

Investigation of the prevalence of functional constipation and its related factors for in older outpatients

M. Esra Bozkurt¹, T. Erdogan², Z. Fetullahoglu², S. Ozkok², C. Kilic², G. Bahat², M. Akif Karan²

(1) Mersin City Hospital, Department of Internal Medicine, Division of Geriatrics Mersin, Turkey; (2) Istanbul University, Istanbul Medical School Department of Internal Medicine Division of 9 Geriatrics Istanbul, Turkey.

Abstract

Background: Functional constipation (FC) is a geriatric syndrome that is common in the older adult's population and can seriously affect the quality of life and may be a frequent cause of hospital visits. In this study, we planned to investigate the relationship between FC and its related factors for in older outpatients.

Patients and Methods: Participants aged 65 and over who applied to the geriatrics outpatient were included in the study. The diagnosis of FC was made according to the presence of the Rome IV criteria. Frailty was screened by the using FRAIL scale, ≥ 3 a score of were evaluated as frail. Participants quality of life was evaluated by Euro-Quality of Life Visual Analog Scale (EQ-VAS).

Results: The study included 602 participants. FC prevalence was found 28.7%. In univariate analyses, FC was found related to age, having a diagnosis of depression or Parkinson diseases, frailty, urinary incontinence, sleep disorders, number of chronic diseases, and EQ-VAS. In multivariate analyses, FC was not found to be associated by the frailty while the number of chronic diseases [OR=1.212, 95%CI (1.084-1.355), $p=0.001$] and EQ-VAS were found to be related [OR=0.988, 95%CI (0.978-0.997), $p=0.012$].

Conclusion: In the results of this study, FC was not found to be associated by frailty in older outpatients but it emerged as a syndrome that should be screened frequently in patients with a high number of chronic diseases and a low general quality of life. (*Acta gastroenterol. belg.*, 2024, 87, 361-365.

Keywords: functional constipation, frailty subgroups, older adults.

Introduction

Functional constipation (FC) is characterized by straining during defecation, the passage of hard/lumpy stools, the sensation of incomplete stool evacuation, the need for manual manoeuvres during defecation and an inability to produce soft stools without laxative support (1-4). If left untreated, FC can lead to such undesired consequences in older adult patients as faecal impaction, stercoral ulcerations, diverticula and even bowel perforation (5). When considered alongside these complications, FC represents a significant cause of hospital admissions in older adults (1,4-5). Studies have reported a wide range of prevalence rates, from 7.5% to 40%, in the older adult population (6,7), with even higher rates reported among nursing home residents and inpatients (8,9). This broad difference in reported FC rates can be attributed to ethnic variations in the studied populations and the use of different diagnostic screening methods (6-10). Despite its unfavourable consequences, FC remains underdiagnosed and undertreated in the older adult population.

Frailty is defined as increased vulnerability leading to a limited ability to cope with trauma or acute stressors, and is an outcome of the declining bodily reserves associated with aging (11). The frailty concept is linked to an increased risk of such negative health consequences as falls, admission to nursing homes, dependence and mortality. It is more prevalent among older adult patients, and its management in this population can pose difficulties, often requiring a re-evaluation of treatment targets (12). The present study investigates the prevalence of FC in older adult patients based on the ROME IV criteria, and identifies the associated factors, particularly frailty, as a common occurrence among older adults.

Methods

This retrospective, cross-sectional study was conducted following the principles outlined in the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement (13). The local ethics committee of the medical faculty granted approval for the study (Reference number: 2023/1172). The medical charts of patients aged 65 years and older who attended geriatric outpatient clinics between June 2016 and March 2023 were reviewed, and those with no history of abdominal surgery, with no symptoms or history of mechanical bowel obstruction, with accessible colonoscopy data from the previous five years, with no history of analgesic medication containing opioids and with available data regarding functional constipation were included in the study. Patients with symptoms (history of abdominal surgery, malignancy or rectocele) indicating potential mechanical bowel obstruction were excluded from the study, along with those lacking colonoscopy data from the past five years and those with inaccessible medication records. The diagnosis of FC was made based on the presence of at least two of the symptoms included in the ROME IV criteria for at least six months (3) (Table 1). The participants' data, including age, gender, chronic diseases and information on geriatric syndromes (falls, frailty,

Correspondence to: Meris Esra Bozkurt (for reprint), Mersin City Hospital, Geriatrics, Toroslar, Mersin, 33240, Mersin, Turkey. Phone: + 90 5375114809. Email: mesragunduz@gmail.com

Submission date: 14/02/2024

Acceptance date: 06/05/2024

Table 1. — **The presence of functional constipation diagnosis was established based on the Rome IV criteria in the table below**

1. Must include two or more of the following:
- Straining during more than (25%) of defecations,
- Lumpy or hard stools (Bristol Stool Form Scale 1-2) more than (25%) of defecations,
- Sensation of incomplete evacuation more than (25%) of defecations,
- Sensation of anorectal obstruction/blockage more than (25%) of defecations,
- Manual manoeuvres to facilitate more than (25%) of defecations (e.g., digital evacuation, support of the pelvic floor),
- Fewer than three spontaneous bowel movements per week,
2. Loose stools are rarely present without the use of laxatives;
3. Insufficient criteria for irritable bowel syndrome;
* The diagnosis of FC was made based on the presence of at least two of the symptoms included in the ROME IV criteria for at least six months.

malnutrition, urinary incontinence, sleep disorders, chronic pain), were garnered from their medical records. Frailty was assessed using the FRAIL scale. Based on the results of the five-item FRAIL scale, which measures fatigue, resistance, ambulation, illnesses, and weight loss, the participants were considered frail if their score was 3-5 (14); a Mini Nutritional Assessment-Short Form (MNA-SF) score of 7 or lower was considered indicative of malnutrition (15); polypharmacy was defined as using five or more medications (16); and overall life quality was assessed using the EuroQol-visual analog scale (EQ-VAS) (17).

Statistical Analysis

The statistical analyses were performed using the IBM SPSS Statistics for Windows (Version 26.0. Armonk, NY: IBM Corp.) software package. A Kolmogorov-Smirnov test was used to test the distribution normality of the study variables. The data were presented as percentages, mean $\pm$ standard deviation, and median (minimum-maximum) where applicable. Paired analyses were conducted with a Chi-square test, a Mann-Whitney U test or an Independent samples t-test, depending on the appropriateness of the data. Multicollinearity was evaluated using Pearson's correlation coefficient, Spearman's rank correlation coefficient or Kendall's tau-b correlation analysis. The variables that demonstrated no multicollinearity and exhibited a significant relationship with FC in a univariate analysis were subjected to further regression analyses. In the multivariate analysis, the odds ratio was presented within a 95% confidence interval (CI). A p-value of less than 0.05 was considered statistically significant.

Results

Included in the study were 602 older adult patients with a median age of 73 years, of which 197 (32.7%) were female, and in which the prevalence of FC was 28.7%.

The FC group was older than (median:75 vs. median:73 years; p : 0.001) the normal defecation group. In the FC group, chronic diseases such as depression (23.7% vs. 14.9 %; p :0.010) and Parkinson's (6.9% vs. 2.3%; p :0.006), and geriatric syndromes such as frailty (30.6% vs. 15.6%; p <0.001), urinary incontinence (50.9% vs. 36.4%; p : 0.001), and sleep disorders (45.1% vs.35.7%; p :0.031) were also encountered more frequently compared to the normal defecation group. While the number of chronic diseases (median:4 vs. median:3; p : <0.001) was higher in the FC group, EQ-VAS scores (median:60 vs. median:70; p <0.001) were lower (Table 2).

The frail group was older (median:76 vs. median:72; p : <0.001) and frequently female (79.2%, p :0.002) compared to the non-frail group. In the frail group, chronic diseases such as dementia (17.5% vs. 7.3%; p :0.001), depression (28.3% vs.14.7%; p : <0.001), and diabetes mellitus (43.3% vs. 31.7%; p :0.017); geriatric syndromes such as FC (44.2% vs. 24.9%; p <0.001), falls (52.5% vs. 34.6%; p <0.001), malnutrition (10% vs.1%; p <0.001), urinary incontinence (60% vs. 35.7%; p <0.001), sleep disorders (57.5% vs.33.6%; p <0.001), and chronic pain (79.2% vs. 52.5%; p <0.001) were also encountered more frequently compared to the non-frail group. In addition, polypharmacy (90.8% vs. 69.3%; p <0.001) and the number of chronic diseases (median:4 vs. median:3; p : <0.001) was higher in the frailty group compared to the non-frail group, but EQ-VAS scores (median:50 vs. median:70; p <0.001) were lower (Table 3).

Univariate analysis identified age (p =0.001), depression (p =0.010), diagnosis of Parkinson's disease (p =0.006), frailty (p <0.001), urinary incontinence (p <0.001), sleep disorders (p =0.031), number of chronic diseases (p <0.001) and EQ-VAS score (p <0.001) as factors associated with FC (Table 2).

The prevalence of frailty was 19.9%, associated in univariate analysis with age (p <0.001), sex (p =0.002), dementia (p =0.001), depression (p <0.001), diagnoses of diabetes mellitus (p =0.017), FC (p <0.001), falls (p <0.001), malnutrition (p <0.001), urinary incontinence (p <0.001), sleep disorders (p <0.001), chronic pain (p <0.001), polypharmacy (p <0.001), number of chronic diseases (p <0.001) and EQ-VAS score (p <0.001) (Table 3).

In the multivariate analysis, adjustments were made for confounding factors associated with FC. The results revealed no significant relationship between FC and frailty, while the number of chronic diseases [OR=1.212, 95%CI (1.084–1.355), p =0.001] and EQ-VAS score [OR=0.988, 95%CI (0.978–0.997), p =0.012] were identified as factors associated with FC (Table 4).

Discussion

The present study found the prevalence of FC among patients aged 65 years or older to be 28.7% based on the

Table 2. — Characteristic data of the study population by presence of constipation

	Functional Constipation (n=173) 28.7%	Normal Defecation (n=429) 71.3%	Total Population (n=602) 100%	p value
Age ^o	75 (65-91)	73 (65-96)	73 (65-96)	0.001*
Gender (n, %)				
Male	59 (34.1%)	138 (32.2%)	197 (32.7%)	0.647
Female	114 (65.9%)	291 (67.8%)	405 (67.3%)	
Chronic disease (n, %)				
Dementia	19 (11%)	37 (8.6%)	56 (9.3%)	0.367
Depression	41 (23.7%)	64 (14.9%)	105 (17.4%)	0.010*
Diabetes mellitus	61 (35.3%)	144 (33.6%)	205 (34.1%)	0.691
Parkinson disease	12 (6.9%)	10 (2.3%)	22 (3.7%)	0.006*
COPD	15 (8.7%)	24 (5.6%)	39 (6.5%)	0.165
Geriatric syndromes (n, %)				
Falls	76 (43.9%)	154 (35.9%)	230 (38.2%)	0.066
Frailty (FRAIL scale $\geq$ 3)	53 (30.6%)	67 (15.6%)	120 (19.9%)	<0.001*
Malnutrition (MNA-SF $\leq$ 7)	7 (4%)	10 (2.3%)	17 (2.8%)	0.250
Urinary incontinence	88 (50.9%)	156 (36.4%)	244 (40.5%)	0.001*
Sleep Disorders	78 (45.1%)	153 (35.7%)	331 (38.4%)	0.031*
Chronic Pain	110 (63.6%)	238 (55.5%)	348 (57.8%)	0.068
Polypharmacy (n, %)	136 (78.6%)	307 (71.6%)	443 (73.6%)	0.076
Number of chronic diseases^o	4 (0-10)	3 (0-10)	3 (0-10)	<0.001*
Quality of life (EQ-VAS) (0-100)^o	60 (10-100)	70 (10-100)	70 (10-100)	<0.001*

COPD: Chronic Obstructive Pulmonary Disease, EQ-VAS: Euro-Quality of Life Visual Analog Scale, MNA-SF: Mini Nutritional Test-Short Form. Data are given as mean $\pm$ standard deviation, median (interquartile range) or number (percentage) as applicable. ^oGiven data as median (interquartile range). *Significant p values

Table 3. — The study population data according to frailty groups

	Frail Group (n=120) 19.9%	Non-frail Group (n=482) 80.1%	Total (n=662) 100%	p value
Age ^o	76 (65-96)	72 (65-93)	73 (65-96)	<0.001*
Gender				
Male	25 (20.8%)	172 (35.7%)	197 (32.7%)	0.002*
Female	95 (79.2%)	310 (64.3%)	405 (67.3%)	
Chronic disease (n, %)				
Dementia	21 (17.5%)	35 (7.3%)	56 (9.3%)	0.001*
Depression	34 (28.3%)	71 (14.7%)	105 (17.4%)	<0.001*
Diabetes mellitus	52 (43.3%)	153 (31.7%)	205 (34.1%)	0.017*
Parkinson disease	5 (4.2%)	17 (3.5%)	22 (3.7%)	0.738
COPD	11 (9.2%)	28 (5.8%)	39 (6.5%)	0.181
Geriatric syndromes (n, %)				
Functional Constipation	53 (44.2%)	120 (24.9%)	173 (28.7%)	<0.001*
Falls	63 (52.5%)	167 (34.6%)	230 (38.2%)	<0.001*
Malnutrition (MNA-SF $\leq$ 7)	12 (10%)	5 (1%)	17 (2.8%)	<0.001*
Urinary incontinence	72 (60%)	172 (35.7%)	244 (40.5%)	<0.001*
Sleep Disorders	69 (57.5%)	162 (33.6%)	331 (38.4%)	<0.001*
Chronic Pain	95 (79.2%)	253 (52.5%)	348 (57.8%)	<0.001*
Polypharmacy (n, %)	109 (90.8%)	334 (69.3%)	443 (73.6%)	<0.001*
Number of chronic diseases^o	4 (1-10)	3 (0-9)	3 (0-10)	<0.001*
Quality of life (EQ-VAS) (0-100)^o	50 (10-100)	70 (10-100)	70 (10-100)	<0.001*

ROME IV criteria. The number of chronic diseases and EQ-VAS score were identified as factors associated with FC.

In a study of 384 diverse older adults aged 70 years or older, including those residing in the community, nursing homes and hospitals in Spain, Arco et al. reported an FC prevalence of 26.8% based on the ROME III criteria (10). While their reported FC prevalence rate is similar to that of the present study, it is essential to note that they

employed a different diagnostic approach and studied a distinct patient population. This finding could be attributed to ethnic differences as well as differences in the diagnostic methods.

In a prospective study of 899 community-dwelling adults aged 72–86 years in South Korea, a prevalence of FC of 19.6% was reported based on the ROME III criteria (6). Another study in Korea of 1,278 adults aged 65 years or older residing in the community that utilized

Table 4. — Logistic regression analysis for related factors related by functional constipation

	p	OR	95 %CI	
			Lower	Upper
Age	0.055	1.029	0.999	1.059
Depression	0.135	1.429	0.895	2.282
Parkinson disease	0.075	2.260	0.921	5.544
Frailty (FRAIL scale $\geq$ 3)	0.198	1.364	0.850	2.188
Sleep Disorders	0.551	1.124	0.765	1.652
Number of chronic diseases	0.001*	1.212	1.084	1.355
Quality of life (EQ-VAS)	0.012*	0.988	0.978	0.997

CI: Confidence Interval, COPD: Chronic Obstructive Pulmonary Disease, OR: Odds Ratio, *Significant p values

the ROME IV criteria reported a prevalence of FC of 10.7% (4). It is thus apparent that the prevalence of FC can vary even within the same ethnic population when employing the same diagnostic criteria, which may be attributed to variations in the lifestyles of the respondents. This finding also offers a potential explanation for the discrepancy between the prevalence rates of FC found in the present study and those reported in other studies.

In an online survey conducted in the United States, Canada and the United Kingdom, Palsson et al. reported a prevalence rate of FC of 7.5% among patients aged 65 years or older based on the ROME IV criteria (3). This lower rate than reported in literature may be attributed to the fact that the study was conducted via the internet, and internet usage is lower among older adults than younger people (3). Furthermore, older adults may have had only limited interest in contributing to this survey, as older individuals often perceive constipation to be a natural part of the aging process.

In Palsson et al.'s study, they found no significant relationship between FC and frailty, with the former being assessed using the FRAIL diagnostic criteria. In contrast, Arco et al. identified a relationship between FC and frailty, assessed using the Fried diagnostic criteria (10). This discrepancy may be explained by the utilization of different screening tools for the assessment of frailty among older adults. Furthermore, the patient population in Arco et al. included respondents residing in the community, in nursing homes and in hospitals, whereas the present study focused solely on patients presenting to outpatient clinics (10). The difference in the studied patient population may be another factor contributing to the discrepancies in the frailty findings. Lim et al. reported a relationship between FC and frailty assessed based on the frailty phenotype (4). The finding of a distinct relationship between FC and frailty in the present study might be attributed to the use of different variables in the multivariate analysis and the differences in the frailty screening tools.

The present study revealed a statistically significant relationship between FC and EQ-VAS score, concurring with other studies in literature reporting a significant

relationship between FC and overall quality of life (10,19-20). Functional constipation negatively impacts quality of life in older adults, independently of diagnostic criteria, ethnic variations and frailty.

Some studies in the literature have not assessed the relationship between FC and the number of chronic diseases (3,6,10). The limited number of studies investigating the potential relationship between FC and the number of chronic diseases reveal a significant association between the two, similar to the present study (4,18).

The strengths of the present study include its use of a comprehensive database of detailed information on older adults and the use of the ROME IV criteria for diagnoses of FC. Its limitations, on the other hand, include its retrospective design, including only patients applying from outpatients and the exclusion of patients using various medications aside from opioids that may be employed for the treatment of chronic conditions but are potentially associated with FC.

One of the chronic conditions potentially associated with FC is depression. FC may have been a side effect of tricyclic antidepressants currently used by patients diagnosed with depression (21). Therefore, this may differ from our results regarding functional constipation. On the other hand, various studies have shown constipation itself is associated with depression in all adults, regardless of age. However, in these studies, the diagnosis was either made by questioning constipation experienced by the patients (no objective criteria), or the diagnostic tools used in our study were not used to diagnose depression and constipation (22-25).

FC may also have affected the results by causing constipation due to autonomic dysfunction in patients with Parkinson's disease, which is another chronic disease. Studies in the literature show that constipation is common in Parkinson's disease using both objective and subjective measurement methods (26-28). However, in none of these studies, constipation has yet been evaluated with ROME IV criteria (26-28). In addition, a recent study evaluating constipation in Parkinson's patients using ROME III criteria found that irritable bowel syndrome is more common than constipation (29). Another study found that constipation was less common in Parkinson's patients using β -blockers (30). A relationship between Parkinson's disease and functional constipation may not be detected due to the frequent use of β -blockers in our study's patient group due to concomitant diseases such as hypertension or chronic ischemic heart disease and the exclusion of patients with irritable bowel syndrome by using ROME IV criteria. However, the limitation of our study remains that it does not include patients' information about hypertension and chronic ischemic heart disease. The high rate of urinary incontinence detected in our study seems to be related to FC being a cause of urinary incontinence. According to studies in the literature, constipation is one of the easily solvable causes of both transient and chronic urinary

incontinence in older adults (31). Additionally, studies conducted on both individuals over the age of 18 and older adults have found a relationship between persistent urinary incontinence and constipation (32-34). Although a relationship was found between urinary incontinence and functional constipation in the univariate analysis results of our study, another limitation of this study is that it could not be included in the multivariate analysis due to the high correlation between urinary incontinence and frailty. Unfortunately, in the literature, few studies investigated the relationship between EQ-VAS and FC. Therefore, further studies are needed to compare the results of this study in terms of the relationship between QoL and FC.

Conclusion

The present study reports an association between FC and the number of chronic diseases and overall life quality, while also providing comprehensive data regarding these diseases.

Conflict of Interest

The authors declare no conflict of interest.

Financial Disclosure

None

References

- EMMANUEL A., MATTACE-RASO F., NERI MC., PETERSEN KU., REY E., ROGERS J. Constipation in older people: A consensus statement. *Int J Clin Pract.* 2017;71(1).
- MEARIN F., LACY BE., CHANG L., CHEY WD., LEMBO AJ., SIMREN M., et al. Bowel Disorders. *Gastroenterology.* 2016;18:S0016-5085(16)00222-5.
- PALSSON OS., WHITEHEAD WE., VAN TILBURG MA., CHANG L., CHEY W., CROWELL MD., et al. Rome IV Diagnostic Questionnaires and Tables for Investigators and Clinicians. *Gastroenterology.* 2016; 13:S0016-5085(16)00180-3.
- LIM J., PARK H., LEE H., LEE E., LEE D., JUNG HW., et al. Higher frailty burden in older adults with chronic constipation. *BMC Gastroenterol.* 2021; 21(1):137.
- SERRANO FALCÓN B., BARCELÓ LÓPEZ M., MATEOS MUÑOZ B., ÁLVAREZ SÁNCHEZ A., REY E. Fecal impaction: a systematic review of its medical complications. *BMC Geriatr.* 2016;16:4.
- JEONG E., KIM JA., KIM BS., LEE CK., KIM M., WON CW. Functional Constipation and Anorexia in Community-Dwelling Older Adults: Korean Frailty and Aging Cohort Study (KFACS). *Int J Environ Res Public Health.* 2021;18(11):5754.
- LUCAS S., LUNSFORD TN., HARRIS LA. Evaluation and Treatment of Constipation in the Geriatric Population. *Clin Geriatr Med.* 2021;37(1):85-102.
- REY E., BARCELO M., JIMÉNEZ CEBRIÁN MJ., ALVAREZ-SANCHEZ A., DIAZ-RUBIO M., ROCHAAL. A nation-wide study of prevalence and risk factors for fecal impaction in nursing homes. *PLoS One.* 2014;9(8):e105281.
- KONRADSEN H., LUNDBERG V., FLORIN J., BOSTRÖM AM. Prevalence of constipation and use of laxatives, and association with risk factors among older patients during hospitalization: a cross sectional study. *BMC Gastroenterol.* 2022;22(1):110.
- ARCO S., SALDAÑA E., SERRA-PRAT M., PALOMERA E., RIBAS Y., FONT S., et al. Functional Constipation in Older Adults: Prevalence, Clinical Symptoms and Subtypes, Association with Frailty, and Impact on Quality of Life. *Gerontology.* 2022;68(4):397-406.
- DENT E., MORLEY JE., CRUZ-JENTOFT AJ., WOODHOUSE L., RODRÍGUEZ-MAÑAS L., FRIED LP., et al. Physical Frailty: ICFSR International Clinical Practice Guidelines for Identification and Management. *J Nutr Health Aging.* 2019;23(9):771-787.
- RUIZ JG., DENT E., MORLEY JE., MERCHANT RA., BEILBY J., BEARD J., et al. Screening for and Managing the Person with Frailty in Primary Care: ICFSR Consensus Guidelines. *J Nutr Health Aging.* 2020;24(9):920-927.
- VANDENBROUCKE JP., VON ELM E., ALTMAN DG., GÖTZSCHE PC., MULROW CD., POCOCK SJ., et al. STROBE Initiative. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): explanation and elaboration. *Int J Surg.* 2014;12(12):1500-24.
- ISAUTIER MJ., BOSNIĆ M., YEUNG SS., TRAPPENBURG MC., MESKERS CGM., WHITTAKER AC., et al. Validity of Nutritional Screening Tools for Community-Dwelling Older Adults: A Systematic Review and Meta-Analysis. *J Am Med Dir Assoc.* 2019;20(10):1351.e13-1351.e25.
- THOMPSON MQ., THEOU O., TUCKER GR., ADAMS RJ., VISVANATHAN R. FRAIL scale: Predictive validity and diagnostic test accuracy. *Australas J Ageing.* 2020;39(4):e529-e536.
- PAZAN F., WEHLING M. Polypharmacy in older adults: a narrative review of definitions, epidemiology and consequences. *Eur Geriatr Med.* 2021;12(3):443-452.
- CHENG LJ., TAN RL., LUO N. Measurement Properties of the EQ VAS Around the Globe: A Systematic Review and Meta-Regression Analysis. *Value Health.* 2021;24(8):1223-1233.
- WERTH BL., WILLIAMS KA., PONT LG. A longitudinal study of constipation and laxative use in a community-dwelling elderly population. *Arch Gerontol Geriatr.* 2015;60(3):418-24.
- NORTON C. Constipation in older patients: effects on quality of life. *Br J Nurs.* 2006;15(4):188-92.
- MARQUIS P., DE LA LOGE C., DUBOIS D., MCDERMOTT A., CHASSANY O. Development and validation of the Patient Assessment of Constipation Quality of Life questionnaire. *Scand J Gastroenterol.* 2005;40(5):540-51.
- DOLDER C., NELSON M., STUMPA A. Pharmacological and clinical profile of newer antidepressants: implications for the treatment of elderly patients. *Drugs Aging.* 2010;27(8):625-40.
- CHENG C., CHAN AO., HUI WM., LAM SK. Coping strategies, illness perception, anxiety and depression of patients with idiopathic constipation: a population-based study. *Aliment Pharmacol Ther.* 2003;18(3):319-26.
- WANG Y., SHEN X., WANG P. Constipation is associated with depression of any severity, but not with suicidal ideation: insights from a large cross-sectional study. *Int J Colorectal Dis.* 2023;38(1):231.
- LIANG J., ZHAO Y., XI Y., XIANG C., YONG C., HUO J., et al. Association between Depression, Anxiety Symptoms and Gut Microbiota in Chinese Elderly with Functional Constipation. *Nutrients.* 2022;14(23):5013.
- DORE MP., PES GM., BIBBÒ S., TEDDE P., BASSOTTI G. Constipation in the elderly from Northern Sardinia is positively associated with depression, malnutrition and female gender. *Scand J Gastroenterol.* 2018;53(7):797-802.
- KNUDSEN K., FEDOROVA TD., BEKKER AC., IVERSEN P., ØSTERGAARD K., KROGH K., et al. Objective Colonic Dysfunction is Far more Prevalent than Subjective Constipation in Parkinson's Disease: A Colon Transit and Volume Study. *J Parkinsons Dis.* 2017;7(2):359-367.
- YU QJ., YU SY., ZUO LJ., LIAN TH., HU Y., WANG RD., et al. Parkinson disease with constipation: clinical features and relevant factors. *Sci Rep.* 2018;8(1):567.
- DE PABLO-FERNÁNDEZ E., PASSANANTI V., ZÁRATE-LÓPEZ N., EMMANUEL A., WARNER T. Colonic transit, high-resolution anorectal manometry and MRI defecography study of constipation in Parkinson's disease. *Parkinsonism Relat Disord.* 2019;66:195-201.
- MISHIMA T., FUKAE J., FUJIOKA S., INOUE K., TSUBOI Y. The Prevalence of Constipation and Irritable Bowel Syndrome in Parkinson's Disease Patients According to Rome III Diagnostic Criteria. *J Parkinsons Dis.* 2017;7(2):353-357.
- PAGANO G., TAN EE., HAIDER JM., BAUTISTA A., TAGLIATI M. Constipation is reduced by beta-blockers and increased by dopaminergic medications in Parkinson's disease. *Parkinsonism Relat Disord.* 2015;21(2):120-5.
- KATARIA K., ILSLEY A. Urinary incontinence in older adults: what you need to know. *Br J Hosp Med (Lond).* 2021;82(4):1-8.
- MURUKESU RR., SINGH DKA., SHAHAR S. Urinary incontinence among urban and rural community dwelling older women: prevalence, risk factors and quality of life. *BMC Public Health.* 2019;19(Suppl 4):529.
- LINDE JM., NIJMAN RJM., TRZPIS M., BROENS PMA. Urinary incontinence in the Netherlands: Prevalence and associated risk factors in adults. *Neurourol Urodyn.* 2017;36(6):1519-1528.
- MANUELYAN Z., SIOMARA MUÑOZ K., STEIN E. Common Urinary and Bowel Disorders in the Geriatric Population. *Med Clin North Am.* 2020;104(5):827-842.