

Original Article

Identifying the Constipation Levels of Older People and their Interventions for Recovery

Cemile Kutmec Yilmaz, Ph D

Assist. Prof. Nursing Department, Faculty of Health Science, Aksaray University, Aksaray, Turkey

Guler Duru Asiret, Ph D

Assist. Prof. Nursing Department, Faculty of Health Science, Aksaray University, Aksaray, Turkey

Corresponding author: Assist. Prof. Cemile KuTMEC YILMAZ, Aksaray University, Nursing Department, Faculty of Health Science, 68100, Aksaray, Turkey E-mail: cemilekutmec@yahoo.com

Abstract

Aim: This study aimed at identifying the constipation levels of older people and their interventions for recovery.

Methodology: This descriptive study was conducted between the dates of 04.07.2016–15.01.2017 with 309 patients aged 65 and above, who applied to the internal (internal diseases, cardiology, chest diseases, neurology) clinics in a state hospital. The study data was collected by using an introductory information form, Bristol Stool Form Scale (BSFS) and Rome-III Diagnostic Criteria for Constipation. Data was analyzed by descriptive statistical methods and chi-square test.

Results: In this study, the average age was 72.72 ± 7.19 , and 57% of participants were female. Of the study participants, 64.7% reported having constipation problems and 18.1% reported having delayed colon excretion. 39.7% of older people drank plenty of water, 29.2% used laxatives, 24.9% tried to eat plenty of fruits and vegetables, 22.7% ate dried apricots when they had constipation. We found that older people, whose daily fluid intake was low, experienced constipation more frequently ($p < 0.008$). The study compared the participants' gastrointestinal system symptoms and constipation cases, and found that older people with constipation experienced problems such as indigestion ($p < 0.00$), bloating ($p < 0.00$), rectal pain ($p < 0.01$), swallowing difficulties ($p < 0.01$), lack of appetite ($p < 0.01$) more than those without constipation.

Conclusion: This study found that older people frequently had constipation, and they consumed plenty of fluids and used laxatives to treat it.

Keywords: Elderly, Constipation, Intervention, Recovery

Introduction

The growth of elderly population throughout the world leads to an increase in health problems emerging in the aging process. As a result of the structural and functional changes resulting from aging, older people face many complex health problems (Hakverdioglu Yont et al., 2011). Constipation is one of the health problems that are common in old age and that affect older people's physical, psychological and social well-being. The studies in literature reported that the prevalence of constipation among older people was between 16-50% and increased with age (Mugie, Benninga and Di, 2011; Munch et al., 2016; Bilgic et al., 2016). The study by Blekken et al. (2016) found that 23.4% of people with an average age of 84.7 had constipation. The study Lamas et al. (2016), which covered older people

receiving service from five different geriatric care units, found that the constipation prevalence was 67%. A study made in our country reported that 19.6% of people living in a nursing home suffered from constipation (Bilgic et al., 2016).

Constipation is a preventable and treatable health problem, which occurs due to various factors with aging, and when it is not treated, it makes a negative impact on health-related quality of life by affecting people's physical, mental and social well-being (Orhan et al., 2015; Layer et al., 2015). Mihaylov et al. (2008) reported that older people with constipation were grumpy, annoyed, worried, agitated and fed up. The study by Sun et al. (2011) found that chronic constipation patients had significantly lower levels of health-related quality of life and significantly higher levels of loss of work productivity and activity

impairment. In addition, older people with constipation might have physical symptoms such as abdominal pain, bloating, lack of appetite, rectal fullness and pain, nausea-vomiting, which might adversely affect people's daily life. Johanson and Kralstein (2007) reported that, for people with constipation, the most prevalent symptoms were straining, bloating, hard stool, abdominal distension, feeling of incomplete evacuation after a bowel movement, and 69% of those with constipation reported impaired performance at school or work. Another study found that 12% of people with constipation had absence from work or school in the preceding month, with a mean nonattendance period of 2.4 days (Belsey et al., 2011). Constipation, of which prevalence increases with aging, might cause productivity loss (Sun et al., 2011) and decreased quality of life (Belsey et al., 2011) in older people.

Therefore, it is recommended to prevent constipation and decrease or relieve its symptoms when it cannot be prevented. In managing constipation, it is important for health professionals to assess older people in terms of constipation risks, determine individual interventions particularly for constipation management, set up personalized and proper colon management programs and sustain colonic elimination with interventions for the detected problems.

Determining interventions for treating constipation in older people contributes to the formation of personalized and proper colon management programs. Therefore, this study aimed at identifying the constipation levels of older people and their interventions for treating constipation.

METHODS

Design and setting

This descriptive study was conducted between the dates of 04.07.2016–15.01.2017, with patients aged 65 and above, who applied to the internal clinics in a state hospital with the aim of identifying the constipation levels of older people and their interventions for recovery.

The study universe consisted of the older patients who applied to the internal clinics of the hospital between the dates of 04.07.2016–15.01.2017. We did not select a sampling for the study; we included the 309 volunteering patients who applied to hospital on the dates of study and who

had no mental incompetency or a problem obstructing communication.

Data collection

The study data was collected by using a patient information form, Bristol Stool Form Scale (BSFS) and Rome-III Diagnostic Criteria for Constipation. The researchers explained the study purpose to the patients, aged 65 and above, who applied to the hospital on the dates of study. The study data was collected by researchers through face-to-face interviews of approximately 15-20 minutes.

Patient information form: This form consisted of 31 questions including descriptive information for identifying participants' socio-demographic, medical, dietary, physical activity and defecation information.

Bristol Stool Form Scale (BSFS): This scale was developed by Lewis and Heaton (1997), and it provides information on the changing physical features of stool and intestinal transit time. While applying the scale, older people were asked a question "Which one of the following figures most resembles your stool?" and requested to select the most resembling one (Type 1: Separate hard lumps, like nuts as the stool stays for a long time in colon, Type 2: Sausage-like but lumpy, Type 3: Like a sausage but with cracks in the surface, Type 4: Like a sausage or snake, smooth and soft, Type 5: Soft blobs with clear-cut edges, Type 6: Fluffy pieces with ragged edges, a mushy stool, Type 7: Watery, no solid pieces) (Lewis and Heaton, 1997; Bengi, Yalcin and Akpınar, 2014).

Rome-III Diagnostic Criteria for Constipation: The Rome Foundation published the diagnostic criteria for functional constipation in order to set a standard for defining constipation. According to Rome-III criteria; functional constipation symptoms must originate 6 months prior to diagnosis and continue more than 3 days per month over the last 3 months, and also the patient must actively experience at least 2 of the objective and subjective symptoms in the last 3 months such as defecation frequency, manual maneuvering required to defecate, hard stool, sensation of incomplete defecation, sensation of anorectal obstruction (Drossman and Dumitrascu, 2006).

This form was developed as a guide to be used for evaluating patients' colon excretion, and older people who mark 2 items get chronic

constipation diagnosis. IBM SPSS for Windows Version 21.0 package program was used to analyze the study data. Percentage (%), number (n), mean and standard deviation were used in evaluation. Chi-square test was used to evaluate the participants' descriptive features and their gastrointestinal disorders.

Ethical Approvals

Approvals were taken from the Human Researches Ethics Council of Aksaray University for the study (2016/24) and also from the hospital where the study was conducted. In addition, informed consents were received from the older people participating in the study.

Results

In the study, the average age was 72.72 ± 7.19 , and 57% of participants were female. Of the participants, 86.4% were married, 49.2% were primary school graduates, and 56.3% were not working. 92.2% of older people had at least one chronic disease, and 93.5% were on regular medication. 22.4% of participants did exercises and 96.8% of those exercising walked (Table 1).

We found that participants with chronic diseases experienced more constipation problems compared to those without chronic diseases ($p < 0.05$). When older people's gender ($p > 0.05$), marital status ($p > 0.05$), work status ($p > 0.050.57$), exercising ($p > 0.05$) were compared to having constipation problems, there was no statistically significant difference.

Gastrointestinal (GI) problems of older people included bloating (29.4%), lack of appetite (27.5%), indigestion (21.7%), swallowing difficulties (20%), rectal pain (17.3%), nausea (16.2%), belching (6.5%) and flatulence (5.2%). When older people's GI symptoms were compared to having constipation problems; it was found that people who suffered from indigestion ($p = 0.000$), bloating ($p = 0.000$), rectal pain ($p = 0.001$), swallowing difficulties ($p = 0.003$), and lack of appetite ($p = 0.008$) experienced constipation more than those without those problems (Table 2).

The stool type of participants according to BSFS indicated that 21.8% were Type 1, 20.5% were Type 2, 22.5% were Type 3, 19.2% were Type 4, 8.5% were Type 5, 6.8% were Type 6, and 0.7%

was Type 7. According to ROME-III diagnostic criteria, 40.1% of older people had less than 3 defecations in a week. Moreover, 25.7% experienced constant straining during defecation, 17.6% constantly had hard stool, 10.7% constantly had the sensation of incomplete defecation, and 9.8% constantly had the sensation of anal obstruction while 2.9% used manual maneuvering to ease defecation (Table 3).

64.7% of older people reported having constipation while 18.1% reported delaying colon excretion. We found that when study participants had constipation, 39.7% drank plenty of water, 29.2% took laxatives, 24.9% tried to eat plenty of fruits and vegetables, 22.7% ate apricots, 8.5% walked, 6.9% drank olive oil, and 4.6% used manual maneuvering to ease defecation (Table 4).

In addition, we found that older people, whose daily water intake was little, experienced constipation more than those whose fluid intake was plenty ($p < 0.008$). While the Table does not indicate it, people's interventions for preventing constipation included consuming plenty of fluids (42.3%), green-leaved vegetables (24.9%), dried apricots (17.7%) and walking (9.9%).

Discussion

In our study, 64.7% of participants, whose average age was 72.72 ± 7.19 , had constipation. The literature reported that constipation prevalence increased with age (Lamas et al., 2016; Bilgic et al., 2016). The study by Hakverdioglu Yont et al. (2011) reported that 97.5% of participants living in nursing homes had the risk factors and descriptive features for constipation.

The literature indicated that constipation prevalence increased with advanced age, and that constipation prevalence values varied significantly. With aging, factors such as reduced rate of colon peristalsis, poly-pharmacy, chronic diseases and decreased physical activity might cause an increase in constipation. It is also known that constipation prevalence might differ based on cultural, genetic, dietary, environmental and socio-economic conditions (Mugie, Benninga and Di, 2011).

Table 1. Descriptive Characteristics of Individuals (N:309)

Descriptive Characteristics	n	%
Age (years)		
Mean Age (72.72 ± 7.19)		
65 - 75	205	66.3
76 and +	104	33.7
Gender		
Female	176	57.0
Male	133	43.0
Marital status		
Married	267	86.4
Single	42	13.6
Education Levels		
Not literate	151	48.9
Primary education	152	49.2
High school or higher	6	1.9
Work status		
Working	35	11.3
Non-working	174	56.3
Retired	100	32.4
Chronic Illness Status		
Yes	285	92.2
No	24	7.8
Regular Drug Use Status		
Yes	289	93.5
No	20	6.5
Exercise doing status		
Doing Exercise	68	22.4
Not Exercising	241	77.6

Table 2. Problems of living with gastrointestinal system according to constipation status of individuals (N=309)

	Constipation problem status				p
	Evet		Hayır		
	n	%	n	%	
Indigestion					
Yes	55	27.8	11	10.2	0.000
No	143	72.2	97	89.8	p<0.00
Bloating					
Yes	73	36.9	17	15.7	0.000
No	125	63.1	91	84.3	p<0.00
Excessive Flatulency					
Yes	14	7.1	2	1.9	0.034
No	184	92.9	106	98.1	p<0.05
Belching					
Var	13	6.6	7	6.5	0.977
Yok	185	93.4	101	93.5	
Nausea					
Yes	34	17.2	15	13.9	0.454
No	164	82.8	93	86.1	
Rectal Pain					
Yes	45	23.0	8	7.4	0.001
No	151	77.0	100	92.6	p<0.00
Swallowing Difficulties					
Yes	18	30.5	3	6.8	0.003
No	41	69.5	41	93.2	p<0.00
Lack of Appetite					
Yes	65	32.8	20	18.5	0.008
No	133	67.2	88	81.5	

Table 3. Complaints Regarding Defectification of Individuals According to Rome-III Constipation Diagnosis Criteria

Complaints	n	%
Straining During Defecation		
Never	37	12.1
Sometimes	191	62.2
Constant	78	25.7
Hard Stool Defecation		
Never	43	14.1
Sometimes	209	68.3
Constant	54	17.6
Sensation of Incomplete Defecation After Defecation		
Never	92	30.0
Sometimes	182	59.3
Constant	33	10.7
Sensation of Anorectal Obstruction		
Never	146	47.6
Sometimes	130	42.6
Constant	30	9.8
Used Manual Maneuvering to Ease Defecation		
Never	208	68.0
Sometimes	89	29.1
Constant	9	2.9
Defekasyon sayısı / Week		
<3 Defecation / Week	123	40.1
≥3 and + Defecation / Week	184	59.9

Table 4. Constipation Levels of Older People and their Interventions for Recovery

Constipation	n	%
Yes	198	64.7
No	111	35.3
Postponement of defecation status		
Yes	55	18.1
No	254	81.9
Statements related to solution of constipation*		
I drink plenty of water)	121	39.7
Drug use	89	29.2
I consume plenty of vegetables and fruits	76	24.9
I eat apricots	69	22.7
I use of herbal products	34	11.4
I drink olive oil.	21	6.9
Doing manual intervention	14	4.6
I'm walking.	16	8.5

* Response more than one.

The gender-based evaluation indicated that constipation was more common in women but there was no statistically significant difference between genders. The literature reported that constipation was more prevalent in women than men (McCrea et al., 2009; Papatheodoridis et al., 2010). The study by Papatheodoridis et al. (2010) found that women experienced constipation more than men. However, the studies by Bilgic et al. (2016) and Sun et al. (2011) reported that constipation prevalence did not vary according to gender. In addition, pelvic floor damage and innervation in women during delivery or gynecological surgery was considered as to why constipation prevalence was higher in women (Amselem et al., 2010). Kinnunen (1991) argued that, while there was a difference between genders in terms of constipation prevalence in

middle-aged people, there was no difference in advanced ages. This might be explained by the increased number of chronic diseases, decreased level of physical activity, increased number of drugs used and changes in dietary habits in parallel with aging (Lamas et al., 2016).

In this study, we found that older people with chronic diseases ($p=0.044$) and on regular medication ($p<0.001$) had constipation more. Another study found that older people with higher numbers of drugs for regular use had constipation more frequently (Lamas et al., 2016). Chronic cases are clinical conditions which require people to regularly use multi-drugs. Literature reported that systemic diseases such as diabetes (Prasad and Abraham, 2016), Alzheimer, stroke, hypothyroidism might cause

constipation and drugs for treating chronic diseases such as opioid, anticholinergic, non-steroid anti-inflammatory, diuretic, antihistaminic and fluid-electrolyte imbalances (Gallegos-Orozco et al., 2012) might cause constipation.

When we studied older people's stool types according to BSFS; 22.5% were Type 3, 21.8% were Type 1, 20.5% were Type 2, 19.2% were Type 4, 8.5% were Type 5, 6.8% were Type 6, and 0.7% were Type 7. The stool type of older people with constipation was Type 1-2 according to BSFS ($p < 0.001$). The literature defined constipation as having the stool Type 1-2 according to BSFS (Markland et al., 2013; Lim et al., 2016). Our study found that people with constipation suffered more from complaints such as indigestion ($p = 0.000$), bloating ($p = 0.000$), rectal pain ($p = 0.001$), swallowing difficulties ($p = 0.003$), and lack of appetite ($p = 0.008$). Studies in literature reported similar results (Hakverdioglu Yont et al., 2011; Lamas et al., 2016; Belsey et al., 2011; Markland et al., 2013). Lamas et al.⁵ found that older people with constipation had more complaints such as lack of appetite, decreased food intake in the last months, and refusal to eat. Uysal et al. (2010) found that constipation caused complaints such as abdominal bloating/tightness, sensation of fullness after meals, sour belching/burping, burning/pain in epigastric region. It is considered that patients have complaints such as bloating, abdominal pain, rectal fullness, and lack of appetite because of delayed colon excretion in constipation cases.

Today, ROME-III Diagnostic Criteria are widely used for diagnosing constipation. Considering those criteria, our study found that 40.1% of older people had less than 3 defecations in a week; and the participants who suffered from constipation had subjective complaints as they said that they sometimes experienced straining during defecation (62.2), had hard stool (68.3), sensation of incomplete defecation after defecation (59.3), sensation of anorectal obstruction (42.6), and used manual maneuvering to ease defecation (29.1) (Table 3). In response to the question "Do you have constipation?" 64.7% of older people reported having constipation. The studies in literature reported similar results (Lim et al., 2016; Uz et al., 2006). Lim et al. (2016) found that 74.4% of people had less than 3 defecations in a week, 90.7% experienced straining during defecation, 91.5%

had anal obstruction, and 73.7% needed manual maneuvering. In the study, having constipation was evaluated according to ROME-III diagnostic criteria and by asking open-ended questions. According to the results of both evaluations, it was considered that the difference between the constipation rates of older people was associated with the possibility that people might have answered in general rather than focusing on the last 3 months.

Laxatives are generally used for treating constipation in older people. However, laxatives' side effects and high costs require the use of non-pharmacological methods (Arslan and Eser, 2011). For managing constipation, non-pharmacological practices such as colon management, fiber-rich diet, sufficient fluid intake and regular exercising are preferred (Blekken et al., 2016; Bilgic et al., 2016). In our study, we found that people with constipation drank plenty of fluids, took laxatives, ate plenty of fruits, vegetables, dried apricots, drank olive oil, walked and used manual maneuvering to ease defecation (Table 4). Yang et al. (2016) found that constipation prevalence was lower in people whose diets mainly consisted of fruits and vegetables. Lifestyle changes such as increasing fiber and fluid intake in daily diet and exercising regularly were found effective in preventing constipation (Hakverdioglu Yont et al., 2011). The literature reported that fibers preserve the liquids in colons, increase stool volume and accelerate colon transit thereby preventing constipation, while fluid intake must also be sufficient (Prasad and Abraham, 2016; Yang et al., 2016). The literature also reported that insufficient fluid intake was among the potential risk factors of constipation (Blekken et al., 2016; Emmanuel et al., 2017). Studies examining the effect of fluid intake on constipation prevalence had different results. Engler et al. (2016) reported that a daily intake of fluids less than 800 ml posed a risk for constipation, and Markland et al. (2013) found that increasing dietary fluid intake was effective in constipation treatment. Bilgic et al. (2016) found that there was no significant relation between the amount of daily fluid intake and the severity of constipation. In our study, we found that the patients, whose daily fluid intake was less, had constipation more ($p < 0.008$). Sufficient hydration effects the colon transit time and is important for sustaining colon motility, so sufficient fluid intake is recommended for people

with constipation (Markland et al., 2013; Chua and Nieh, 2012).

It is considered that recommending non-pharmacological interventions such as increasing liquid intake (Markland et al., 2013), adding fibrous food to diet (Yang et al., 2016), colon management and increasing physical activity are important for treating constipation (Blekken et al., 2016; Bilgic et al., 2016) before resorting to pharmacological methods in older people.

In conclusion, we found that older people frequently had constipation, and drank plenty of fluids and used laxatives for recovery. Constipation prevalence increases with age and has an adverse effect on people's lives. Therefore, constipation in older people must certainly be evaluated, and proper colon management programs must be established. Moreover, we think that supporting non-pharmacological interventions such as increasing fluid intake, physical exercise and fiber consumption for managing and preventing constipation might be instrumental in decreasing laxative use and problems that might occur due to their use.

References

- Amselem C, Puigdollers A, Azpiroz F, Sala C, Videla S, Fernández-Fraga X, Whorwell P, Malagelada JR. (2010). Constipation: a potential cause of pelvic floor damage? *Neurogastroenterol Motil.* 22(2):150-3.
- Arslan G.G. & Eser I. (2011). An examination of the effect of castor oil packs on constipation in the elderly. *Complementary Therapies in Clinical Practice* 17(1):58-62.
- Belsey J, Greenfield S, Candy D, Geraint M. (2011). Systematic review: impact of constipation on quality of life in adults and children. *Alimentary Pharmacology & Therapeutics* 31(9):938-49.
- Bengi G, Yalcin M, Akpınar H. (2014). Kronik Konstipasyona Guncel Yaklasım. *Guncel Gastroentoroloji*, 18/1:72-88.
- Bilgic S, Dilek F, Avcı Arslan H.S, Unal A. (2016). Constitutional Situations and Affecting Factors of the Elderly Living in a Nursing Home. *International Journal of Basic and Clinical Medicine* 4(1):9-16
- Blekken L.E, Nakrem S, Vinsnes A.G, Norton C, Mørkved S, Salvesen O, Gjeilo K.H. (2016). Constipation and Laxative Use among Nursing Home Patients: Prevalence and Associations Derived from the Residents Assessment Instrument for Long-Term Care Facilities (interRAI LTCF). *Gastroenterol Res Practice* 2016:1215746.
- Chua H.C. & Nieh C.C. (2012). The Effect of Lifestyle Modification in Treatment of Constipation in Older Adult. medcraveonline.com/.../The-Effect-of-Lifestyle-Modificatio.
- Drossman D.A. & Dumitrascu D.L. (2006). Rome III: New Standard for Functional Gastrointestinal Disorders. *Journal of gastrointestinal and liver diseases* 15(3): 237-241.
- Emmanuel A, Mattace-Raso F, Neri M.C, Petersen K.U, Rey E, Rogers J. (2017). Constipation in older people: A consensus statement. *International Journal Clinical Practise* 71(1).
- Engler T.M, Aguiar M.H, Furtado Í.A, Ribeiro S.P, de Oliveira P, Mello P.A, Padula M.P, Beraldo P.S. (2016). Factors Associated With Intestinal Constipation in Chronic Patients With Stroke Sequelae Undergoing Rehabilitation. *Gastroenterology Nursing* 39(6):432-442.
- Gallegos-Orozco J.F, Foxx-Orenstein A.E, Sterler S.M, Stoa J.M. (2012). Chronic Constipation in the Elderly. *Am J Gastroenterol* 2012; 107:18–25;
- Hakverdioglu Yont G, Turk G, Khorshid L, Eser İ. (2011). Assessment of Constipation Diagnosis in Elderly Residents in Nursing Homes. *İ.U.F.N. Both. Journal*, 19(2):83-88.
- Johanson J.F. & Kralstein J. (2007). Chronic constipation: a survey of the patient perspective. *Alimentary Pharmacology & Therapeutics* 25(5):599-608.
- Kinnunen O. (1991). Study of constipation in a geriatric hospital, day hospital, old people's home and at home. *Aging (Milano)* 3(2):161-70.
- Lamas K, Karlsson S, Nolen A, Lovheim H, Sandman P.O. (2016). Prevalence of constipation among persons living in institutional geriatric-care settings - a cross-sectional study. *Journal of gastrointestinal and liver diseases* 2016.
- Layer P, Andresen V, Diemert S, Mackinnon J, Bertsch J, Fortea J, Tack J. (2015). Economic Burden and Quality of Life of Moderate-to-Severe Irritable Bowel Syndrome With Constipation (Ibs-C) In Germany: Results From The Ibis-C Study. *Value Health* 18(7):A624.
- Lewis S.J. & Heaton K.W. (1997). Stool Form Scale as a Useful Guide to Intestinal Transit Time. *Scandinavian Journal of Gastroenterology* 32(9): 920-4.
- Lim Y.J, Rosita J, Chieng J.Y, Hazizi A.S. (2016). The Prevalence and Symptoms Characteristic of Functional Constipation Using Rome III Diagnostic Criteria among Tertiary Education Students. *PLoS One* 11(12): e0167243.
- Markland A.D, Palsson O, Goode P.S, Burgio K.L, Busby-Whitehead J, Whitehead W.E. (2013). Association of low dietary intake of fiber and liquids with constipation: evidence from the National Health and Nutrition Examination Survey. *The American Journal of Gastroenterology* 108(5):796-803.

- McCrea G.L, Miaskowski C, Stotts N.A, Macera L, Paul S.M, Varma M.G. (2009). Gender differences in self-reported constipation characteristics, symptoms, and bowel and dietary habits among patients attending a specialty clinic for constipation. *Gender Medicine* 6(1):259-71.
- Mihaylov S, Stark C, McColl E, Steen N, Vanoli A, Rubin G, Curless R, Barton R, Bond J. (2008). Stepped treatment of older adults on laxatives. The STOOL trial. *Health Technology Assessment* 12(13):iii-iv, ix-139.
- Mugie S.M, Benninga MA, Di L.C. (2011). Epidemiology of constipation in children and adults: A systematic review. *Best Practice Research. Clinical Gastroenterology* 25:318.
- Munch L, Tvistholm N, Trosborg I, Konradsen H. (2016). Living with constipation--older people's experiences and strategies with constipation before and during hospitalization. *International Journal of Qualitative Studies on Health and Well-being* 26;11:307-32.
- Orhan C, Akbayrak T, Kaya S, Kav T, Kerem Gunel M. (2015). Investigation of the relationship between physical activity level and constipation severity. *Journal of Exercise Therapy and Rehabilitation* 2(2):66-73
- Papatheodoridis G.V, Vlachogiannakos J, Karaitianos I, Karamanolis D.G. (2010). A Greek survey of community prevalence and characteristics of constipation. *European Journal of Gastroenterology & Hepatology* 22(3):354-60.
- Prasad V.G. & Abraham P. (2016). Management of chronic constipation in patients with diabetes mellitus. *Indian Journal of Gastroenterology* doi:10.1007/s12664-016-0724-2.
- Sun S.X, Dibonaventura M, Purayidathil F.W, Wagner J.S, Dabbous O, Mody R. (2011). Impact of chronic constipation on health-related quality of life, work productivity, and healthcare resource use: an analysis of the National Health and Wellness Survey. *Digestive Diseases and Sciences* 56(9):2688-95.
- Uysal N, Khorshid L, Eser İ. (2010). Determination of Constipation Problem in Healthy Individuals. *TAF Preventive Medicine Bulletin* 9(2):127-132.
- Uz B, Turkay C, Bavbek N, Isık A, Erbayrak M, Uyar M.E. (2006). Assessment of our cases detected constipation. *Academic Gastroenterology Journal* 5(1):56-59
- Yang X.J, Zhang M, Zhu H.M, Tang Z, Zhao D.D, Li B.Y, Gabriel A. (2016). Epidemiological study: Correlation between diet habits and constipation among elderly in Beijing region. *World Journal of Gastroenterology* 22(39):8806-8811.