



## Nursing Assessment of Constipation's Risk Factors in Patients with Coronary Artery Disease

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### Abstract

**Background:** Some observational studies have investigated the relationship between long-term constipation and clinical outcomes, including mortality and CVDs, in recent years. Others have proposed a separate link between a higher risk of cardiovascular death and persistent constipation.

**Objective(s):** The study aimed to ascertain the association between clinical characteristics, age, fiber intake, and fluid intake with constipation incidence in patients with coronary artery disease.

**Methods:** At Nasiriyah Heart Center, a descriptive study design was used from the 2nd of January 2023 to the 19th of March 2024. A (purposive) nonprobability sampling was conducted to select (32) coronary artery disease patients who suffered from constipation, which was observed for three consecutive days. The researcher used the constipation severity scale and Bristol Stool Scale (BSS).

**Results:** The study findings show an average age of (60.18±10.57) years. (59.4%) reported a past medical history of hypertension. It was observed that most participants (37.5%) had no prior surgical procedures. Regarding fluid intake, most participants (62.5%) reported consuming less than 2500 ml of fluids daily. Likewise, when assessing fiber intake, a substantial percentage of individuals (65.6%) indicated consuming 2-3 servings of fiber-rich foods daily. (65.6%) exhibited a lack of physical activity and movement. Statin medication emerged as participants' primary type of medication (37.5%).

**Conclusion:** The study presented socio-demographic factors and clinical characteristics associated with old age and male gender, in addition to inadequate knowledge, lack of activity, and a healthy diet, which are related to increased symptoms of constipation among patients with coronary artery diseases.

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### Introduction

Constipation is diagnosed clinically when there are signs of either difficulty passing stool or inadequate evacuation of stool. Patients' symptoms usually include pain, distention, abdominal bloating, and rigid stools (Vriesman *et al.*, 2019) <sup>[1]</sup>.

Constipation affects over 30% of the general population at some point, with a higher frequency in women and older adults. It is one of the most frequent gastrointestinal illnesses in primary care settings (Heidelbaugh *et al.*, 2021; Du *et al.*, 2022) <sup>[2]</sup>.

Individuals with cardiovascular disease frequently have other chronic conditions that require various prescription drugs (Al-Ganmi *et al.*, 2018).

According to projections, there would be a 146% increase in CAD mortality for women and a 174% increase for males in Middle Eastern countries between 1990 and 2020 (Hamid M, 2016) <sup>[5]</sup>.

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The prevalence of constipation among patients hospitalized for cardiovascular disease is approximately (50%). Moreover, constipation causes straining with elimination, which may involve forced breathing like the Valsalva-style method. In other words, the heart rate briefly lowers, and the blood pressure rises. In addition, cardiac beats faster, and blood pressure decreases. Following that, there is a brief dip in blood pressure. Finally, the BP increases (Ishiyama *et al.*, 2019)<sup>[6]</sup>.

An abrupt rise in blood pressure and pulse rate raises the cardiac muscle's oxygen demand, exacerbating the condition of ACS patients with an imbalance between supply and demand for oxygen (Yurtdaş *et al.*, 2020)<sup>[7]</sup>.

Risk factors that are common to both constipation and cardiovascular illnesses include age, diabetes mellitus, depression, non-aspirin, non-steroidal anti-inflammatory drug use, lack of physical activity, and poor dietary fiber intake (Ishiyama *et al.*, 2019; Camilleri *et al.*, 2017)<sup>[6]</sup>.

Nonetheless, a significant percentage of cardiovascular illnesses defy the explanation provided by conventional cardiovascular risk factors. Constipation may increase the risk of cardiovascular diseases through several potential pathways. Constipation patients frequently experience disruptions in their gut flora, which have been linked to heart failure, atherosclerotic cardiovascular illnesses, elevated blood pressure, and stiffened arteries (Menni *et al.*, 2018)<sup>[9]</sup>. Constipation is a possibility for patients receiving treatment in critical care units (CCU) for acute diseases. Disorders of intestinal motility might be brought on by acute illnesses and the treatments received. For instance, in 50% of ventilator-dependent patients and 80% of patients with brain injuries, stomach emptying has decreased. Reduced intestinal motility is mostly caused by hemodynamic instability, scarring, electrolyte imbalances, abdominal surgery, and the use of analgesic or active vasoactive sedatives (Zukhri *et al.*, 2020)<sup>[26]</sup>.

### Research Methodology

At Nasiriyah Heart Center, a descriptive study design was used from the 2nd of January, 2023, to the 19th of March, 2024. A (purposive) nonprobability sampling was conducted to select (32) coronary artery disease patients who suffered from constipation, which was observed for three consecutive days.

After obtaining approval from the Council of Nursing College for the study, the researcher submitted a detailed description, including the study objectives, to the Ministry of Health in Iraq (Department of Planning, Health Research Section) on 8-5-2023 (reference number 1583). The researcher also submitted the description to the Ministry of Planning (Central Statistical Organization) to obtain official permission to conduct the study on 11-5-2023 (reference number 1-3-1-8-3683). Subsequently, permission was given to the Director of Dhi-Qar Health Office at Al-Nasiriya's Heart Center on 23-5-2023 (reference number 1798) to ensure their agreement and cooperation. The consent form facilitated access to the Al-Nasiriya's Heart Center facilities on 14-6-2023 (reference number 360) and obtaining written permission from the patients for their participation in the study.

Approval of the Ethical Considerations Committee at the College of Nursing, University of Baghdad, to conduct the research (Number 6 in 7 of May 2023).

Purposive sampling, which is non-probability, was used to ensure accurate and representative data collection. Sample size is determined based on power analysis method (Cohen's method). A total sample of 140 patients with coronary artery disease who suffer from constipation from Al-Nasiriya's Heart Center during the period of the study. However, due to various reasons, 40 Patients excluded for needs assessment; Ten patients excluded from pilot study; Nine patients who refused to participate; 17 patients who did not complete post-test; final number of participants are sixty-four individuals. These patients were sourced from the center's outpatient department through an appointment, consultation, or referral from a primary healthcare facility.

For the purpose of achieving the objectives of the study the questionnaire sheet has constructed based on previous studies (Ishimaru *et al.*, 2023; Li *et al.*, 2023; and Coss-Adame *et al.*, 2023)<sup>[10, 12]</sup> and experience of researcher.

The study instrument includes the following:

Part 1: The Socio- Demographic Characteristics for patients: This part is concerned with the collection of demographic data collected from the patients by interview such as age, gender, education level, marital status, occupation, environment, smoking habits.

Part 2: Clinical Characteristic for patients: This part is concerned with the collection of clinical characteristic collected from the patients by interview such as (past medical and surgical history, fluid intake, activity and movement, medication used).

Part 3: Measurement of Bowel Routine: This parts consisted of three domains to evaluate the patients' bowel routine included (The daily defecation record form, Bristol Stool Scale (BSS) and Constipation Severity Scale). The daily defecation record form it is one questions for each patient of the frequency of bowel movements over three consecutive days, with response options including "not once," "daily," "once," "twice," or "more than three times. Bristol Stool Scale (BSS) this tool, established in 1997 by Dr. Ken Heaton, MD, from the University of Bristol and it is categorizing fecal characteristics into groups 1-2, constipation; Groups 3-4, optimal passage; and Groups 5-7, potentially signifying diarrhea and urgency. Constipation Severity Scale: This It is a screening tool used by most of health care providers either professional nurse or caregivers to assess the severity and existence of constipation. It comprises eight features: frequent bowel movements, flatulence, and distension in the abdomen, variations in the amount of fuel expelled from the anus, fluid absorption from the surrounding stool, sensation of lightness and pressure in the pelvis, anal pain during bowel movements, low volume of feces, and inability to dispose of within the previous 24 hours.

The content validity of the study instrument was determined by the panel of (17) experts with mean of experience years for expert panel is (23.82) years. In order to find out the reliability of the instrument, a pilot study was carried out on 10 patients who had the same criteria of the original study sample. Reliability of the study instrument was determined through the use of test and re-test approach on (10) patients and interval period was two weeks. The reliability of the evaluate the Bristol Stool Scale (BSS) Form and Constipation Assessment Scale that concerned with performance test Bristol scale is the interclass correlations for interrater reliability of the BSS by individual stool type was (0.88) and that for intrarater reliability was (0.89).

## Result

**Table 1:** Distribution of participants by their Socio-Demographic Variables (SDVs)

SDVs	Classification	N	%
Age	25 to 35	1	3.1
	36 to 45	4	12.5
	46 to 55	6	18.8
	56 to 65	9	28.1
	66 to 75	12	37.5
	<i>Min. - Max.</i>	32-73	
	<i>Mean± SD</i>	58.81±12.24	
Gender	Female	15	46.9
	Male	17	53.1
Marital status	Single	2	6.3
	Married	18	56.3
	Separated	6	18.8
	Widowed	4	12.5
	Divorced	2	6.3
Level of education	Illiterate	7	21.9
	Read and write	3	9.4
	Primary school	5	15.6
	Intermediate school	6	18.8
	Secondary school	8	25.0
	University	3	9.4
Occupation	Self-employed	7	21.9
	Government employ	6	18.8
	Housewife	9	28.1
	Retired	10	31.3
Residents	Urban	20	62.5
	Rural	12	37.5
Smoking	Yes	20	62.5
	No	12	37.5
Alcohol use	Yes	2	6.3
	No	30	93.4

No.= Number; %= Percentage

In table (1), the results showed that the age of patients ranged from (32 to 73) years, with an average age of (58.81±12.24) years. Sex distribution revealed a predominant male (53.1%). Marital status indicated a majority of married individuals (56.3%). Regarding education level, most (25%) of patients are secondary school graduates. Regarding occupation, a notable percentage of participants (31.3%) were retired.

Residential characteristics showed that most participants were urban residents (87.5%). In terms of smoking habits, a substantial portion of participants (62.5%) reported smoking history. Lastly, the overwhelming majority of participants refrained from alcohol use, with (93.4%) reporting no alcohol consumption.

**Table 2:** Distribution of participants by their Clinical Characteristics.

Clinical data	Classification	N	%
Past Medical History	Non-medical history	2	6.3
	Hypertension	19	59.4
	Diabetes mellitus	7	21.9
	Arrhythmias	2	6.3
	HTN & DM	4	12.5
	Valvular heart diseases	1	3.1
	COPD	2	6.3
	Cancer	1	3.1
	Rheumatism	5	15.6
	Renal Disease	3	9.4
Past surgical history	Non-surgical history	12	37.5
	Bypass surgery	3	9.4
	Heart valve surgery	0	0.00
	Angioplasty	7	21.9
	Abdominal surgery	5	15.6
	Head surgery	1	3.1
Fluid intake	Peripheral surgery	6	18.8
	> 2500 ml/24 h	12	37.5

	< 2500 ml/ 24 h	20	62.5
Fiber intake	One daily	10	31.3
	2-3 Daily	21	65.6
	≥4 daily	1	3.1
	Inactive	21	65.6
Active and movement	Low	8	25.0
	Moderate	3	9.4
	None	2	6.3
Medication Use	Calcium channel blockers	4	12.5
	Amiodarone	2	6.3
	Statins	12	37.5
	Beta-blockers	9	28.1
	Antiplatelet	8	25.0
	Anticoagulant	2	6.3
	Antacids	6	18.8
	Iron supplements	2	6.3
	Non opioid analgesics	8	25.0

No.= Number; %= Percentage

The findings offer a comprehensive overview of the clinical characteristics of patients within the context of coronary artery diseases. Notably, a significant proportion of individuals (59.4%) reported a past medical history of hypertension. It was observed that most participants (37.5%) had no prior surgical procedures. (62.5%) reported

consuming less than 2500 ml of fluids daily. A substantial percentage of individuals (65.6%) indicated consuming 2-3 servings of fiber-rich foods daily. Interestingly, (65.6%) exhibited a lack of physical activity and movement. Regarding medication, statin medication emerged as the primary type used by participants (37.5%).

**Table 3:** Severity of Constipation among participants

Items	Class	N	%	M.s	Ass
1. Abdominal distension or bloating	Very intense	10	31.3	2.19	Sever
	Intense	8	25.0		
	Average	12	37.5		
	Mild	2	6.3		
2. Change in amount of gas passed rectally	Very intense	19	59.4	1.63	Sever
	Intense	7	21.9		
	Average	5	15.6		
	Mild	1	3.1		
3. Less frequent bowel movement	Very intense	19	59.4	1.66	Sever
	Intense	5	15.6		
	Average	8	25.0		
	Mild	0	0.0		
4. Oozing liquid stool	Very intense	10	31.3	2.66	Moderate
	Intense	6	18.8		
	Average	1	3.1		
	Mild	15	46.9		
5. Rectal fullness or pressure	Very intense	16	50.0	1.66	Sever
	Intense	11	34.4		
	Average	5	15.6		
	Mild	0	0.0		
6. Rectal pain with bowel movement	Very intense	13	40.6	1.94	Sever
	Intense	8	25.0		
	Average	11	34.4		
	Mild	0	0.0		
7. Small stool size	Very intense	26	81.3	1.19	Sever
	Intense	6	18.8		
	Average	0	0.0		
	Mild	0	0.0		
8. Urge but unable to pass stool	Very intense	17	53.1	1.53	Sever
	Intense	13	40.6		
	Average	2	6.3		
	Mild	0	0.0		

Each items evaluated as Sever =1-2, Moderate =2.1-3, Mild=3.1-4

The results in Table (3) participants reported experiencing severe levels of constipation across all the items examined, with a mean range of 1 to 2.33. The only exception to this

trend was the symptom of oozing liquid stool, for which patients reported a moderate severity level, with a mean range of 2.34 to 3.66.

**Table 4:** Distribution of participants by their Stool Characteristics

Stool data	Classification	N	%
Frequent defecation for three consecutive days	Daily	7	21.9
	Not once	1	3.1
	Once	15	46.9
	Twice	9	28.1
Bristol Stool Chart	Group 1	10	31.3
	Group 2	16	50.0
	Group 3	4	12.5
	Type 4	2	6.3

No.= Number; %= Percentage

The findings regarding bowel movements among patients with coronary artery disease are (46.9%) of patients reported having a single bowel movement for three consecutive days. Taking a closer look at the Bristol Stool Chart, it was observed that (50%) of patients initially presented with type 2 stool consistency.

### Discussion

Analysis of the findings' data reveals that most precipitants had an average age of 58.81 (Table 1). Our finding agrees with Sumida, Yamagata, and Kövesdy (2020) that at baseline, the age was 59.8±13.9 years, mean±SD.

The study reports a predominant male presence with (53.1%). These findings agree with another study in the exact center, which found that Male respondents made up the majority (64%) of those who underwent percutaneous coronary intervention (Lafta and Mohammed, 2023)<sup>[14]</sup>. Additionally, these results are consistent with those from AL-Najaf AL-Ashraf City, where men made up the majority of participants in the education program with hypertension (Yassin, M., & Hassan, 2020)<sup>[15]</sup>. The majority of participants were married, with (56.3%). I agree with (Athbi H, Hassan, 2019)<sup>[16, 21]</sup> who presented that the majority (75.43%) of their precipitants were married.

According to the results, most participants (25%) had completed secondary school. I agree with Al-Al-Fatlawi and Mohammad (2022)<sup>[17]</sup>, who present that (44.4%) of seniors with constipation were in secondary school.

The study found that a notable majority of participants (28.1) were not work homemakers. These results were similar to the study reported that (56%) of patients were self-employed (Abbas, Hassan, 2023)<sup>[18]</sup>. On the other hand, the results of one study included coronary artery disease patients. Cardiac Centers in Baghdad City present that for the intervention and control groups, a significant portion of both groups—30.0% and 26.7%, respectively—were employed by the government (Mousa and Mansour, 2020)<sup>[19]</sup>. The majority of participants (62.5%) were urban residents. This disagrees with another study at Baghdad Cardiac Centres that presents (69 %) of CAD in rural areas (Mousa, 2014)<sup>[20]</sup>. The study shows that a substantial portion of participants reported a smoking history (62.5%). These results are similar to the findings by Hassan, H. S. (2019)<sup>[21]</sup>, who revealed that the majority (41.66%) of the smokers group are within the age group (50-59) of patients with coronary artery disease.

The majority of participants refrained from alcohol use, with (93.4%) reporting no alcohol consumption. This result agrees with Lee *et al.* (2014), who reported in their constipation study that (76.1%) did not drink alcohol.

Otherwise, the results (Table 2) show that a significant proportion of individuals with Hypertension were mentioned as having a prior medical history (59.4%). This outcome is in line with a study that found that individuals with hypertension comprised 62% of the study group and 72% of the control group, respectively, and that both groups had hypertension (Isam & Hassan, 2023)<sup>[23]</sup>. Other studies conducted on cardiovascular disease patients that present (81%) of precipitants have chronic diseases (Mukhlif, Qassim, 2023)<sup>[24]</sup>.

The majority of participants (37.5%) had no prior surgical procedures. Elsaman and Ahmed (2017)<sup>[25]</sup> supported this result, reporting that most (40%) of their studied patients had no past surgical comorbidities.

Most participants (62.5%) reported consuming less than 2500 ml of fluids daily. This is supported by the Zuhri *et al.* (2020)<sup>[26]</sup> study, which found a 21.33% independent risk of constipation in patients with acute coronary syndrome (ACS) is associated with poor fluid intake (less than 2500 ml/24 hrs). A substantial percentage of individuals (65.6%) indicated consuming 2-3 servings of fiber-rich foods daily. This is supported by Ali *et al.* (2021)<sup>[27]</sup>, who mentioned that fiber consumption was assessed as a possible risk factor for constipation, and (75.2%) of participants consumed two or fewer pieces of fiber daily. There are (65.6%) exhibited a lack of physical activity and movement. This is supported by Shiba *et al.* (2022)<sup>[28]</sup>, who presented that (70.8%) of all the participants did not exercise.

Statin medication was the primary type of medication used by participants (37.5%). This result is similar to that of a study by Skal and Ahmed (29), who found that the majority (49.0%) of participants with constipation were using an antihypertensive drug.

Results of (table 3) show that a substantial majority of patients (81.3%) suffered from severe constipation. The average constipation severity score for the patients before the program was (14.46 ± 2.55). These scores indicate that, on average, the patients were experiencing a high level of constipation symptoms.

Most (46.9%) coronary artery disease patients reported having a single bowel movement for three consecutive days (Table 4). The study also considered the Bristol Stool Chart, which categorizes stool types based on consistency. Half of the patients (50.0%) had type 2 stool shape associated with constipation or less-than-optimal bowel health.

### Limitation and Recommendation

The primary research limitation, although employing a quasi-experimental study method, was the small sample size (N =

64). The attendees' health conditions also contributed to the meeting's brief duration.

To assess the long-term development of constipation in patients with coronary artery disease, longitudinal follow-up of the same study group is still necessary. Implementing it is imperative that nurses and other healthcare professionals receive regular health education about how to treat and prevent constipation in the elderly

### Conclusion

Based on the study's results, a considerable improvement in stool consistency was observed in the study sample of patients with coronary artery disease. However, there was no difference in the frequency of defecation during the trial. The study presented socio-demographic factors and clinical characteristics associated with old age and male gender, in addition to inadequate education, lack of activity, and a healthy diet, which are related to increased symptoms of constipation among patients with coronary artery diseases.

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### Conflict of Interest

The research was carried out without any financial or commercial ties that might be seen as having a conflict of interest, the authors disclose.

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