with more than 5 years experiences in endoscopy performance. All the pathological diagnoses of biopsy samples were also made by experienced pathologists.

Primary outcomes and secondary outcomes

The endoscopic and pathological diagnosis were reviewed and recorded. The primary outcomes of the study were the positive rates of gastrointestinal disorders, including reflux esophagitis, gastric polyp, peptic ulcer, *H. pylori* infection, atrophy gastritis, gastric cancer, colorectal polyp, adenoma and cancer, colorectal ulcer, melanosis coli and colonic diverticula. *H. pylori* infection was ensured by histopathology or rapid urease test (RUT) of mucosa from corpus or antrum.

The secondary outcomes were the subgroup analysis within the Medical Professional Group, which included the incidences of gastrointestinal diseases between males and females, clinicians and non-clinicians, surgeons and non-surgeons, and among different ages.

Statistical analysis

Statistical analysis was performed using SPSS 23.0. Continuous variables were expressed as means (standard deviation, SD) and compared with Student's t test; categorical variables were expressed as percentages and were compared with the Pearson's Chi-square test.

Propensity scores (PSs) were estimated via a multiple logistic regression model to balance the two groups with respect to age and sex.²⁰ One-to-one nearest-neighbor matching was performed between Medical Professional Group and General Population Group with a caliper set at 0.1. The resulting score-matched groups were used in subsequent analysis. The age- and sex-balance were verified by Student's t test and Pearson's Chi-square test separately. Upon obtaining satisfactory balance between the two groups, the primary outcomes, the positive rates of gastrointestinal disorders, were analyzed using Pearson's Chi-square test. To further investigate the differences among medical professionals, subgroup-analysis was performed within the Medical Professional Group. Pearson's Chi-square test was also used to assess incidences between subgroups divided by genders, ages and specialties. The significant level was set at $p < 0.05$.

Results

A total of 3181 records were reviewed, 1597 for gastroscopy and 1562 for colonoscopy after dropping duplicate records. Finally, 414 records were excluded from gastroscopy records, of which 397 records due to ages, 14 due to surgical or endoscopic operation histories, and 3 due to incomplete information. As for colonoscopy, 412 records were excluded, of which 395 for younger or older ages, 6 for surgical or endoscopic operation histories, 9 for unfinished colonoscopy and 2 for incomplete information. After one-to-one propensity score matching, 1534 records were enrolled for further analysis, 791 for gastroscopy and 743 for colonoscopy. Exactly, 893 subjects were enrolled in the study and 641 of the subjects received both gastroscopy and colonoscopy at the same visits. The flowchart of reviewing and enrolling the participants was shown in Fig. 1. The participants were age- and sex- matched between Medical Professional Group and General Population Group. The clinical characteristics were shown in Additional Table 1. No significant differences were found between the two groups with respect to ages and genders.

Among upper gastrointestinal diseases, the detection rates of reflux esophagitis, gastric polyp, peptic ulcer, H. pylori infection, atrophic gastritis and the gastric cancer were analyzed. The detection rates of atrophic gastritis and reflux esophagitis are significantly lower in Medical Professional Group than General Population Group, 19.8% versus 25.9% ($p = .04$) for atrophic gastritis and 4.0% versus 12.6% ($p < 0.001$) for reflux esophagitis (Fig. 2, Additional Table 2). The detection rates of colorectal polyp, adenoma, colorectal cancer, colorectal ulcer, melanosis coli and colonic diverticula among subjects who received colonoscopy examinations were shown in Fig. 3. The colorectal adenoma detection rate of the Medical Professional Group (17.5%) was statistically distinguished from the General Population Group (11.5%) ($p = .02$) (Fig. 3 and Additional Table 3).

Subgroup analysis within Medical Professional Group indicated a lower level of gastric polyp detection rate in male (14.5%) than female (28.7%) ($p = .002$). But male physicians had a significantly higher risk (58.9%) for colorectal polyp compared with females (39.4%) ($p = .001$) (Table 1 and Table 2). For the comparison between surgeons and non-surgeons, the positive rate of reflux esophagitis and gastric polyp were 8.6% versus 2.9% ($p = .03$) and 14.3% versus 25.6% ($p = .04$) respectively (Table 3). Incidences of lower gastrointestinal diseases were similar in surgeons and non-surgeons (Additional Table 4). No significant differences were found in gastrointestinal diseases when comparing the clinical staff and non-clinical staff (Additional Table 5 and Additional Table 6).

Table 1

The positive rates of upper gastrointestinal diseases in males and females within Medical Professional Group.

Positive Rate (%)	Male (n = 138)	Female (n = 240)	<i>p</i> value
Reflux esophagitis	5.1	3.3	.40
<i>H. pylori</i>	24.6	28.7	.39
Atrophic gastritis	22.5	18.3	.33
Gastric cancer	0.7	0.4	> .99
Peptic ulcer	4.3	4.2	.93
Gastric polyps	14.5	28.7	.002**

Table 2

The positive rates of lower gastrointestinal diseases in males and females within Medical Professional Group.

Positive Rate (%)	Male (n = 112)	Female (n = 213)	<i>p</i> value
Colorectal polyp	58.9	39.4	.001**
Colorectal adenoma	23.2	14.6	.05
Colorectal cancer	0.9	0.9	> .99
Colorectal ulcer	-	-	-
Melanosis coli	1.8	3.3	.72
Colonic diverticula	3.6	2.8	.74

Table 3

The positive rates of upper gastrointestinal diseases in surgeons and non-surgeons within Medical Professional Group.

Positive Rate (%)	Surgeon (n = 70)	Non-surgeon (n = 308)	<i>p</i> value
Reflux esophagitis	8.6	2.9	.04*
<i>H. pylori</i>	32.9	26.0	.24
Atrophic gastritis	20.0	19.8	.97
Gastric cancer	1.4	0.3	.33
Peptic ulcer	1.4	4.9	.32
Gastric polyp	14.3	25.6	.04*

Discussion

Results show that positive rate of colorectal adenoma in medical professionals is higher than in age- and sex-matched general population. The positive rates of atrophic gastritis and reflux esophagitis in medical professionals are lower than general population. Subgroup analysis within the medical professionals indicates positive rates of gastric cancer and colorectal cancer get higher with age (Additional Table 7 and Additional Table 8). It is suggested that medical professionals' health consciousness for gastrointestinal diseases should be promoted. And regular screening endoscopic examinations, especially colonoscopy, are recommended.

The underline mechanisms for these results are not exactly known. However, previous studies have provided us some potential risk factors based on lifestyles, such as fewer physical activities, burnout and psychological stress.^{8,10-13} Their beliefs, varied lifestyle may cause co-effects to the differences. Understanding the mechanism helps for potential screening and preventive measures for gastrointestinal diseases in medical professionals, which will potentially influence the healthy condition of the communities. One underlying reason may be the health beliefs and practices of physicians. Reflux esophagitis and chronic gastritis often present with symptoms like heartburn, pain, belching and abdominal distension, which can be easily recognized and relieved by simple prescriptions by medical professionals. Yet colorectal adenomas tend to be asymptomatic abnormalities, which basically show no warning signal. So, even reflux esophagitis, chronic gastritis and colorectal adenoma share similar risk factors in clinical settings, the positive rates of the diseases are diverse in two groups.

Gender-based subgroup analysis within the medical professionals indicates higher gastric polyp positive rate but lower colorectal polyp positive rate in female, which is consistent with those of the general population. Whereas surgeons tend to a higher reflux esophagitis positive rate and a lower gastric polyp positive rate than non-surgeons. These may due to different working environment and stress. Unexpectedly, the comparison results between clinical and non-clinical staff for gastrointestinal diseases is insignificant, which may serve as supporting proof of comparable concerns for non-clinical staff in the hospital.

There are several limitations of this study. First, this is a retrospective study in one single center. But propensity score-based analysis was used to reduce bias. Second, the subgroup analysis within physicians did not adjust for some important potential confounding factors, like age, gender and diets. Because the subject number in subgroups analysis was not sufficient to be fully matched or adjusted. Third, the lifestyles and related risk factors of subjects were not investigated in this study. Prospective studies are needed to provide more exact evidence and guidance for physicians' healthcare.

Conclusion

In conclusion, this study provided us the most recent statistical evidence for the healthy condition of gastrointestinal tract in medical professionals in a provincial comprehensive hospital, which was a wake-

up call for all doctors. This study was based on but also an extension of previous articles which analyzed the characteristics of physician's lifestyles. The lifestyle changes and endoscopy screening for medical professionals should be valued, especially for colonoscopy examination.

Abbreviations

RUT: rapid urease test

Declaration

Ethics approval and consent to participate

The study was approved by Medical Ethics Committee of Qilu Hospital of Shandong University. The consent of patients was waived by the hospital's ethical committee.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Chen Qiao, Zhen Li and Xiuli Zuo designed the study. Chen Qiao and Min Zhang collected the data. Chen Qiao and Zhen Li analyzed the data and interpreted the results. Chen Qiao drafted the manuscript. Zhen Li and Xiuli Zuo revised the manuscript. Chen Qiao, Min Zhang, Zhen Li and Xiuli Zuo interpreted the data and reviewed the manuscript. All authors read and approved the final manuscript.

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Figures

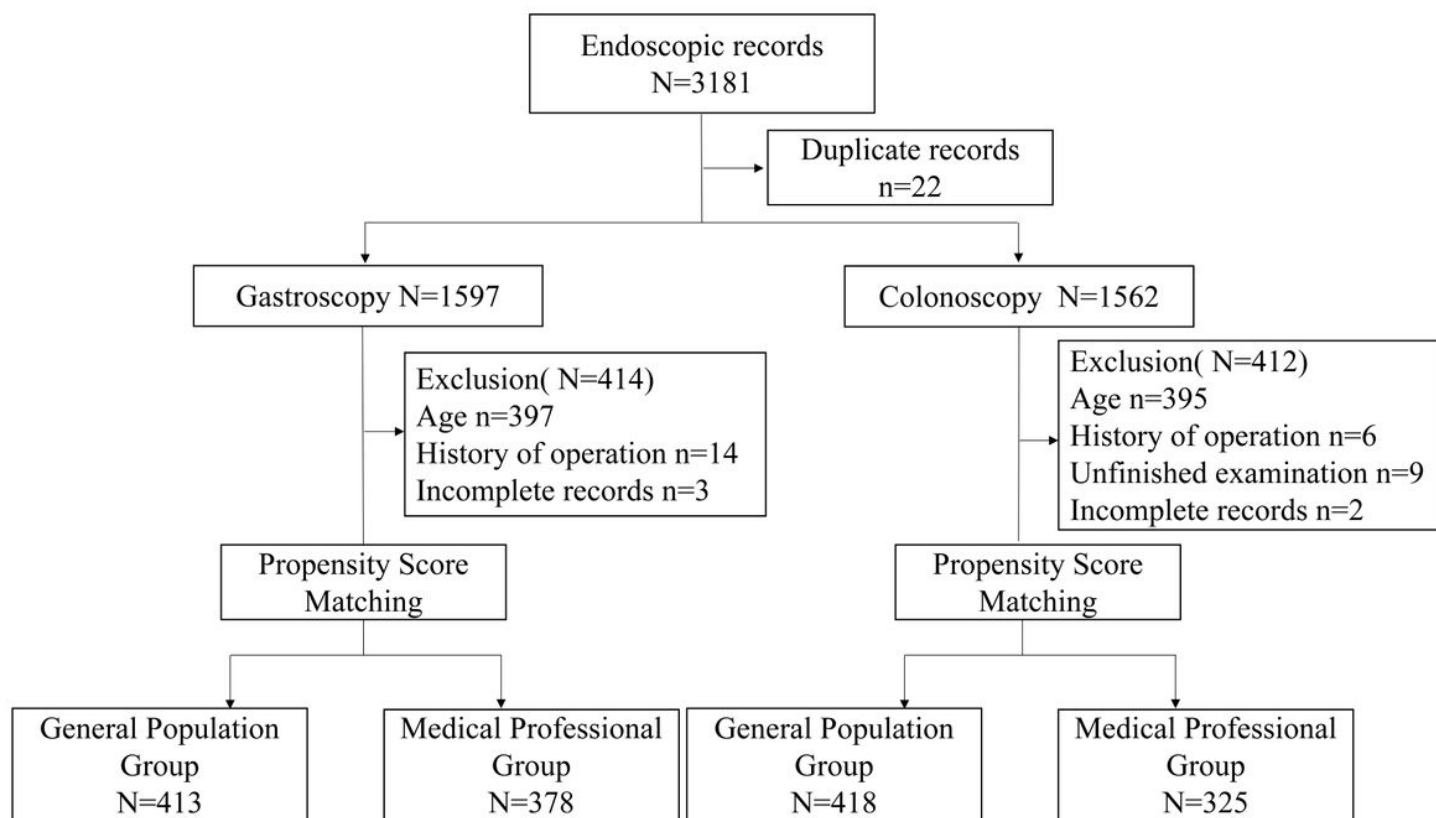


Figure 1

The flowchart of reviewing and enrolling the participants

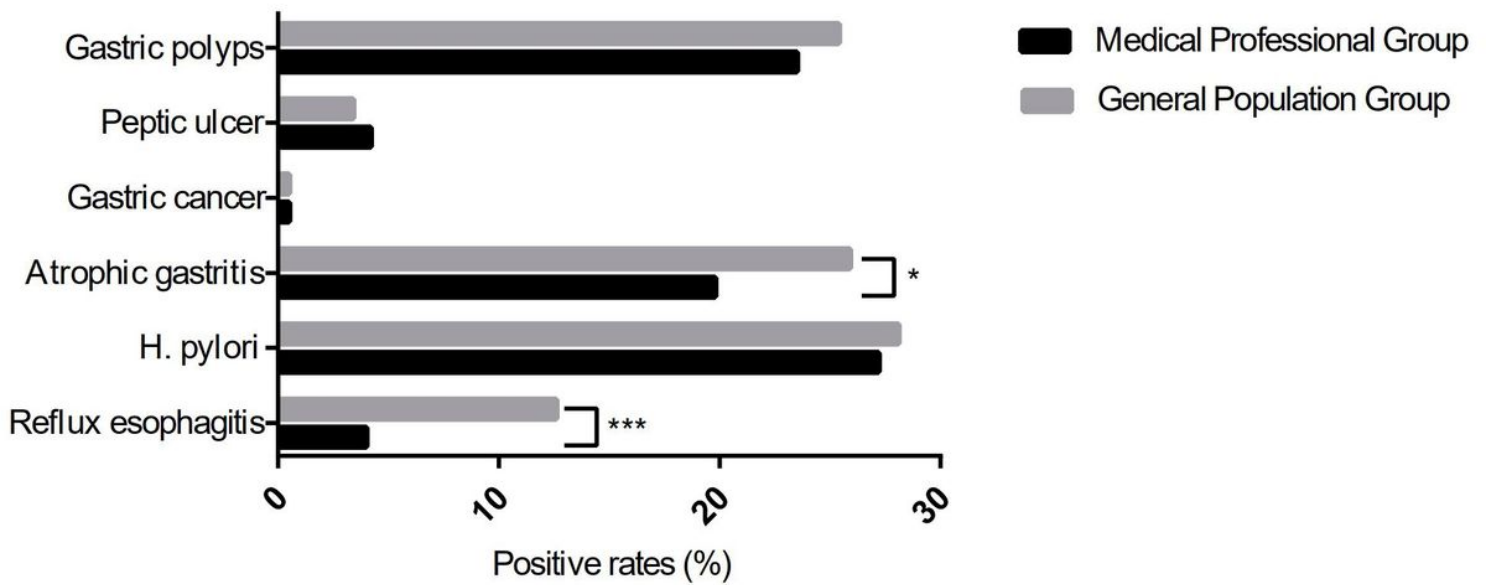


Figure 2

The disease spectrum of upper gastrointestinal tract in Medical Professional Group and General Population Group

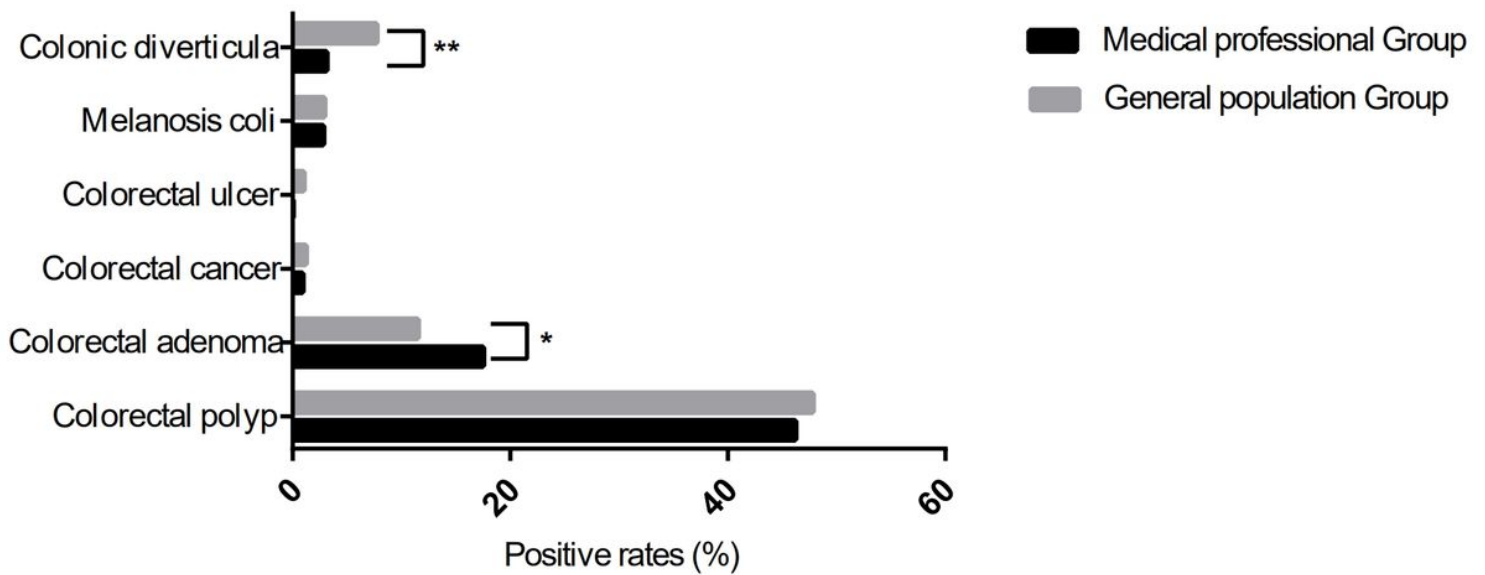


Figure 3

The disease spectrum of lower gastrointestinal tract in Medical Professional Group and General Population Group

Supplementary Files

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