

Efficacy of Murdoch Bowel Protocol on Constipation among Patients with Hip and Pelvic Surgery

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Abstract

background Constipation is a troubling condition that can happen to anyone, but it has much concern in patients with limited physical mobility as patient with orthopedic disorder. **Aim of the study was To** evaluate the efficacy of Murdoch bowel protocol on constipation among patients with hip and pelvic surgery **Study design:** was Quasi- experimental. **Setting:** The study conducted in Tanta International Teaching Hospital. **Subjects:** The sample included 80 patients who were adults (21- 60 years), conscious and newly admitted to orthopedic department. **Tools:** Three tools were enrolled in the study for data collection: **Tool (I)** patients' sociodemographic sheet and health relevant data ", **Tool II:** Bristol Stool Form Scale. **Tool III:** Constipation Assessment Scale. **Results:** shows that the majority of patients 86.4% in study group and three quarters 75% of control group patients had constipation at the beginning of the study but at the end of study period after application of Murdoch bowel protocol only 11.1 %of study group had constipation compared to less than three quarters of control group patient. **Conclusion:** The Murdoch bowel protocol had great effect in prevention and management of constipation for patients with hip or pelvic surgery with a highly statistically significant difference between study and control group through period of the study as P value =0.000*. **Recommendation:** implementation of Murdoch bowel protocol for all orthopedic patients in orthopedic department for assessment and management of constipation.

Key words: constipation , hip or pelvic surgery, Murdoch

Introduction

The Pelvic fractures is widely considered to be one of the most complex and fatal lesions, accounting for 2–8% of all skeletal injuries with mortality rate of 5to16%⁽¹⁾ Patients hospitalized in orthopedic units for management of hip or pelvic fracture are at risk of constipation due to different factors as enforced immobility, receiving of contributory medical treatment as opioids , reduced dietary and fluid intake, use of bad pans in the period following surgery and long- term hospitalization, which can lead to other complications, including fatal bowel obstruction⁽²⁾ Constipation is defined as difficult, incomplete, or irregular bowel movements or have defecation less

than three bowel a week. It is associated with bowel symptoms such as hard or infrequent stool passage with feeling of incomplete evacuation and difficulty in passing stool.⁽³⁾

The prevalence of constipation in the general population worldwide ranges from 0.7 to 79% with median 16%⁽⁴⁾ Its incidence in post-operative orthopedic patients is about 40% – 60%⁽⁵⁾. Patients with constipation may have complications such as fecal impaction, and hemorrhoids, and others syndromes such as mental confusion, urine retention, intestinal obstruction and even vasovagal syncope⁽⁶⁾.

Nurses are first-line professionals in implementing non pharmacological interventions that improve constipation amongst adults in long-term care settings. Therefore, a multi-disciplinary team developed the Murdoch Bowel Protocol which is a bowel management tool depend on general best practice guidelines for constipation and including the Bristol Stool Chart which is a standardized instrument used to record stool type and classify it into seven types. Murdoch Bowel protocol is applied according to day of admission and type of stool in for the patient ⁽⁷⁾

Significance of the study

Early exploration of constipation and its risk factors among hospitalized orthopedic patients has gained the attention of researchers worldwide⁽⁸⁾. so the aim of this study was to evaluate the efficacy of Murdoch bowel protocol on constipation among patient with hip and pelvic surgery.

The aim of the study

To evaluate the efficacy of Murdoch bowel protocol on constipation among patients with hip and pelvic surgery

Research Hypothesis

Patients who receive Murdoch bowel protocol post hip and pelvis surgery will exhibit improvement of bowel function with minimal complication related to constipation.

Subjects and Method

Study design

A quasi- experimental design was utilized in this study.

Setting: The study was conducted at orthopedic department at Tanta University Teaching Hospital. The department has two parts for male and female; male ward have 6 rooms 3 of them have 6 beds in each. and other 3 rooms have 3 beds in each and have 3 single rooms .The female part have 3wards each of them have 3 beds and

one single room .Total number of bed is(40).

Subjects

The sample of this study consisted of: A convenient sample of 80 adult patients of both sexes admitted to the above mentioned setting and diagnosed with hip or pelvic surgery were included in this study.

The study subjects were divided into two equal groups

Group (1): Study group: - 40 patients who managed by Murdoch bowel protocol of care by the researcher.

Group (2): Control group: - 40 patients who managed according to routine bowel management in hospital by nursing staff by giving laxative in case of patients complain.

Inclusion criteria :patients were Adult (21-60 years),patients were Conscious , Newly admitted to orthopedic department and on enteral feeding .

Exclusion criteria :Patients on parenteral nutrition, patient with bowel disorder such as(inflammatory bowel disease or peptic ulcer), Patients who had chronic constipation (doesn't respond to dietary fiber or simple therapeutic meals)

Tools of data collection

Three tools were used in this study to collect pertinent data related to the study purpose as follow :

Tools of the study:

Tool (1) Patients' sociodemographic sheet and health relevant data:

This tool was constructed by the researcher and developed in Arabic language after reviewing relevant recent literatures to collect baseline data pertinent to the current study. It was consist of two parts as follow:

Part I- Sociodemographic Data This part concerned with patients' age, gender, marital status, educational level, occupation and residence.

Part II- Health relevant data: This part concerned with

1. patients' past medical history as heart diseases, diabetes, neurological disorder , liver diseases or other.
2. present medical history which include :*medical diagnosis*: **hip surgery**(hip fixation ,hip arthroplasty), **pelvic surgery** (pelvic fixation, pelvic bone debridement)and **hip and pelvic surgery**.
3. Date of operation , date of discharge ,duration of hospital stay
4. patient normal bowel habit which divided into (every day ,day after day or every two day)
5. current medication as(opioid analgesic ,hormonal replacement therapy, muscle relaxant).
6. graduation of dietary intake post operatively from full liquid ,soft then regular diet .
7. quality of diet (low fiber or high fiber diet)
8. level of mobility: The researcher depended on bedside mobility assessment tool to classify patient level of mobility. It is validated tool which developed by (Boynton ,2003) and was used to determine patients' current mobility status and standardize safe patient handling and mobility equipment use. It was divide level of mobility as level one(site and shake) level two(stretch and point) level three (stand) level four (walk, march in place and advance step).it include **tasks** preformed by patient with or without researcher assistance after explanation of this tasks ,then patient give score as **pass** the level to transfer to following level .or **fail** and stay in this level. ^(9,10)

Tool II: Bristol Stool Form Scale (BSFS): This tool was developed by (Heaton and Lewis) at the University of Bristol and was first published in the Scandinavian Journal

of Gastroenterology (**Heaton & Lewis, 1997**)⁽¹¹⁾and it is adopted by (**Abd-Elraheem,2020**) ⁽¹²⁾and has been used by the researcher. It is diagnostic tool used to classify human stool into seven types to assess daily bowel habit and presence of constipation or diarrhea as:

Type1 separate hard lumps, like metal, hard to pass **Type 2** sausage shaped but lumpy

Type 3 like sausage but with cracks on its surface **Type 4** like sausage or snake, smooth and soft **Type 5** soft blobs with clear cut edges passed easily **Type 6** fluffy pieces with ragged edges, a mushy stool, **Type 7** watery, no solid pieces.

The scoring system of this scale was as the following:

Type 1 and 2 indicate constipation, Type 3 and 4 are the ideal stools and Type 5, 6 and 7 indicate diarrhea.

Tool III: Constipation Assessment Scale

This tool has been used to assess severity of constipation. It was developed by **Millan and Williams (1989)**⁽¹³⁾ and is adopted by (**Abd-Elraheem,in 2020**)⁽¹²⁾ and it has been used by the researcher .This tool included eight items that focus on the symptoms of constipation that are the most universal, these items are

- Abdominal distension or bloating,
- Change in amount of gases passed rectally
- Less frequent bowel movement
- Oozing liquid stool
- Rectal fullness or pressure
- Rectal pain with bowel movement
- Smaller stool size,
- Urge but inability to pass stool.

The scoring system of this tool was as the following: Each symptoms had assessment score **0 no problem 1 some problem 2 sever problem** .then add the score to calculate total score.

The total score range between 0 and 16. score from 2 to 6 indicates mild constipation, score from 7 to 10 indicates moderate constipation, while the score from 11 or more indicates severe constipation.

Method

1. An official permission to carry out the study was obtained from the responsible authorities of faculty of nursing and the head of the Tanta orthopedic department.

2. Ethical consideration:

- An approval of the ethical committee of the faculty of nursing about the study was obtained
- Consent was obtained from every patient included in the study after explanation of the aim of the study and assuring them of confidentiality of collected data.
- Confidentiality and anonymity were maintained by the use of code number instead of name and the right of withdrawal was reserved.
- Privacy of the studied patients was maintained.
- Nature of the study was not causing any harm or pain to the entire sample.
- any unexpected risks appeared during the course of the research was cleared to participants and the ethical committee on time

3-Tool (I) was developed by the researcher after reviewed the relevant literatures⁽¹⁻⁸⁾.

Tool II , III.: Bristol Stool Form Scale (BSFS) and Constipation Assessment Scale (CAS):was adapted by researcher and they are translated into Arabic

4- All tools were tested for content validity and reliability by five jury of experts in the field of medical-surgical nursing at the faculty of nursing, orthopedic field professor at the faculty of medicine

5- the Pilot study was conducted before the actual study on 8 patients undergoing hip and pelvic surgery after taking their written approval in order to test the clarity,

feasibility , relevance of the tool used, and applicability of the different items of the determinant tools. And those patients were excluded from the study sample due to modification occur in tool 1 by adding assessment of patients daily bowel habit .

6-The suitable statistical test was used for testing tools reliability.

7- Data were collected over a period of 6 months started from Jun to December 2022

Field of work

The study was conducted at four phases which include: assessment, planning, implementation and evaluation.

1) Assessment phase:

- in second day post hip or pelvic surgery that patient who meet inclusion criteria was interviewed by researcher and all purpose, nature and follow up schedule was explained to patients and after obtaining informed consent, initial assessment was carried out by the researcher for all the study subjects in both the control and study groups to collect baseline data pertinent to the current study by using tool I, II and III throughout the period of the study

Planning phase:

- Based on data of assessment phase and literature review. The researcher planned to use Murdoch bowel protocol for patient from second day post hip or pelvic surgery . Priorities and outcomes were formulated

General objective

The patient improve bowel function with minimal complication related to constipation

Specific objective

1. The patient demonstrate no sign of constipation
2. The patient report proper bowel care in case of constipation
3. The patient list minimal complication of constipation

3- Implementation phase

The Murdoch bowel protocol was implemented from second day until ten day post-operative as the following:

On Days 2 and 3

Type 1 or 2 of stool (constipation) : the following guidelines were discussed and demonstrated by the researcher for patients then the Arabic colorful booklet was given for patient and it was include the following

- full liquid or High fiber diet according to patient graduation of diet (soft or regular), the different types and sources of high fiber diet were discussed and listed into illustrative picture in the booklet .

- the patient was educated about fluid importance and increasing fluids intake for 2to 3liter per day

- mobilization was Encouraged according to patient mobility level ,range of motion exercise and strength exercise were demonstrated by the researcher then performed by the patient and was listed into illustrative picture in the given booklet as the following:

- **The exercise** protocol for hip or pelvic surgery consisted of 10 basic isometric and AROM exercises commonly performed during the acute phase of recovery from THA. These exercises consisted of ankle pumps, thigh squeezes (quadriceps sets), buttock squeezes (gluteal sets), leg roll out and in, heel slides (hip and knee flexion), leg slides (abduction/adduction), lying kicks (short arc quadriceps), straight leg raises, and sitting kicks (long arc quadriceps) which were implemented individually.⁽¹⁴⁾

- Each session took about 30 to 35 minutes, where each exercise was performed from 5-10 sets at morning time till performance was found satisfactory under supervision of researchers and then instructed to repeat the exercises at afternoon and evening times (3 repetitions

per day) independently during their hospital stay. Then, patients were recommended to continue practicing these exercises at home in the following days, using colorful booklet as a guide.

- Commence laxative as doctor order (lactulose 15cm or food spoon three times a day) and reducing specific medications (e.g. Opioids)

- Type, 3 or 4 (normal stool):** high fiber Diet, increased fluids intake & exercise as above, Continued laxative.

- Type 5, 6 or 7** (loose stool or diarrhea) Diet, fluids & exercise as above and stopped laxative **If the patient on Days 4 and 5**

- Type 1 or 2 (constipation). • High fiber diet, increased fluids & exercise as per Day 2, Commence laxative as doctor order and *Administer enema with laxative*

- Type, 3 or 4 (normal stool) : Diet, fluids & exercise as above and Continue laxative.

- Type, 5, 6 or 7 (loose stool or diarrhea): Diet, fluids & exercise as above and *stop laxative*

- **If the patient on Days 6 and 7**

- Type 1 or 2 (constipation). High fiber diet, increased fluids intake & exercise as per Day 2 encourage mobilization if possible , Commence laxative as doctor order *and referral to internal medicine or dietician*

- Type, 3 or 4 (normal stool) : Diet, fluids & exercise as above and Continue laxative

- Type, 5, 6 or 7 (loose stool or diarrhea) : Diet, fluids & exercise as above and stop laxative

- **If the patient on Days (8, 9 and 10)**

- Type 1 or 2 stool (constipation):. High fiber diet, increased fluids intake & exercise as per Day 2 encourage mobilization if possible , Commence laxative as doctor order , *provide care*

according to advice of internal medicine or dietician.

- Type, 3 or 4 (normal stool): Diet, fluids & exercise as above .Continue laxative

- Type, 5, 6 or 7 (loose stool or diarrhea) : Diet, fluids & exercise as above and *stop laxative with referral to dietician*

4- Evaluation phase

- The patients in both group were evaluated by tool(I) part 1 and 2 in the second day only and for four time during implementation of Murdoch bowel protocol using tool(I) part 2 (quality ,graduation of diet and level of mobility) and tool (II, III) on the second ,forth ,sixth and tenth day post operative to determine if patient passed stool or not and type of passed stool according to his normal bowel habit and level of constipation severity for constipated patients during period of hospitalization and telehealth including phone calling and watsapp media were used to continue follow up for patients after discharge from hospital during period of study .

Statistical analysis

Data were analyzed using Statistical Program for Social Science (SPSS) version 22.0 Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage. Independent-samples t-test of significance was used when comparing between two means. A one-way analysis of variance (ANOVA) when comparing between more than two means. Chi-square (X²) test of significance was used in order to compare proportions between two qualitative parameters.. The level of significant was adopted at $p < 0.05$

Results

Table (1): presents sociodemographic characteristics of studied groups undergoing hip and pelvic surgery. It reveals that more than one third (37.5%) of

the control group and about one third (30%) of the study group, were in age group of 50-60 years with Mean±SD (**39.65±14.036, 42.58±11.05**) respectively. **Regarding gender** more than three quarters of the study group and about three quarters of the control group (77.5%,75%) respectively were males.

. **Table (2):** show distribution of the studied patients regarding their health relevant data.

In relation to medical diagnosis more than half of study and half of control group(52.5%,50%) respictivly under going hip surgery and more than two third of study group and about two third of control group (66.7,%60%)who were under going hip surgery were had hip replacement.

According to current medication the majority (92.5%,90%)of patient in study and control group respectively were have opioid analgesic

Table (3): show Distribution of the studied patients according graduation of dietary intake, quality of diet and their level of mobility among the studied groups throughout periods of study: It shows - highly statistical significant differences between both groups regarding level of mobility ,graduation of diatery intake and quality of diet with $p = 0.000^*$

Table (4): show Distribution of the studied patients regarding their level of Bristol stool form (BSFS) among the studied groups throughout periods of study it show that in the **second day** three quarter (75%) of patient in control group and the majority (86%) of study group who passed stool were *constipated*.. While in the **10th day** less than three quarter (72.4%) of patients in control group were **constipated, compared** with the minority (11.1%) of patients in study group were constipated

Table (5): show **Distribution of the studied patients regarding constipation severity level among the studied groups**

throughout periods of study. It present that there were highly statistically significant difference between the two group $p= 0.000^*$.And statistically significant difference between patients in the study group regarding their level of constipation throughout period of the study . $p=0.005^*$

Table (6) show Effect of sosio-demographic characteristics and health relevant data of the studied patients on their Bristol stool form (BSFS) among the studied groups in the 2edand10th day. Regarding age there was statistically significant effect of age in studied patients regarding their Bristol stool scale . $p=0.001^*$

Concerning to gender there is statistically significant effect of gender in studied patients regarding their Bristol stool scale as more than half of constipated patient were female $p=0.017^*$

Table (7) show Effect of health relevant data of the studied patients on their Bristol stool form (BSFS) among the studied groups in the 2edand10th day

concerning quality of diet there was statically significant effect of patients quality of diet on Bristol stool scale In study group as about three quarteres of

constipated patients were have low fiber diet

As regard level of mobility there was statically significant effect of patient level of mobility on Bristol stool scale In study group as more than two third of constipated patient (75%) at level one $p= 0.001^*$

Table (1): Distribution of the studied patients undergoing hip and pelvic surgery regarding their sociodemographic data (n=80).

Characteristics	The studied patients (n=80)				χ^2 P
	Control group (n=40)		Study group (n=40)		
	N	%	N	%	
Age (in years)					
▪ (21-<30)	13	32.5	6	15.0	7.094 0.069
▪ (30-<40)	8	20.0	11	27.5	
▪ (40-<50)	4	10.0	11	27.5	
▪ (50-60)	15	37.5	12	30.0	
Range	(21-59)		(21-60)		t=1.036 P=0.304
Mean \pm SD	39.65\pm14.036		42.58\pm11.05		
Gender					
▪ Male	30	75.0	31	77.5	FE
▪ Female	10	25.0	9	22.5	1.00

Marital status					
▪ Single	8	20.0	9	22.5	1.276 0.735
▪ Married	29	72.5	28	70.0	
▪ Divorced	1	2.5	0	0.0	
▪ Widow	2	5.0	3	7.5	
Occupation					
▪ Employee	5	12.5	8	20.0	2.492 0.477
▪ Manual work	23	57.5	23	57.5	
▪ Housewife	8	20.0	8	20.0	
▪ Other	4	10.0	1	2.5	
Educational level					
▪ Illiterate	9	22.5	12	30.0	2.802 0.423
▪ Basic school	4	10.0	4	10.0	
▪ Secondary school	20	50.0	13	32.5	
▪ High education	7	17.5	11	27.5	
Residence					
▪ Rural	26	65.0	22	55.0	FE 0.494
▪ Urban	14	35.0	18	45.0	

Table (2): Distribution of the studied patients regarding their health relevant data among the patients undergoing hip and pelvic surgery.

Health relevant data	The studied patients (n=80)				χ^2 P
	Control group (n=40)		Study group (n=40)		
	N	%	N	%	
Diagnosis					
Hip surgery	(20)	(50.0)	(21)	(52.5)	0.196 0.658
▪ Hip replacement	12	60.0	14	66.7	
▪ Hip fixation	8	40.0	7	33.3	
Pelvic surgery	(12)	(30.0)	(13)	(32.5)	0.196 0.658
▪ Pelvic bone fixation	8	66.7	10	76.9	
▪ Pelvic bone debridement	4	33.3	3	23.1	
Hip and pelvic surgery	(8)	(20.0)	(6)	(15.0)	
#Current medication					
▪ Opioid analgesic	36	90.0	37	92.5	0.313 0.576
▪ Hormonal replacement therapy	3	7.5	3	7.5	
▪ Muscle relaxant	1	2.5	3	7.5	

More than one answer was chosen

Table (3): Distribution of the studied patients according graduation of dietary intake, quality of diet and their level of mobility through period of study.

	The studied patients (n=80)																	χ^2 P							
	Control group (n=40)								χ^2 P	Study group (n=40)															
	2 nd day		4 th day		6 th day		10 th day			2 nd day		4 th day		6 th day		10 th day									
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%								
Graduation of Dietary Intake																		229.18 0.000*	139.53 0.000*						
▪ Full liquid diet	38	95.0	2	5.0	0	0.0	0	0.0	2	9	72.5	0	0.0	0	0.0	0	0.0								
▪ Soft diet	2	5.0	26	65.0	22	55.0	19	47.5	1	1	27.5	7	17.5	5	12.5	3	7.5								
▪ Regular diet	0	0.0	12	30.0	18	45.0	21	52.5	0	0	0.0	3	82.5	35	87.5	3	92.5								
Gp1 Vs G2 χ^2, P	FE 0.000*		49.015 0.000*		FE 0.000*		FE 0.000*																		
Quality of diet																		50.23 0.000*	57.12 0.000*						
▪ Low fiber diet	38	95.0	33	82.5	20	50.0	13	32.5	3	7	92.5	2	60.0	7	17.5	3	7.5								
▪ High fiber diet	2	5.0	7	17.5	20	50.0	27	67.5	3	3	7.5	1	40.0	33	82.5	3	92.5								
Gp1 Vs G2 χ^2, P	FE 0.000*		FE 0.000*		FE 0.000*		FE 0.003*																		
Level of mobility																		52.562 0.000*	86.072 0.000*						
Level 1 (Sit and shake)	40	100.0	22	55.0	12	30.0	15	37.5	4	0	100.0	1	37.5	11	27.5	3	7.5								
Level2 (Stretch and Point)	0	0.0	9	22.5	15	37.5	10	25.0	0	0	0.0	7	17.5	4	10.0	3	7.5								
Level3 (Stand)	0	0.0	9	22.5	10	25.0	11	27.5	0	0	0.0	1	32.5	15	37.5	1	45.0								
Level4(walk and advance step)	0	0.0	0	0.0	3	7.5	4	10.0	0	0	0.0	3	12.5	10	25.0	1	40.0								
Gp1 Vs G2 χ^2, P	-		7.302 0.063		11.182 0.011*		20.658 0.000*																		

Table (4): Distribution of the studied patients regarding their level of Bristol stool form (BSFS) among the studied groups throughout periods of study

Level of Bristol Stool Form (BSFS)	The studied patients (n=80)																		χ^2 P
	Control group (n=40)								χ^2 P	Study group (n=40)								χ^2 P	
	2 nd day (n=24)		4 th day (n=26)		6 th day (n=27)		10 th day (n=29)			2 nd day (n=22)		4 th day (n=32)		6 th day (n=34)		10 th day (n=36)			
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
▪ Constipation	18	75.0	20	76.9	22	81.5	21	72.4	2.693 0.260	19	86.4	12	37.5	6	17.6	4	11.1	27.836 0.000*	
▪ Ideal stools	6	25.0	5	19.2	4	14.8	6	20.7		3	13.6	18	56.3	24	70.6	26	72.2		
▪ Diarrhea	0	0.0	1	3.8	1	3.7	2	6.9		0	0.0	2	6.3	4	11.8	6	16.7		
Gp1 Vs G2	0.394		13.695		15.646		19.09												
χ^2	0.394		13.695		15.646		19.09												
P	0.695		0.000*		0.000*		0.000*												

Table (5): Distribution of the studied patients regarding constipation level among the studied groups throughout periods of study.

Total constipation level	The studied patients (n=80)																		χ^2 P
	Control group (n=40)								χ^2 P	Study group (n=40)								χ^2 P	
	2 nd day (N=18)		4 th day (N=20)		6 th day (N=22)		10 th day (N=21)			2 nd day (N=19)		4 th day (N=12)		6 th day (N=6)		10 th day (N=4)			
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
▪ Mild constipation		16.6						9.52	5.186 0.520	1	5.26		66.6		66.6			18.332 0.005*	
▪ Moderate constipation	3	6	1	5.0	1	4.54	2	14.2		6	31.5	8	6	4	6	3	75.0		
▪ Severe constipation	5	7	7	35.0	8	36.36	3	8		1	7	2	16.6	1	6	1	25.0		
	10	55.5	12	60.0	13	59.09	16	76.1	2	63.1	2	6	1	6	0	0.0	9		
Range	(2-16)		(4-14)		(6-13)		(6-16)		F=2.94	(2-16)		(2-11)		(2-11)		(2-7)		F=6.12	
Mean ± SD	9.5±3.4		10.2±3.1		11.24±3.5		12.5±3.7		4	11.9±3.7		7.5±2.7		5.3±2.1		4.5±1.8		0	
									P=0.035*									P=0.001*	
Gp1 Vs G2	0.651		13.510		15.522		22.57												
χ^2	0.651		13.510		15.522		22.57												
P	0.517		0.001*		0.000*		0.000*												

(2–6) Mild constipation

(7–10) Moderately constipation

≥11 Severe constipation

Gp1: Control group**Gp2: Study group** * Statistical significant at level P<0.05

Table (6): Effect of sosio-demographic characteristics and Health relevant data of the studied patients on their Bristol stool form (BSFS) among the studied groups in the 2^{ed} and 10th day.

Characteristics	The studied patients (n=80) Bristol stool form (BSFS)																							
	Control group												study group											
	2 ^{ed} day						10 th day						2 ^{ed} day						10 th day					
	Constipation N=18		Ideal stool N=6		Diarrhea N=0		Constipation N=21		Ideal stool N=6		Diarrhea N=2		Constipation N=19		Ideal stool N=3		Diarrhea N=0		Constipation N=4		Ideal stool N=26		Diarrhea N=6	
N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	
Age (in years)																								
▪ (21-<30)	0	0	3	50	0	0	0	0	3	50	1	50	0	0	2	66.7	0	0	0	0	5	19.2	1	16.7
▪ (30-<40)	0	0	3	50	0	0	2	9.5	2	33.3	0	0	0	0	1	33.3	0	0	0	0	9	34.6	1	16.7
▪ (40-<50)	4	55.5	0	0	0	0	7	33.3	1	16.7	1	50	17	36.8	0	0	0	0	1	25	8	30.8	1	16.7
▪ (50-60)	14	77.8	0	0	0	0	12	57.1	0	0	0	0	2	63.2	0	0	0	0	3	75	4	15.4	3	50
χ²	24.001						17.952						22.001						8.662					
P value	0.001*						0.006*						0.001*						0.194					
Gender																								
▪ Male	8	44.4	6	100	0	0	14	66.7	5	83.3	1	50	10	52.6	3	100	0	0	3	75	19	73.1	5	83.3
▪ Female	10	55.6	0	0	0	0	7	33.3	1	16.7	1	50	9	47.4	0	0	0	0	1	25	7	26.9	1	16.7
χ²	5.712						0.973						2.402						0.273					
P value	0.017*						0.617						0.121						0.872					

Table (7): Effect of Health relevant data of the studied patients on their Bristol stool form (BSFS) among the studied groups in the 2^{ed} and 10th day.

	The studied patients (n=80) Bristol stool form (BSFS)																							
	Control group												study group											
	2 ^{ed} day						10 th day						2 ^{ed} day						10 th day					
	Constipation N=18		Ideal stool N=6		Diarrhea N=0		Constipation N=21		Ideal stool N=6		Diarrhea N=2		Constipation N=19		Ideal stool N=3		Diarrhea N=0		Constipation N=4		Ideal stool N=26		Diarrhea N=6	
N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	
Quality of diet																								
▪ Low fiber diet	18	100	4	66.7	0	0	13	61.9	0	0	0	0	17	89.5	2	66.7	0	0	3	75	0	0	0	0
▪ High fiber diet	0	0	2	33.3	0	0	8	38.1	6	100	2	0	2	10.5	1	33.3	0	0	1	25	26	100	6	100
χ²	6.551						0.973						1.142						26.176					
P value	0.011*						0.617						0.285						0.001*					
Level of mobility																								
▪ Level 1 (Sit and shake)	18	100	6	100	0	0	7	33.3	1	16.7	0	0	19	100	3	100	0	0	3	75	0	0	0	0
▪ Leve2 (Stretch and Point)	0	0	0	0	0	0	13	61.9	4	66.7	1	50	0	0	0	0	0	0	1	25	2	7.7	0	0
▪ Leve3 (Stand)	0	0	0	0	0	0	1	4.8	0	0	0	0	0	0	0	0	0	0	0	0	10	38.5	4	66.7
▪ Level4(walk and advance step)	0	0	0	0	0	0	0	0	1	16.7	1	50	0	0	0	0	0	0	0	0	14	53.8	2	33.3
χ²	-						9.182						-						31.052					
P value	-						0.164						-						0.001*					

Discussion

The most common treatment of pelvic and hip fractures is the surgical treatment but most of cases are accompanied with complications such as shock, pain, **constipation**. due to different factors as enforced immobility, receiving of opioids , reduced dietary and fluid intake, use of bad pans in the period following surgery and long- term hospitalization.^(1,7) So, the current study aimed to evaluate the effect of implementing Murdoch bowel protocol on occurrence of constipation in patients with hip and pelvic surgery.

Concerning socio-demographic characteristics of patients undergoing hip and pelvic surgery. the findings of the present study revealed that Mean±SD for age of control and study group were nearly forty years old (**40.65±13.036, 42.58±11.05**) respectively with no significant difference between the two groups. In this regard, this finding may be related to that the young adult is economically productive and they are prone to traffic accident , pedestrians, motorcyclists, and cyclists, work and sports accidents. And with increase age they are prone to osteopenia and osteoporotic condition This finding was in agreement with (**He. C. et al ,2021**)⁽¹⁵⁾ who stated that the mean age of studied groups were 50.61±10.30 47.58±10.31 in addition this result

supported by (**Wang. P,2019**)⁽¹⁶⁾ who said that the mean age of studied groups were 44.2 + 13.8 .on the other hand, this finding was in contrast with (**Herath SC ,2019**)⁽¹⁷⁾ who reported that the mean age of studied groups were 58.6 6 21.6 years

As regard to sex, the present study showed that the majority of the studied patients were males with no significant difference between the two groups. This finding may be related to risk taking behavior in male ,high energy trauma as traffic accident and cycling and engage into heavy manual work ,smoking and drug addiction This findings was similar with (**Ström Rönquist S,2022**)⁽¹⁸⁾ who noted that more than two third of studied groups were male. On the other hand this outcomes was in contrast with(**Lundi N, 2021**)⁽¹⁹⁾ who observed that The majority of the fractures occurred in females this finding could be related to large number of older women suffering from this fracture

Regarding health relevant data this study showed that the majority of the studied patients were undergoing hip surgery ,and about two third of hip surgery patients in control group and more than two third in study group were treated by hip replacement surgery .in the researcher opinion this may be due to that the hip fracture require low energy trauma as sliding ,falling or

hitting which is most common causes in young adult and effect of osteoarthritis or osteoporosis with increasing age . this result in line with **Schultz BV et al 2023**⁽²⁰⁾ who said more than half of studied patient with lower limb fracture had femoral neck fracture .similar with **Stockton DJ et al 2019**⁽²¹⁾Who noted that the majority of patients with hip fracture had total hip replacement in his study . in contrary this findings disagreed with **Somersalo A et al 2016**⁽²²⁾, who noted that the majority of patient with lower extremity fracture were had leg fracture . **In regard to current used medication** ,the majority of patients in control and study group used opioids analgesic especially in the first and second day post operative. This may be due to sever pain post orthopedic surgery at wound site with low tolerance of patients. This conclusion were supported by (**Cozowicz C et al , 2022**)⁽²³⁾ who said that the majority of patient undergoing total hip arthroplasty used opioid in first 24 hour post operative. In contrary this result contradicted with (**Moutzouros V,2020**)⁽²⁴⁾ who stated that the more than half of the studied patients with orthopedic surgery weren't use opioids in postoperative period.

Regarding graduation of dietary intake and quality of diet postoperatively .this study show that majority of

the studied patients in the second day had full liquid low fiber diet. This finding may be due to that most of patients prefer full liquid diet which low in fiber in the days post operative due to effect of anorexia caused by anesthesia and sever pain ,to rest intestine until return of peristalsis and fear of distention or post operative ileus.this conclusion was in line with (**Rattray M.2019**)⁽²⁵⁾who found that all orthopedic patient had full diet in post operative day and first solid meal was low fiber soft diet after first 24hors . But in the tenth day more than half of patients have regular diet with high fiber. while the majority of patient in the study group had regular high fiber diet with gradual improvement in their graduation of dietary intake . This may be due to instruction were explained to study group patients about increase fiber intake in their regular diet and notify them about its different sources

Concerning to patient level of mobility all patients in study and control group in the second day was at level one of mobility. This limited mobility may be related to effect of drowsy caused by surgical anesthesia, sever pain, presence of fixation devices and physician instruction of bed rest to allow wound healing. this result supported by **Abd El Kader & Youssef, 2022**⁽²⁶⁾ who noted that the majority of patient had restricted physical

mobility post orthopedic surgery .while In the tenth day less than two fifth of patients in control group at level one and the minority at level four but in study group two fifth of patient at level four and the minority at level one of mobility .in the researcher point of view the improvement in study group may be due to encouragement by the researcher to patients about early mobility and the performance of exercise to strength muscle and improved general health for patients . this observation were similar to **(Zhang X et al 2022)**⁽²⁷⁾ finding who observed that the strength exercise were had large effect on patients mobility after hip fracture .in contrary this result contradicted with **(Hulsbæk S et al 2022)**⁽²⁸⁾ who said that there were no statistically significant relation between physical therapy and level of mobility in his study

As regard to Bristol stool form the finding of this study revealed that in the second day post operative three quarters of patients who passed stool in control group and the majority of patients in the study group had constipation .in the researcher point of view this may be related to effect of type of anesthesia used in operation ,preoperative fasting ,and peristalsis movement not return to normal yet . . this finding was supported by **(Celik B and Bilik Ö 2022)**⁽²⁹⁾ observation which

include more than three quarters of patient with hip fracture developed constipation . Also this result agreed with **Jing D, Jia L ,2019)**⁽³⁰⁾who stated that the majority of studied patient had constipation postoperatively in their study . In contrary with . **Arli,ŞK.2019**⁽³¹⁾.who said that the majority of studied postoperative patients had no constipation. Moreover this result contradicted by **Abd El Kader & Youssef, 2022**⁽²⁶⁾ who said that about a quarter of the patient in orthopedic had constipation during their stay in the hospital for more than five days.

In tenth day less than three quarters of patients who passed stool in control group were had constipation while 11.1% only of study group patients were had constipation .This finding may be justified by that the percentage of constipation still high in control group due to decrease fiber intake, low level of mobility, excessive use of opioid analgesic in management of pain ,effect of bed ban toilet and withholding behavior by patient due to lack of privacy and patient embracement .in contrast with study group the improvement may be due to Murdoch bowel protocol instruction given to patients about increased level of mobility, doing exercise, high fiber diet ,fluid intake, lactulose therapy ,and decrease opioids intake. This result were supported by **Abd-**

ElraheemM2020⁽¹²⁾ who used Murdoch bowel protocol in critical patients and discovered that more than one fifth of patients in study group had constipation compared with less than three quarters of patients in control group in the tenth day .Moreover this findings were supported by (**Ross-Adjie, 2012**)⁽⁷⁾ who said that about two thirds of the patients with hip and knee arthroplasty who received Murdoch Bowel Protocol had normal bowel function by the fifth day compared with one quarter of patients in control group.

concerning to constipation assessment scale this present study showed that more than half and more than two third of constipated patient had sever level of constipation in the second day .this is may be due to immobility ,low fiber diet and effect of anesthesia on peristalsis movement. meanwhile in the tenth day more than three quarters of patients in control group had sever level of constipation while there was no one had sever constipation in the study group and three quarters of constipated patient had mild constipation .this finding is justified by that constipation is neglecting problem by staff and most of patient felt embraced to notify about presence of constipation which lead to delay management of this problem so the severity of

constipation increase along with other factors as increasing duration of immobility, low fiber diet and opioids intake. In contrast with study group as the severity of constipation decrease to 0% sever constipation at the end of study period .this may be due to rapid assessment by the researcher for presence of constipation and its severity with proper management by application of Murdoch bowel protocol guidelines which mentioned before. This finding supported with (**Nouhi E et al.2022**)⁽³²⁾ who said that mean score of CAS decline from 10.74 to 4.51 after intervention in studied patient . also this conclusion in line with **Sajadi M et al 2020**⁽³³⁾ who said that the mean score of severity of constipation among studied patient decreased from 14.39 to 6.39 in study group after intervention but still worsen in control group from 14.8 to 14.97 in the fifth day. In contrary this result contradicted with (**Noiesen E et al 2014**)⁽³⁴⁾who noted that 7%of studied patients were have sever level of constipation at admission .

Regarding relation between sociodemographic data and BSFS the finding of this study showed that with increasing age increase level of constipation as more than half of constipated patient in the control group and three quarters of constipated patient in the study group were between age of (50-60) years old .in my opinion

this may be due to lack of normal bowel movement with aging with decrease physical activity and poor denture or dentation problem leading to impaired in nutrition. This finding agreed with **Farahat et al., (2019)**⁽³⁵⁾ who studied " Risk factors for constipation among elderly attending family health center in Damietta District and reported that the prevalence of constipation increased with increasing age, where most of elderly population experienced constipation. This finding inconsistent with (**Mansouri et al.2018**)⁽³⁶⁾ who reported that there was no significant relationship between constipation and age.

Concerning gender there were statistically significant relation between gender and constipation as more than half of constipated patient in control group were female this finding may be due to effect of female sex hormone as in the luteal phase of the menstrual cycle, progesterone lead to increase the risk of constipation. This result supported by **Yurtdaş G,et al .2020**⁽³⁷⁾ who noted in his study about risk factors for constipation in adult that females were more expected to have constipation than males. this conclusion were contradicted by **E bling et al 2014**⁽³⁸⁾ who Saied that constipation in male were more than female .

As regarded to relation between BSFS and quality of diet the majority of constipated patient in study and

control group had low fiber diet . this result justified by fiber intake maintain adequate water in stool that assist in stool bulking and facilitate defecation. The result consistent with **Van Der Schoot A 2022**⁽³⁹⁾ who observed that increase dietary fiber to 10g/d improve response to treatment of chronic constipation . but this result inconsistent with **Kang SJ et al 2021**⁽⁴⁰⁾ who noted that bran did not show significant increases in the number of bowel movements or decreased the use of laxatives in the studied patients .

Regarding level of mobility and BSFS in this study all the constipated patients in study and control group were at level one of mobility .this observation justified by effect of immobility on gastric transit time as it lead to slow transit time .and slow peristalsis movement which lead to hardening of stool and constipation. the finding agreed with **Ashrafi A,2021**⁽⁴¹⁾ who observed that more than two third of constipated patient had low level of physical mobility .also the result in line with (**Hidayati N 2019**)⁽⁴²⁾ who said that two third of patient developed constipation after three days of immobility due to effect of hospitalization with stroke

Conclusion: The Murdoch bowel protocol had great effect in prevention and management of constipation for patients with hip or pelvic surgery with a highly

statistically significant difference between study and control group throughout the period of the study as P value =0.000*.

Recommendation: implementation of Murdoch bowel protocol for all orthopedic patients in orthopedic department for assessment and management of constipation.

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