

Endoscopic findings in a gastrointestinal cancer screening programme in the Podlaskie Province: a retrospective analysis

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Abstract

Introduction: Gastrointestinal cancer remains a major public health concern in Poland. The Podlaskie Province has one of the highest incidence rates of colorectal cancer in the country. Preventive endoscopic procedures can facilitate the early detection of neoplastic and pre-neoplastic lesions.

Aim of the research: To evaluate gastrointestinal symptoms reported by patients and endoscopic findings identified during gastroscopy and colonoscopy among residents of the Podlaskie Province, and to analyse their association with sociodemographic variables.

Material and methods: This retrospective study included 125 patients aged 45 years and older (65 gastroscopies and 60 colonoscopies) performed at the Endoscopy Unit of the Ministry of Internal Affairs and Administration Hospital in Białystok. Prior to the procedure, all patients completed a purpose-designed questionnaire comprising 17 symptom-related and 5 demographic questions. Associations between variables were assessed using Pearson's chi-square test and Fisher's exact test, with the significance level set at $p < 0.05$.

Results and conclusions: Colonoscopy most frequently revealed colorectal polyps (43.3%), colonic diverticulosis (20.0%), and external haemorrhoids (16.7%); no pathological findings were reported in 25% of patients. No neoplastic lesions were identified. During gastroscopy, erythematous gastropathy was the most common finding (86.2%), followed by sliding hiatal hernia (24.6%), reflux oesophagitis (21.5%), atrophic gastropathy (16.9%). Place of residence was significantly associated with colonic diverticulosis (more frequent among rural residents; $p = 0.031$) and external haemorrhoids (observed exclusively among urban residents; $p = 0.025$). Endoscopic examinations identified clinically relevant gastrointestinal abnormalities among residents of the Podlaskie Province. These findings highlight the importance of access to appropriate endoscopic evaluation and may inform public education on gastrointestinal cancer prevention.

Introduction

Malignant neoplasms constitute the second most common cause of death in Poland, accounting for 26% of deaths among men and 23% among women in 2023 [1]. Oncological diseases are a particularly significant health problem in individuals aged 25–64 years. This is especially evident in the female population, among whom malignancies have for years represented the leading cause of death before the age of 65 – accounting for as much as 31% of deaths among younger women and 45% among women aged 45–64 years. In the population over the age of 65, malignant neoplasms account for nearly one-third of male deaths and one-fifth of female deaths [1].

According to data from the National Cancer Registry (NCR) in Poland, colorectal cancer ranked third among newly diagnosed malignancies in 2023 – both in men (11.4%) and women (9.2%). Gastric cancer was less frequent, constituting 3.1% of new cases in men. In terms of cancer mortality, colorectal cancer accounted for 12.8% of cancer deaths in men (the second most common) and 11.5% in women (the third most common). Gastric cancer contributed to 5.5% of cancer deaths in men and 3.6% in women [1].

In the Podlaskie Province, colorectal cancer was the second most common newly diagnosed cancer in 2023, both in men (12.5%) and women (9.3%). Gastric cancer ranked seventh among men (2.6%) and ninth among women (2.6%). This region is characterised by

a relatively high colorectal cancer burden. According to NCR data from 2021, the Podlaskie Province ranked 4th in Poland in terms of the age-standardised incidence rate (ASR) for colorectal cancer in men (ASR 33.1) and 6th among women (ASR 19.0). For gastric cancer, the Podlaskie Province ranked 13th in incidence among men (ASR 7.2) and first among women (ASR 6.1). In terms of cancer mortality, colorectal cancer represented the second leading cause of cancer death in men (12.9%) and the third in women (12%), while gastric cancer was the fourth cause in men (6%) and the fifth in women (5.2%) [1].

Among strategies to improve gastrointestinal cancer treatment outcomes, secondary prevention through screening programmes plays a pivotal role. The aim of screening is to detect precancerous lesions and early-stage malignancies before the onset of clinical symptoms. Scientific societies, including the European Society of Gastrointestinal Endoscopy (ESGE), emphasise the growing role of endoscopy in the prevention and early detection of gastrointestinal cancers. ESGE notes that digestive cancers are expected to account for approximately one-third of cancer-related deaths in Europe, both currently and in 2040 [2].

In Poland, three colorectal cancer screening programmes are currently implemented. The first, funded by the National Health Fund (NFZ), has been available since 2000 and targets both high-risk patients and asymptomatic individuals within specified age ranges [3]. The second programme has been co-financed by European Union funds since 2016. The third – considered the most epidemiologically valuable – is the Population-Based Screening Programme (PBOS), operational since 2012, under which personalised invitations for colonoscopy are sent to individuals aged 55–64 years regardless of the presence of symptoms. Invitations are dispatched six weeks in advance, with a reminder after three weeks in the event of no response. Despite the availability of these programmes, participation in colorectal cancer screening colonoscopy in Poland – as in other European countries – remains low. International data demonstrate substantial variation in the use of lower gastrointestinal endoscopy. Chen et al. reported recent colonoscopy use of 13–30% in countries outside the United States, compared with 62% within the preceding 10 years among US adults aged 50–75 years [4]. The endoscopic examinations described in the present study were conducted as part of a separate cross-border project – the Interreg VI-A Lithuania–Poland Programme 2021–2027 – funded by the European Union. Unlike the national programmes mentioned above, this project targeted residents of the Podlaskie Province aged 45 years and older, with no upper age limit, and represents an example of supplementary preventive activities implemented at the regional level outside the framework of the National Health Programme.

Gastric cancer screening primarily targets the intestinal-type carcinoma, which accounts for more than 95% of gastric cancer cases and develops through the Correa cascade: inflammation → metaplasia → dysplasia → carcinoma [5]. Most evidence regarding endoscopic gastric cancer screening originates from high-incidence Asian countries. A meta-analysis of 10 Asian studies comprising 342,013 individuals found endoscopic screening to be associated with a 40% reduction in gastric cancer mortality [6]. Economic analyses from South Korea have also supported the cost-effectiveness of endoscopic screening strategies in high-incidence settings [7]. In accordance with ESGE guidelines, endoscopic gastric cancer screening should be considered in individuals aged over the age of 40 in high-risk populations [2]. In Poland, the Polish Gastric Cancer Research Project has been ongoing since 1986, resulting in the development of the Polish Consensus on the Diagnosis and Treatment of Gastric Cancer, the most recent update of which was published in 2022 [8].

Aim of the research

The aim of the present study was to analyse the frequency of reported gastrointestinal symptoms and endoscopic findings identified during preventive gastroscopy and colonoscopy among 125 residents of the Podlaskie Province undergoing elective gastrointestinal endoscopic screening. The analysis was conducted in relation to selected sociodemographic variables, including sex, age, and place of residence, and the results were compared with regional epidemiological data on gastrointestinal malignancies.

Material and methods

Study design and population

The present study is a retrospective descriptive analysis based on medical records and questionnaire data collected at the Endoscopy Unit of the Ministry of Internal Affairs and Administration Hospital in Białystok. Study funding was provided by the Interreg VI-A Lithuania–Poland Programme 2021–2027 within the project entitled “Prevention of Gastrointestinal Diseases in the Podlaskie Province and the Tauragė District through the Application of Highly Specialised Medical Equipment and Telemedicine Tools,” implemented by the Ministry of Internal Affairs and Administration Hospital in Białystok. This project is aligned with the objectives of the Interreg VI-A Lithuania–Poland Programme 2021–2027, the overarching aim of which is to improve the welfare of cross-border communities through cooperation between Polish and Lithuanian regions. Its territorial scope includes, among others, the Białystok subregion of the Podlaskie Province on the Polish side and the Tauragė District on the Lithuanian side. The present paper reports results

from the Białystok centre. The study enrolled residents of the Podlaskie Province who voluntarily presented for preventive gastrointestinal endoscopic examination between 20 October and 31 December 2025. Participants were recruited through two channels of public outreach: an announcement published on the hospital's official website and posters displayed throughout the hospital premises. No personalized invitations were issued, and participation was based entirely on self-selection. The total number of individuals who responded to the outreach and the corresponding response rate relative to the invited population are not available, as recruitment was open and non-individualized.

Patients were eligible for inclusion if they met the following criteria: age of at least 45 years (with no upper age limit), residence in the Podlaskie Province, no participation within the preceding year in other national or regional gastrointestinal disease prevention programmes, absence of ongoing diagnosis or treatment for gastrointestinal disorders at referral centres within the national health system, and provision of informed, voluntary consent to participate in the study. Cases with incomplete questionnaire or medical record data were excluded from the analysis. A total of 125 patients were included in the final analysis: 65 who underwent gastroscopy and 60 who underwent colonoscopy.

Endoscopic procedures

Endoscopic examinations were performed at the Endoscopy Unit by experienced endoscopists in accordance with applicable standards of practice. Gastroscopy included evaluation of the oesophagus, stomach, and duodenum, whereas colonoscopy comprised complete assessment of the colorectal mucosa from the rectum to the caecum. Endoscopic diagnoses were established based on direct visualisation of the mucosa and, where clinically indicated, confirmed by histopathological examination.

Questionnaire assessment

Prior to the endoscopic procedure, each patient completed a purpose-designed questionnaire. The research instrument was constructed in accordance with established principles of questionnaire development and comprised 17 single-choice questions concerning gastrointestinal symptoms and five demographic questions addressing sex, age, place of residence, educational attainment, and occupational status. The following symptoms were assessed: rectal bleeding, diarrhoea, constipation, dyspepsia, nausea, vomiting, abdominal pain, sensation of incomplete bowel emptying, reduced appetite, bloating, heartburn, mood changes, fatigue with reduced physical capacity, and unintentional weight loss. Participation was voluntary, and

completion of the questionnaire was considered to constitute consent to its administration.

Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics version 27.0 (IBM Corp., Armonk, NY, USA). Continuous variables were presented as the arithmetic mean with standard deviation (SD) or as the median with interquartile range (IQR), depending on the data distribution assessed using the Kolmogorov-Smirnov test. Categorical variables were described using absolute frequencies and percentages. Associations between categorical variables were assessed using Pearson's χ^2 test; when the assumptions of the χ^2 test were not met, a two-sided Fisher's exact test was used. Statistical significance was set at $p < 0.05$. The sociodemographic variables analysed included sex (female vs. male), age (≤ 60 years vs. > 60 years), place of residence (rural vs. urban), and occupational status (white-collar employment, manual labour, or not employed).

Ethical considerations

The retrospective analysis of data collected during the screening programme was conducted in accordance with the principles of the Declaration of Helsinki. Approval for the analysis of the data was granted by the Bioethics Committee of the Medical University (approval number APK.002.10.2026, dated 22 January 2026).

Participation in the preventive screening project was voluntary and free of charge. All participants provided informed consent prior to enrolment. Personal data were processed in accordance with applicable data protection regulations.

Results

Gastroscopy – characteristics of the study group

Of 69 patients with available data, 65 with complete records were included in the analysis (four cases were excluded due to missing data). The median age was 59.0 years (IQR, 52–66). Male patients predominated in the group, accounting for 48 individuals (73.8%). The majority of participants resided in urban areas (49 individuals; 75.4%). Demographic characteristics of the study group are presented in Table 1.

Gastroscopy – symptom frequency and statistical associations

The frequency of gastrointestinal symptoms was assessed and analysed in relation to selected sociodemographic variables, including sex, age (≤ 60 years vs. > 60 years), and place of residence (rural vs. urban). The prevalence of individual symptoms is presented in Table 2.

Table 1. Demographic characteristics of the gastroscopy group ($N = 65$)

Characteristic	<i>n</i> (%)
Age	
≤ 60 years	32 (49.2)
> 60 years	33 (50.8)
Sex	
Female	17 (26.2)
Male	48 (73.8)
Place of residence	
Rural	16 (24.6)
Urban	49 (75.4)
Occupational status	
Not employed	24 (36.9)
Manual worker	16 (24.6)
White-collar worker	25 (38.5)

Among male patients, the following symptoms were reported at significantly higher frequencies: mood changes (64.6% vs. 29.4% in females; $p = 0.012$), dyspepsia (72.9% vs. 11.8%; $p < 0.001$), constipation (60.4% vs. 29.4%; $p = 0.028$), abdominal pain (62.5% vs. 23.5%; $p = 0.006$), sensation of incomplete bowel emptying (68.8% vs. 23.5%; $p = 0.001$), and nausea (37.5% vs. 5.9%; $p = 0.014$). For the remaining symptoms, no statistically significant association with sex was observed. No statistically significant associations between symptom frequency and age or place of residence were identified. Statistically significant differences are summarised in Table 3.

Analysis of symptom frequency in relation to age (≤ 60 years vs. > 60 years) revealed a statistically significant association only for rectal bleeding, which was reported more frequently in the younger patient group (12.5% vs. 0.0%; $p = 0.036$). The prevalence

Table 2. Prevalence of analysed symptoms – gastroscopy group ($N = 65$)

Symptom	<i>n</i> (%)
Heartburn	40 (61.5)
Fatigue, lethargy, reduced physical capacity	36 (55.4)
Bloating	46 (70.8)
Irregular bowel habits	46 (70.8)
Reduced appetite	10 (15.4)
Rectal bleeding	4 (6.2)
Diarrhoea	26 (40.0)
Dyspepsia	37 (56.9)
Constipation	34 (52.3)
Abdominal pain	34 (52.3)
Unexplained weight loss	5 (7.7)
Sensation of incomplete bowel emptying	37 (56.9)
Nausea	19 (29.2)
Vomiting	10 (15.4)
Mood changes	36 (55.4)
Persistent/frequent belching	21 (32.3)
Aversion to meat consumption	56 (86.2)

of all other symptoms did not differ significantly between the age groups. No statistically significant associations between symptom frequency and place of residence were identified. Statistically significant differences are summarised in Table 3.

Gastroscopy – endoscopic diagnoses

The most frequent endoscopic finding was erythematous gastropathy, identified in 56 patients (86.2%). Gastro-oesophageal reflux and sliding hiatal hernia were present in 9 (13.8%) and 16 (24.6%) patients, respectively. Reflux oesophagitis was diagnosed in 14 patients (21.5%), and atrophic gastropathy in 11 patients (16.9%). A positive urease test for *Helicobacter pylori* was obtained

Table 3. Statistically significant associations – gastroscopy group ($p < 0.05$)

Symptom	Differentiating variable	Frequency of reported symptom by group	<i>p</i>
Dyspepsia	Sex	M 72.9% vs. F 11.8%	< 0.001
Sensation of incomplete bowel emptying	Sex	M 68.8% vs. F 23.5%	0.001
Abdominal pain	Sex	M 62.5% vs. F 23.5%	0.006
Constipation	Sex	M 60.4% vs. F 29.4%	0.028
Nausea	Sex	M 37.5% vs. F 5.9%	0.014
Mood changes	Sex	M 64.6% vs. F 29.4%	0.012

M – male, F – female

Table 4. Frequency of diagnoses in patients undergoing gastroscopy ($N = 65$)

Diagnosis	<i>n</i> (%)
Erythematous gastropathy	56 (86.2)
Gastro-duodenal reflux	9 (13.8)
Positive urease test (<i>H. pylori</i>)	4 (6.2)
Reflux oesophagitis	14 (21.5)
Atrophic gastropathy	11 (16.9)
Sliding hiatal hernia	16 (24.6)
Gastric submucosal tumour (SMT)	1 (1.5)
Mallory-Weiss lesion	1 (1.5)
Suspected Barrett's oesophagus	1 (1.5)
Oesophageal polyp	1 (1.5)
Erosive duodenal bulbitis	1 (1.5)
Cardia polyp	1 (1.5)

in four patients (6.2%). The remaining diagnoses were sporadic and included one case of each (1.5%): gastric submucosal tumour, Mallory-Weiss lesion, suspected Barrett's oesophagus, oesophageal polyp, cardia polyp, and erosive duodenal bulbitis. A summary of gastroscopic findings is presented in Table 4.

Analysis of endoscopic findings did not reveal statistically significant differences between sex groups (all $p > 0.05$). The observed percentage differences – such as a slightly higher prevalence of hiatal hernia in men (27.1% vs. 17.6%) and a positive urease test observed exclusively in men (8.3% vs. 0%) – did not reach statistical significance. Similarly, analysis of findings by age group (≤ 60 years vs. >60 years) demonstrated no statistically significant differences for any of the diagnoses assessed (all $p > 0.05$); the prevalence of most lesions was similar between the age subgroups. The limited sample size for certain diagnoses, particularly those occurring as isolated cases, may have contributed to limited statistical power.

Colonoscopy – characteristics of the study group

All 60 patients with complete data were included in the analysis. Female patients predominated in this group, accounting for 34 individuals (56.7%). The majority of participants resided in urban areas (42 individuals; 70.0%). The median age was 58 years (IQR, 49–71). A total of 32 patients (53.3%) were assigned to the age subgroup of ≤ 60 years. A significantly greater proportion of women than men was observed in the ≥ 60 years age subgroup (61.8% vs. 26.9%; $p = 0.007$). Most participants were professionally active (61.7%) and engaged in white-collar work (43.3%). Demographic characteristics of the group are presented in Table 5.

Table 5. Demographic characteristics of the colonoscopy group ($N = 60$)

Characteristic	<i>n</i> (%)
Age	
≤ 60 years	32 (53.3)
> 60 years	28 (46.7)
Sex	
Female	34 (56.7)
Male	26 (43.3)
Place of residence	
Rural	18 (30.0)
Urban	42 (70.0)
Occupational status	
Not employed	23 (38.3)
Manual worker	11 (18.3)
White-collar worker	26 (43.3)

Table 6. Prevalence of symptoms in patients undergoing colonoscopy ($N = 60$)

Symptom	<i>n</i> (%)
Heartburn	29 (48.3)
Fatigue, lethargy, reduced physical capacity	27 (45.0)
Bloating	44 (73.3)
Irregular bowel habits	40 (66.7)
Reduced appetite	9 (15.0)
Rectal bleeding	7 (11.7)
Diarrhoea	26 (43.3)
Dyspepsia	33 (55.0)
Constipation	28 (46.7)
Abdominal pain	32 (53.3)
Unexplained weight loss	4 (6.7)
Sensation of incomplete bowel emptying	28 (46.7)
Nausea	16 (26.7)
Vomiting	8 (13.3)
Mood changes/irritability	34 (56.7)
Persistent belching	17 (28.3)
Aversion to meat consumption	6 (10.0)

Colonoscopy – symptom frequency and statistical associations

The prevalence of individual symptoms in the entire colonoscopy group is presented in Table 6. Female patients reported significantly higher frequencies of the following symptoms compared to male patients: fatigue and reduced physical capacity (61.8% vs. 23.1%; $p = 0.003$), bloating (85.3% vs. 57.7%; $p = 0.017$), dyspepsia (70.6% vs. 34.6%; $p = 0.006$), constipation

Table 7. Statistically significant associations – colonoscopy group ($p < 0.05$)

Symptom	Differentiating variable	Frequency of reported symptom by sex group	<i>p</i>
Fatigue/lethargy, reduced physical capacity	Sex	F 61.8% vs. M 23.1%	0.003
Bloating	Sex	F 85.3% vs. M 57.7%	0.017
Dyspepsia	Sex	F 70.6% vs. M 34.6%	0.006
Constipation	Sex	F 58.8% vs. M 30.8%	0.031
Abdominal pain	Sex	F 73.5% vs. M 26.9%	< 0.001
Sensation of incomplete bowel emptying	Sex	F 58.8% vs. M 30.8%	0.031

F – female, M – male

Table 8. Frequency of diagnoses in patients undergoing colonoscopy ($N = 60$)

Diagnosis	<i>n</i> (%)
Recto-sigmoid junction polyp	2 (3.3)
Descending colon polyp	3 (5.0)
Sigmoid colon polyp	3 (5.0)
Caecal polyp	4 (6.7)
Rectal polyp	4 (6.7)
Colorectal polyps (total)	26 (43.3)
Sigmoid diverticulosis	10 (16.7)
Colonic diverticulosis	12 (20.0)
Internal haemorrhoids	4 (6.7)
No pathological findings	15 (25.0)
External haemorrhoids	10 (16.7)
Ulcerative caecitis	1 (1.7)

(58.8% vs. 30.8%; $p = 0.031$), abdominal pain (73.5% vs. 26.9%; $p < 0.001$), and sensation of incomplete bowel emptying (58.8% vs. 30.8%; $p = 0.031$). No significant sex-related differences were identified for the remaining symptoms or endoscopic findings

Age was significantly associated with occupational status. Among patients aged ≤ 60 years, white-collar employment predominated (62.5%), whereas among those aged over 60 years, the absence of occupational activity was markedly more frequent (67.9%; $p < 0.001$). Apart from this association, age was not significantly related to the frequency of any of the analysed symptoms or endoscopic findings. Statistically significant differences are summarised in Table 7.

Colonoscopy – endoscopic diagnoses

Colonoscopy results are presented collectively in Table 8. The most common diagnosis was colorectal polyps, identified in 43.3% of patients ($n = 26$). Colonic diverticulosis was detected in 20.0% of patients ($n = 12$), and external haemorrhoids in 16.7% ($n = 10$). No pathological findings were identified in 25.0% of participants ($n = 15$). No neoplastic lesions were detected.

Place of residence was significantly associated with selected colonoscopic findings. Colonic diverticulosis was significantly more frequent among rural residents than among urban residents (38.9% vs. 11.9%; $p = 0.031$). External haemorrhoids were observed exclusively among urban residents in our study (23.8% vs. 0%; $p = 0.025$). The remaining symptoms and diagnoses did not show statistically significant associations with place of residence.

Discussion

Among strategies to improve gastrointestinal cancer treatment outcomes, secondary prevention – involving the detection of precancerous lesions and early-stage malignancies before the onset of clinical symptoms – plays a pivotal role. Lansdorp-Vogelaar *et al.* [9] confirmed the substantial economic benefits of population-based colorectal cancer screening, demonstrating measurable cost savings attributable to reductions in both the incidence and the stage at diagnosis of colorectal cancer. In 2020, the European Society of Gastrointestinal Endoscopy (ESGE) emphasised the growing role of endoscopy in the prevention and early detection of gastrointestinal malignancies, noting that digestive cancers are expected to account for approximately one-third of cancer-related deaths in Europe, both currently and in 2040 [2].

Use of lower gastrointestinal endoscopy varies substantially between countries. Chen *et al.* [4] reported recent colonoscopy use of 13–30% in countries outside the United States, compared with 62% within the preceding 10 years among US adults aged 50–75 years. The authors identified numerous barriers limiting participation, including insufficient awareness of screening programmes, procedural anxiety, and logistical challenges. Poland is identified as one of the countries at risk of failing to meet the targets set by the 2022 EU cancer screening recommendations. The endoscopic examinations conducted at our centre attracted considerable interest; in less than one week, the number of applicants exceeded the planned study capacity, indicating a genuine unmet demand for accessible preventive endoscopic services in the region.

Our data showed that male patients predominated among those presenting for gastroscopy (73.8%), whereas female patients were more prevalent in the colonoscopy group (56.7%). In both cases, urban residents accounted for the majority of participants (75.4% and 70.0%, respectively). These observations are consistent with Polish studies indicating lower colorectal cancer-related knowledge among rural populations. Rucińska *et al.* found lower knowledge among respondents from small towns and rural areas, those with lower educational attainment, and the unemployed [10]. Markowska *et al.* reported a medium level of colorectal cancer knowledge among urban residents and a low level among rural residents, with the highest level observed in individuals with higher education [11]. Kurowski *et al.* likewise reported urban–rural differences in knowledge of colorectal cancer [12]. Berbecka *et al.*, in a study of 1,352 residents of the Lublin Province, found substantially lower awareness of gastrointestinal malignancies in the rural population [13]. These findings are consistent with the lower representation of rural residents in our cohort.

The lower representation of rural residents, in the absence of significant differences in the prevalence of endoscopic findings, may suggest potential inequalities in access to diagnostic services and a possible underestimation of the true disease burden in the rural population. Alternatively, this observation may indicate that place of residence does not exert a meaningful influence on the prevalence of the lesions analysed.

No neoplastic lesions were identified in the colonoscopic examinations performed at our centre. The most frequent colonoscopic findings were colorectal polyps (43.3%), colonic diverticulosis (20.0%), and external haemorrhoids (16.7%). No pathological changes were detected in one quarter of participants. Of note are the statistically significant differences in the prevalence of colonic diverticulosis and haemorrhoids according to place of residence: diverticulosis was more frequently identified in rural residents (38.9% vs. 11.9%; $p = 0.031$), which may be attributable in part to dietary differences – such as a lower dietary fibre intake – although the questionnaire used in the present study did not include dietary variables. External haemorrhoids were observed exclusively in the urban population (23.8%; $p = 0.025$), which may be associated with sedentary occupational activity. The high prevalence of polyps underscores the value of colonoscopy as a preventive tool – early polypectomy of adenomatous lesions prevents malignant transformation.

The most common endoscopic finding in the gastroscopy group was erythematous gastropathy (86.2%), consistent with the frequent occurrence of superficial inflammatory changes of the gastric mucosa in the general population. Sliding hiatal hernia (24.6%), reflux oesophagitis (21.5%), and atrophic gastropathy (16.9%) represent clinically significant

findings – in particular atrophic gastropathy, which constitutes a component of the Correa cascade leading to gastric carcinoma [5]. *H. pylori* infection was identified in only 6.2% of patients. It should be noted that current estimates in Poland suggest a *H. pylori* infection prevalence not exceeding 20–30%, representing a substantial decline from the approximately 60% estimated in the 1990s [14]. The low prevalence of *H. pylori* infection in our cohort is therefore consistent with the current epidemiological situation in Poland. Notably, none of the endoscopic diagnoses demonstrated statistically significant associations with sex, age, or place of residence, which may be attributable to the relatively limited sample size.

In contrast to colorectal cancer screening, Poland – like most European countries – does not have a nationwide gastric cancer screening programme for the general population. Current European recommendations emphasise a risk-stratified approach to gastric cancer prevention. The 2025 MAPS III guideline recommends individual gastric cancer risk assessment and stratification of precancerous conditions at the time of first gastroscopy. It also recommends endoscopic surveillance every 3 years in patients with extensive endoscopic changes or advanced histological stages of atrophic gastritis or intestinal metaplasia [15]. These recommendations are particularly relevant in the context of the atrophic gastropathy identified in 16.9% of patients in our cohort. At the European policy level, the 2022 Council Recommendation broadened the scope of cancer screening beyond breast, cervical, and colorectal cancer and encouraged countries and regions with high gastric cancer incidence and mortality to consider gastric cancer screening strategies [16]. In parallel, the TO-GAS project (Towards Gastric Cancer Screening Implementation in the European Union) was launched to evaluate the feasibility and suitability of different gastric cancer screening and early detection strategies across EU Member States, including Poland. The project includes pilot studies assessing approaches based on *H. pylori* detection and eradication, identification and surveillance of precancerous gastric lesions, and endoscopic screening, with particular attention to cost-effectiveness and implementation in European healthcare systems [17].

With regard to public awareness of colorectal cancer, available Polish data are unequivocal: societal knowledge remains insufficient despite numerous awareness campaigns. Hreńczuk *et al.* [18] demonstrated that in a cohort of 541 young Polish individuals, only 5.2% possessed a high level of knowledge regarding colorectal cancer risk factors and prevention. Rucińska *et al.* [10] found that only slightly more than one-third of respondents were able to correctly identify the target population of the Colorectal Cancer Screening Programme. Analogously limited knowledge of the screening programme was demonstrated

by Stefanowicz *et al.* [19] in a cohort aged 50–65 years. At the European level, the LEGACy consortium conducted an educational intervention targeting gastric cancer awareness in the general population and reported a statistically significant increase in knowledge following an online educational intervention [20]. These findings confirm the need for systematic educational efforts, not only for colorectal cancer but also for gastric cancer, for which no national screening programme currently exists in Poland.

A notable finding is the divergence between the gastroscopy and colonoscopy groups with respect to sex-related differences in symptom reporting. In the gastroscopy group, male patients reported the majority of analysed symptoms at significantly higher frequencies (dyspepsia, abdominal pain, constipation, sensation of incomplete bowel emptying), whereas in the colonoscopy group, these same complaints were reported more frequently by female patients. This discrepancy may reflect differences in the patient profiles presenting for each procedure, as well as genuine sex-related differences in the perception and reporting of gastrointestinal symptoms. The significantly higher proportion of women in the older age subgroup (> 60 years) within the colonoscopy group (61.8% vs. 26.9% for men; $p = 0.007$) reflects the well-documented phenomenon that women tend to participate in screening examinations later, often following the onset of symptoms.

The present study has certain limitations. The retrospective design and the relatively small sample size (65 gastroscopies and 60 colonoscopies) limit the statistical power of the analysis, particularly with respect to infrequent diagnoses. The study was not randomised – patients presented voluntarily, which may have introduced selection bias and an overrepresentation of urban residents and individuals with higher educational attainment. Furthermore, the absence of a control group and data on key risk factors (e.g., tobacco smoking, dietary habits, family history) precludes conclusions of a causal nature.

Despite these limitations, the results obtained provide valuable data on the spectrum of endoscopic findings in the population of the Podlaskie Province undergoing preventive gastrointestinal screening.

Conclusions

Based on the analyses performed, the following conclusions were formulated:

Preventive endoscopic examinations performed in residents of the Podlaskie Province revealed a high prevalence of clinically significant gastrointestinal lesions, including colorectal polyps and gastric changes potentially associated with premalignant pathology, in the absence of overt neoplastic disease. These findings highlight the potential role of preventive endo-

scopic examinations in the detection of gastrointestinal lesions, including potentially treatable pathology.

Sex was significantly associated with the frequency of gastrointestinal symptoms in both study groups. In the gastroscopy group, a greater number of symptoms were reported by male patients, whereas in the colonoscopy group, female patients reported symptoms more frequently.

Place of residence was significantly associated with selected colonoscopic findings. Colonic diverticulosis was more frequently identified in rural residents, whereas external haemorrhoids were observed exclusively in urban residents. These differences may reflect differences in dietary habits and lifestyle patterns in the populations analysed.

The high level of interest among residents of the Podlaskie Province suggests substantial interest in accessible preventive endoscopic services in a region with a relatively high colorectal cancer burden.

Effective prevention of gastrointestinal malignancies requires both broad access to screening endoscopy and strengthened public education initiatives. This is particularly relevant to gastric cancer, for which no national screening programme currently exists in Poland.

Funding

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Ethical approval

Bioethics Committee of the Medical University (approval number APK.002.10.2026, dated 22 January 2026).

Conflict of interest

The authors declare no conflict of interest.

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