

Hydrotherapy versus Laxative for Treatment of Postoperative Constipation among Orthopedic Patients

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Abstract:

Constipation is a common health problem that orthopedic patients may experience during the recovery phase. There are a wide-range of treatment methods to alleviate all symptoms of constipation and to regulate bowel habit back to baseline. Its treatment includes pharmacologic and non-pharmacologic therapy. Aim of the study: to compare between two treatment approaches (pharmacological in the form of laxative and non-pharmacological in the form of hydrotherapy) to relieve postoperative constipation for orthopedic patients. Design; quasi-experimental design was used. *Setting:* This study was conducted at departments of orthopedic surgery, at a general governmental Hospital in Cairo, *Sample:* A purposive sample of 100 male and female adult patients second day post orthopedic surgery (fixation and traction), divided into two equal groups (50 each), was recruited in this study. *Tools:* data were collected utilizing the following tools: 1) The Structured Interview Questionnaire, including socio-demographic and related medical data. 2) The Constipation Assessment Scale, developed by (McMillan and Williams, 1989). *Results:* the study findings revealed that all patients under the study their age ranged between 20 to 40 years, the majority were males. Findings revealed a statistical significant difference between the two groups in intestinal movement and constipation assessment symptoms. The laxative group expresses more intestinal movement and constipation symptoms complain more than hydrotherapy group after implementing the treatment measure. *Recommendations:* Further research is warranted to conduct studies in nursing to relieve patient's constipation for different types of hospitalized patient and in different hospital settings to apply evidenced based nursing practice.

Key words: constipation, intestinal sound, bowel movement, orthopedic patient, postoperative, hydrotherapy, laxative, pharmacological therapy approaches, non-pharmacological therapy approaches.

Introduction:

Orthopedic surgical procedures are often associated with complications such as infections, thrombotic events, wound care, gastrointestinal dysfunction, and pain during the postoperative period (Julia, Robert & Kelly, 2008). Constipation is one of the most common gastrointestinal symptoms that orthopedic patients may experience during the recovery phase. It is often regarded as a minor annoyance by the majority, including health care professionals (Ho, et al., 2008). Constipation is defined on the basis of stool frequency, stool consistency, and difficulty passing stools (Hermann, Kościński & Drews, 2013). It is the accumulation of old hardened feces that is so tightly packed together that the bowel movements are infrequent and incomplete, causing much difficulty and strain, producing dry, hardened feces. The hardened feces will then stick to the walls of the colon and inhibit proper nutrient absorption (National Board for Colon Hydrotherapy, 2013).

Since most people eat about 2 to 3 times a day, it is most natural to eliminate 2 to 3 times a day. Our body goes through a regular cycle and if the circulation is interrupted then it could lead to constipation. This means that the slower transit time will cause buildup of toxins that get absorbed through the colon wall and seep into the blood stream. This self-poisoning can cause everything from headaches to autoimmune disorders (National Board for Colon Hydrotherapy, 2013). Most healthcare professionals consider constipation as fewer than 3 bowel movements per week, along with symptoms such as small or hard stools, abdominal bloating or pain, straining, need for digital manipulation (Berardi, 2013).

In the general population the incidence of constipation varies from 2 to 30% (Andromanakos, et al., 2006). Arriving at true prevalence rates is complicated, because consensus definitions are lacking. Prevalence of self-reported constipation substantially varies because of differences among ethnic groups in how constipation is perceived. Worldwide, approximately 12% of people suffer from self-defined constipation (Basson, Katz and Anand, 2013). The estimated incidence of constipation is approximately 2% to 28% of the United States population (Tariq, 2007). Constipation has daily implications for those affected, and although only one-third of affected persons seek care, it is associated with high socioeconomic costs (Harris, 2007). An annual expenditure on

laxatives of more than \$800 million, and accounts for an increase in the use of the health care system and a substantial proportion of health care dollars spent on over-the-counter medications (Arora, et al., 2012 and Tariq, 2007).

There are two basic types of constipation organic and functional. Organic constipation is a result of some physical change, obstruction, or distortion in colon. Functional constipation can result from not following a proper diet, not drinking enough water daily, not having a balanced emotional health, and not having a good lifestyle (The Colon Therapist Network 2013).

There is no formal distinction between acute and chronic constipation; however, a duration of symptoms > 6 weeks and unresponsiveness to fiber or over-the-counter medications is often considered a chronic condition (Berardi, 2008). Acute constipation means sudden and lasting for short time. It was defined as having no bowel movement for at least 48 hours, difficulty in having a spontaneous bowel movement (straining or sensation of incomplete evacuation or hard, lumpy stools), or the inability to have a spontaneous bowel movement (Anissian et al., 2012). Most constipation is acute and not dangerous. Understanding the causes, prevention, and treatment of constipation can help many people take steps to find relief (The National Institute of Diabetes and Digestive and Kidney Diseases, 2013).

Treatment strategies for constipation aimed to alleviate all symptoms of constipation and to regulate bowel habit back to baseline. Treatment options include pharmacologic and non-pharmacologic therapies approaches (Berardi, 2008). Glycerin suppositories are the commonest rectal medicines used to treat acute constipation, prevent hemorrhoids and alleviate the pains associated with excessively hardened stool. Glycerins are considered very safe, and usually cause evacuation of the colon within 15 to 60 minutes (Allen, 2013 and Wilhelm & Ruscin, 2009). These laxatives are usually used by people who are bedridden or cannot take bulk-forming agents. Older adults and people with heart or kidney failure should be careful when taking osmotic agents because they can cause dehydration or a mineral imbalance (The National Institute of Diabetes and Digestive and Kidney Diseases, 2013).

Glycerin suppository is a hyperosmotic laxative, which pulls water from the intestines into the stool. This stimulates the normal forward movement of intestines, usually resulting in a bowel movement within 15 minutes to an hour (American Cancer Society, 2013). Glycerin suppositories work through a triple action: lubrication, hydration and muscle irritation of the rectum. The lubrication phase involves lubricating the interior of the rectum, thus enabling a soft slide of the bowel towards the anal orifice. The expulsion is thus rapid and painless, avoiding the occurrence of anal fissures. During the hydration process, water from the bowel is drawn downwards to hydrate the hardened feces for an easier bowel movement. The last process that results after the usage of glycerin suppositories is irritation of rectal muscles. The muscles are coordinated so as to move more efficiently for a smooth and less strenuous expulsion, without any unnecessary straining from patient's part (Morrow, 2008).

Laxatives may provide temporary relief of constipation. However, they could also cause severe abdominal pain. Over time these products could result in involuntary spasmodic gastrointestinal release, bloating and possible dehydration. Repeated use of laxatives could lead to eventually loss of control of rectal muscles (National Board for Colon Hydrotherapy, 2013). As a result, laxatives may become habit-forming (The National Institute of Diabetes and Digestive and Kidney Diseases, 2013). Patients should not use laxative products longer than one week unless directed by a physician. Rectal glycerin suppositories should be stopped if they cause severe stomach pain or cramping, bloody diarrhea, or severe rectal pain, bleeding, or irritation (Allen, 2013, Olson, 2013 and Wilhelm & Ruscin, 2009).

Non-pharmacologic treatment measures for constipation generally are recommended as first-line therapy. These strategies typically include regular exercise, increase dietary fiber via fiber-rich foods, increased fluid intake, and bowel habit training. However, these measures are effective in only a subset of patients (Yang, Wang, Zhou & Xu, 2012 and Johanson, 2007). Water has always been in the center of our lives and is a symbol of life itself, so it is not surprising that water is a crucial element in traditional remedies, as a form of therapy and a non-pharmacologic modality. It is free, cost effective and brings miraculous health benefits. It doesn't require continuous assistance of any professional therapist, and can start this therapy any time. Also, can be used effectively to treat a variety of common illnesses and conditions, one of them is constipation. In its most basic and evidence-based form, it involves drinking water to prevent or treat dehydration. Water therapy is occasionally used as a treatment for acute constipation, although some extreme forms of it are considered to be unsafe (Ramnivas, 2013 & Russo, 2010).

Using water as therapy was practiced during ancient Greece and Rome, and continues to be used in traditional Chinese and Indian medicine today. In Japan and India, the simple act of drinking quantified amounts of water on an empty stomach, is a famous form of water therapy (Finer Minds Team, 2010). Consuming pure water on an empty stomach cleans the colon, and renders the colon more effective by forming new fresh blood. That the mucosal folds of the colon and intestines are activated by this method, it is an undisputed fact, just as the theory that new fresh blood is produced by the mucosal fold (Ramnivas, 2013). Therefore the aim of the present study is to compare between two treatment approaches (pharmacological in the form of laxative and non-pharmacological in the form of hydrotherapy) to relieve postoperative constipation for orthopedic patients.

Significance of the study:

Orthopedic patients are especially at risk for developing constipation than the average person. The patient with traction and fixation is likely to be immobile for an extended period; since it is not possible to get up to use the toilet. Sometimes, traction may be continued for several months until healing is complete. In addition during postoperative period, the patient receives opioids for pain management and in recovery phase may consume less amounts of oral intake, especially during the first few days postoperatively all of these factors may contribute to the occurrence of constipation.

Constipation can have a tremendous impact on patients' quality of life, more likely to report reduced general well-being and symptoms of anxiety and depression (Berardi, 2013). It negatively affects patients' daily lives, and is associated with high healthcare costs. Constipation when left untreated or not properly treated, results in complications, such as fecal impaction and bowel obstruction even perforation and death (Heisler, 2011).

From researchers' experiences with orthopedic patients, it was observed that many patients complain from postoperative constipation and the most commonly used treatment modality is glycerin suppositories; which may lead to some untoward effects. There is no other treatment modalities were tried for those patients, hence ends to try other methods to be safer and economical, alternative treatment measure is therefore needed. There appear to be few studies that have demonstrated the effect of fluid intake on constipation while adequately controlling for other factors. Data on the effectiveness of these measures are limited. Several observational studies (Yang et al., 2012, Hope & Down, 2007 and Maddi, 2007) have studied increased fluid intake but usually with some other measures, such as increased fiber, increased exercise and bowel habit training.

Although these modalities may benefit some patients with temporary constipation, the use of these agents is not supported by strong clinical evidence and their efficacy in patients is less well defined. Therefore this study was conducted to investigate the efficacy of hydrotherapy versus laxative in the management of postoperative constipation among orthopedic patients.

Aim of the Study:

The aim of this study is to compare between two treatment approaches (pharmacological in the form of laxative and non-pharmacological in the form of hydrotherapy) to relieve postoperative constipation for orthopedic patients.

Research hypotheses:

The following research hypotheses were formulated to achieve the aim of the study:

H₁ - There will be a statistical significant difference between the two groups in regard to constipation assessment.

H₂ - The study group who subjected to use hydrotherapy for the treatment of constipation will show better constipation assessment results than glycerin suppository group.

2. Subjects and Methods:

2.1. Design: A quasi-experimental study design was utilized.

2.2. Setting: The study was conducted at departments of orthopedic surgery, at a general governmental Hospital in Cairo, Egypt.

2.3. Sample: A purposive sample of 100 male and female adult patients attended at the second day post orthopedic surgery for (fixation and traction). Patients were divided into two equal groups (50 each), and meet the inclusion criteria of (a) age 20 to 40 years, because this age may tolerate drinking large amounts of water and to avoid the effect of physiological changes which can occur as the result of aging process. (b) complaining of acute constipation or difficulty in having a spontaneous bowel movement (straining or sensation of incomplete evacuation or hard, lumpy stools), or the inability to have a spontaneous bowel movement (c) do not have comorbidities as diabetes, cardiac, renal, liver disease,...etc. and (d) agree to participate in the study.

2.4. Tools: Data of this study was collected using the following tools:

2.4.1. The Structured Interview Questionnaire (SIQ) was designed by the researchers based on literature review, it included Sociodemographic data; namely; age, sex, marital status, etc... and Medical background data as diagnosis, presence of constipation (onset & duration).

2.4.2. The Constipation Assessment Scale (CAS), developed by (McMillan and Williams, 1989). It consists of eight characteristics deemed on the basis of literature searching to be universally related to constipation. Each of these characteristics is given a three point rating scale ("No problem", "Some problem", "Severe problem"), scored 0, 1 or 2 respectively. These scores are summed to make a range between 0 for no constipation and 16 for the most severe constipation, ranged as Low (0-4), Moderate (5-9), High (≥ 10). The CAS was tested for validity and sensitivity. *Reliability* ($r = 0.98$) and *internal consistency* ($\alpha = 0.70$) were also satisfactory.

2.4.3. Stethoscope: was used by the researchers to auscultate participant's intestinal sound in the right lower quadrant for a full minute.

2.5. Ethical Consideration: Permission to conduct the study was obtained from the hospital authorities. Prior to the initial interview, the researchers introduced themselves to patients who met the inclusion criteria; each potential patient was fully informed with the purpose and nature of the study, and then an informed consent was taken from participants who accept to participate in the study. The researchers emphasized that participation in the study is entirely voluntary and withdrawal from the study would not affect the care provided; anonymity and confidentiality were assured through coding the data.

2.6. Pilot Study: A pilot study was carried out on 10 % to test the feasibility and clarity of the used tools; modifications were done based on the results. The sample included in the pilot study was excluded from the final study sample.

2.7. Procedure:

An official permission was obtained from the concerned departments to conduct the proposed study. Once permission was granted to proceed with the proposed study, the researchers met the patients who fulfilled the inclusion criteria three times (1st time was second day postoperatively, 2nd time was fourth day from first assessment, while 3rd time was 7th day from the first assessment). At the initial meeting with each patient, the purpose, nature of the study, and tools were explained and written consent was taken from the literate patients and oral consent was taken from illiterate patients who accept to share in the study. The Structured Interview Questionnaire (SIQ) was read, explained and the choices of answers from patients were recorded by the researchers. For more validation of information, patients' files were revised to complete the needed information. The constipation assessment scale was administered and auscultation of the intestinal sound using stethoscope in a full minute was done for each participant. If bowel sounds was not heard immediately; listening up to two minutes in each of four quadrants is performed.

For the hydrotherapy group; the researchers asked each participant to implement water therapy in their daily routine for ten days. Early morning, after getting up from bed, (without even brushing teeth) drink 1.5 liters of water i.e. 5 to 6 glasses. Then the patient washes his/her face thereafter. Initially, while practicing may drink four glasses first and then the balance two glasses after a gap of 2 minutes. Instructions given to the participants as do not eat or drink

anything for 45 minutes. After one hour the patient may eat and drink as normal. Initially the patient may find the necessity to urinate 2 to 3 times within an hour, but it will become normal after quite some time. For laxative therapy group, the researchers instructed the participants to take (one) glycerin suppository once / day at bed time, for one week according to physician prescription.

During second and third assessment, the researchers re-administered constipation assessment scale and measured intestinal sound. Each patient was interviewed individually. Data collection time for each patient lasted about 15 to 20 minutes in each of the three assessment events. Data was collected along 4 months (February to May 2013).

3. Results:

The data obtained by the designed tools were tabulated, analyzed and presented as follow:

Socio-demographic and personal data revealed that the two groups under the study have an age range between 20 to 40 years. More than half 58% in hydrotherapy treated group aged 30 to less than 40 years; while less than half 42% in the laxative treated group are in the same age group. More than half of both hydrotherapy and laxative groups were males (56% and 52% respectively). Less than half 48% in hydrotherapy group and more than half 54% in the laxative group were married. Less than half of both groups (42% of hydrotherapy and 44% of laxative group) had primary education; coming from urban area (54% and 56% respectively), and had monthly income of less than or equal 500 Egyptian pounds (70% and 68% respectively).

In table (1) it was obvious that all study sample in both hydrotherapy and laxative groups had intestinal sound mean rate in the first assessment (second day postoperative) that ranged between 6 to 10/ min., yielding no statistically significant difference between the two groups. While in the second assessment, there was an increase of intestinal sound mean rate among laxative group ($X \pm SD=18.08 \pm 10.16$) compared to hydrotherapy group ($X \pm SD=11.90 \pm 2.81$). A statistical difference was found between the two groups ($t=4.251$, $P=0.000$). Moreover, in third assessment, there was an increasing intestinal sound rate in both groups; however, the mean rate ($X \pm SD=21.38 \pm 9.97$) among laxative group was higher than hydrotherapy group ($X \pm SD= 16.84 \pm 4.04$), with statistical significant difference ($t=2.875$, $P=0.006$).

Table (2) shows constipation assessment data among hydrotherapy group, it elaborated a significant decline in subjects' constipation related complains, throughout the three assessments in all symptoms of the constipation assessment data. In first assessment there was 54% complains of patients who reported severe abdominal distension, 60% had severe rectal fullness or pressure, 16% had severe rectal pain, 64% complained of severe inability to pass stools. The complains were reported to decrease to 6%, 0.0%, 0.0 % and 0.0% respectively in third assessment.

Table (3) illustrates decline in some symptoms of the constipation assessment data along the three assessments among laxative group. In first assessment there was 58% who reported complains of severe abdominal distension, 74% of severe rectal fullness or pressure, 56% with severe rectal pain, and 70% of severe inability to pass stools. These complain were reported to decrease to 6%, 0.0%, 44 % and 0.0% respectively in third assessment.

Table (4) depicted total constipation assessment scores. The highest frequency in both groups (hydrotherapy group 68%, and laxative group 90%) their total score was high (≥ 10) in the first assessment, with the mean scores $X \pm SD= 10.22 \pm 1.40$ and $X \pm SD= 11.08 \pm 1.17$ among the two groups respectively. While in the third assessment, the mean scores was $X \pm SD= 1.60 \pm 0.90$ and $X \pm SD= 5.18 \pm 1.43$ among the two groups respectively. A significant difference was found between the two groups in all the three assessments, (1st assessment $t=3.45$, $p=0.001$, 2nd assessment $t=3.92$, $p=0.00$ and 3rd assessment $t=14.08$, $p=0.00$).

Table (5) presents high statistically significant differences were found regarding intestinal sound rates as well as total constipation assessment scores between every two assessments events in both hydrotherapy and laxative groups. No statistically significant difference was found in laxative group regarding total constipation assessment scores between the second and third assessment with $t=0.628$, $p=0.533$.

Table (1): Percentage Distribution of Intestinal Sound Rates among the Total Study Sample (Total=100)

Intestinal Sound Rates	Hydrotherapy Group(50)		Laxative Group(50)		t-test p-value
	No	%	No	%	
First Assessment					t=0.672 P=0.504 (NS)
- 6-10/min	50	100	50	100	
Mean ±SD	7.88±1.31		8.04±1.14		
Second Assessment					t=4.251 P=0.000*
- 6-10/min	16	32	14	28	
- 11-15/min	29	58	3	6	
- 16-20/min	5	10	24	48	
- 21-25/min	0	0	1	2	
- 26-30/min	0	0	0	0	
- 31-35/min	0	0	0	0	
- 36-40/min	0	0	8	16	
Mean ±SD	11.90±2.81		18.08±10.16		
Third Assessment					t=2.875 P=0.006*
- 6-10/min	3	6	6	12	
- 11-15/min	14	28	1	2	
- 16-20/min	24	48	27	54	
- 21-25/min	9	18	4	8	
- 26-30/min	0	0	0	0	
- 31-35/min	0	0	3	6	
- 36-40/min	0	0	9	18	
Mean ±SD	16.84±4.04		21.38±9.97		

*Statistical significance. (NS)= not significant

Table (2): Percentage Distribution of Constipation Assessment Data among Hydrotherapy Group (Total=50)

Variables	Hydrotherapy Group (Total=50)					
	First Assessment		Second Assessment		Third Assessment	
	No	%	No	%	No	%
<u>Abdominal distension</u>						
-None	0	0	14	28	29	58
-Some	23	46	31	62	18	36
-Severe	27	54	5	10	3	6
<u>Change in gas amount</u>						
-None	9	18	17	34	34	68
-Some	26	52	26	52	14	28
-Severe	15	30	7	14	2	4
<u>Less frequent movement</u>						
-None	0	0	10	20	31	62
-Some	17	34	35	70	18	36
-Severe	33	66	5	10	1	2
<u>Oozing liquid stool</u>						
-None	41	82	48	96	50	100
-Some	9	18	2	4	0	0
-Severe	0	0	0	0	0	0
<u>Rectal fullness or pressure</u>						
-None	0	0	34	68	46	92
-Some	20	40	15	30	4	8
-Severe	30	60	1	1	0	0
<u>Rectal pain with bowel movement</u>						
-None						
-Some	7	14	23	46	40	80
-Severe	35	70	25	50	10	20
	8	16	2	2	0	0
<u>Small volume of stool</u>						
-None	0	0	23	46	40	80
-Some	18	36	25	50	10	20
-Severe	32	64	2	4	0	0
<u>Unable to pass stool</u>						
-None	0	0	38	76	48	96
-Some	27	54	11	22	2	4
-Severe	23	46	1	2	0	0

Table (3): Percentage Distribution of Constipation Assessment Data among Laxative Group (Total=50)

Variables	Laxative Group (Total=50)					
	First Assessment		Second Assessment		Third Assessment	
	No	%	No	%	No	%
<u>Abdominal distension</u>						
-None	0	0	25	50	33	66
-Some	21	42	20	40	14	28
-Severe	29	58	5	10	3	6
<u>Change in gas amount</u>						
-None	8	16	5	10	2	4
-Some	27	54	27	54	19	38
-Severe	15	30	18	36	29	58
<u>Less frequent bowel movement</u>						
-None	0	0	25	50	27	54
-Some	13	26	18	36	15	30
-Severe	37	74	7	14	8	16
<u>Oozing liquid stool</u>						
-None	44	88	38	76	34	68
-Some	6	12	12	24	16	32
-Severe	0	0	0	0	0	0
<u>Rectal fullness or pressure</u>						
-None						
-Some	0	0	36	72	41	82
-Severe	13	26	14	28	9	18
	37	74	0	0	0	0
<u>Rectal pain with movement</u>						
-None						
-Some	0	0	3	6	0	0
-Severe	22	44	33	66	28	56
	28	56	14	28	22	44
<u>Small volume of stool</u>						
-None	0	0	36	72	33	66
-Some*	25	50	14	28	17	34
-Severe*	25	50	0	0	0	0
<u>Unable to pass stool</u>						
-None	0	0	30	60	33	66
-Some	15	30	16	32	17	34
-Severe	35	70	4	4	0	0

Table (4): Frequency Distribution of Total Constipation Assessment Scores among the Total Study Sample (Total=100)

Interval	Hydrotherapy Group (50)		Laxative Group (50)		t-test p-value
	No	%	No	%	
First Assessment:					
Low (0-4)	0	0	0	0	t=3.452 P=0.001*
Moderate (5-9)	16	32	5	10	
High (≥ 10)	34	68	45	90	
Mean ±SD	10.22±1.40		11.08±1.17		
Second Assessment:					
Low (0-4)	35	70	19	38	t=3.926 P=0.000*
Moderate (5-9)	15	30	31	62	
High (≥ 10)	0	0	0	0	
Mean ±SD	3.82±1.35		5.00±1.48		
Third Assessment:					
Low (0-4)	50	100	18	36	t =14.089 P=0.000*
Moderate (5-9)	0	0	32	64	
High (≥ 10)	0	0	0	0	
Mean ±SD	1.60±0.90		5.18±1.43		

*Statistical significance

Table (5): T-test of Intestinal Sound Rate and Total Constipation Assessment Scores among three Assessments within each Group (Total=100)

Variable	Hydrotherapy Group(50)		Laxative Group(50)	
	t-test	p-value	t-test	p-value
Intestinal Sound Rate				
First & Second Assessment	9.791	0.000*	6.945	0.000*
Second & Third Assessment	7.555	0.000*	2.104	0.040*
First & Third Assessment	15.395	0.000*	9.223	0.000*
Total Constipation Assessment Scores				
First & Second Assessment	26.580	0.000*	24.934	0.000*
Second & Third Assessment	10.356	0.000*	0.628	0.533(NS)
First & Third Assessment	41.880	0.000*	22.900	0.000*

*Statistical significance. (NS)= not significant

4-Discussion:

The discussion of this study is presented in the following sequence: *part I* related to description of subjects' characteristic, *part II* is devoted to highlighting variables related to physical assessment; *part III* presents findings related to the differences between the two methods of relieving constipation.

Part I: Subject Characteristics:

The current study findings showed that both groups subjected to (hydrotherapy and laxative treatment) were approximately similar in their characteristics. More than half of both groups were male patients. This could reflect that male populations were exposed to orthopedic problems because of the nature of their physical hard work making them liable to orthopedic accidents. They are young adult, their age ranged between 20 to 40 years old. The researchers excluded older adults because there is a high risk of postoperative complications among elderly, which may affect their intolerant to drink large amounts of water as they may develop constipation as the result of aging process; this coincide with McKay et al., (2012) who pointed out that older adults may consume insufficient amounts of fluid that can predispose them to constipation.

The study participants' educational level was nearly similar .Both groups having either primary or secondary education. More than half of patients in both groups in the present study are coming from urban areas; this result is in agreement with Johanson, (2007) who reported that constipation is more common in rural areas . The current study showed that participants had monthly income of less than or equal 500 Egyptian pounds. That could explain why all of them are treated in a general governmental hospital, were the cost of treatment is less than in private hospital. Dennison et al., (2007), Kleinman, Brook, and Melkonian, (2007) mentioned that costs associated with

constipation including direct costs such as evaluation and treatment. Furthermore, Rao,(2007) reported that each year, more than \$800 million is spent in the United States on over-the-counter laxatives, the mainstay of therapy for constipation. While in Egypt there is no a definite cost indicated for treatment of constipation.

Part II: physical assessment:

All participants in the current study complained of acute constipation post operatively. This was evident by the first assessment which revealed that all the participants of both groups reported that they have constipation after their orthopedic surgery. Assessment data revealed intestinal sounds heard firstly ranged between 6 to 10 / minute. This might be attributed to several causes supported by many studies. One of which is the analgesic drugs for postoperative pain. Mather, (2013), McKay, Fravel & Scanlon, (2012), Heisler, (2011), and Selby & Corte, (2010) all agreed that the primary reason for constipation after surgery is that the prescribed drugs given for pain relief, as side effect of opioids as a common pain killers.

A second cause would be due to hospital environment as the patients may see it as a strange place compared to their homes and might suppress the urge to defecate because of lack of privacy, inconvenience and change the natural position for defecation. This concur with Read & Timms, (2007) and McKay et al., (2012) who added that factors that contribute to the development of constipation in the hospital include lack of toilet facilities. Moreover, Cohn, (2010) explained that voluntary withholding of stool is a common cause of constipation. The choice to withhold can be due to factors such as fear of pain, fear of public restrooms, or laziness. The study results could be also due to the nature of disease as orthopedic patients are immobilized because of traction and/ or lower limb surgery causing limited movement especially in the recovery period. This match with Bharucha, Pemberton, & Locke, (2013) and Ho, et al.,(2008) who stated that prolonged stay in bed could lead to constipation. Furthermore, Tariq, (2007) explained that more general reduction in rectal sensitivities and loss of normal defecation reflex, immobility and poor access to toilet are causes constipation. Heisler, (2011) added that suddenly spending most of time in bed resting can help to trigger about of constipation. Also, as part of preparation for surgery, the patient in the current study may have been instructed not to eat or drink after surgery, may have been told to drink minimally and perhaps not eat at all for a day. The combination of too little fluid and no food intake can work against the body's normal routine of elimination, causing constipation. This coincide with Ho, et al.,(2008) who stated that decrease in oral intake, especially fluid and fiber, during the first few days postoperatively may also contribute to the occurrence of constipation.

After using constipation treatment approaches, it was obvious that in the second and third assessment of intestinal sound, there were statistical significant differences between the two groups. The group that used laxative (glycerin suppository) has higher intestinal sound that reaches to 36 to 40 / min. compared to hydrotherapy group which reaches 21 to 25/ min. This result might illustrate the effect of glycerin suppository, which stimulates intestine and increase its movement. This coincides with American Cancer Society, (2013), Gandell , Straus , & Bundookwala, (2013) and Weitzel & Goode, (2012) who explained that glycerin suppository pulls water from the intestines into the lumen of the colon , which stimulate movement of intestines . Bharucha, Pemberton, & Locke, (2013), Weitzel & Goode, (2012) and Ho et al.,(2008) affirmed that the main adverse effects with osmotic laxatives is diarrhea. Russo, (2010) reported that there are no side effects associated with Water therapy to treat constipation. On the other hand Müller-Lissner et al., (2005) and Yuan, (2005) mentioned there is no evidence that constipation can be successfully treated merely by increasing fluid intake, unless there is evidence of dehydration. In that case, constipation might be ameliorated to some extent by the added fluids.

By the third assessment (after 7 days of using the treatment method), there was a marked decrease in abdominal distension among the two groups. Hunt & Lacy, (2007) affirmed that the key steps in evaluating a patient who presents with constipation that include checking for the presence of abdominal pain as a primary symptom. The amount of abdominal gas distinctly decreased among hydrotherapy group after 7 days of treatment; whereas in the group using laxative it was increased along the 7 days of treatment. Less frequent bowel movement, oozing liquid stool and rectal fullness or pressure were improved among the group receiving hydrotherapy, whereas less level of improvement was evident among the group receiving laxative. This could be attributed to side effect of glycerin suppository; this result correspond with Krinsky, (2011), Wilhelm & Ruscini, (2009) and James, et al., (2008) who stated that acute constipation can be relieved with the use of glycerin suppositories. Occasionally, patients may experience mild adverse effects as rectal irritation flatulence, bloating, abdominal cramping, nausea, and diarrhea with higher doses. However, when used appropriately, it remains a safe and efficacious option for the treatment of constipation.

The presence of rectal pain with bowel movement was manifestly decreased among hydrotherapy group by the third assessment, while this complains contributed to exist among laxative group. This could be due to the process of suppository insertion which can cause rectal pain, this coincides with O'Han, Gallarano & Kaharick, (2013) who clarified that Laxatives are considered an irritant and stimulant to the colon; and March, (2013) mentioned that laxatives are usually well tolerated, but may cause bloating and cramping. Wikipedia, (2013) stated that the side effects associated with glycerin suppository use are usually local and pass in a short time after the bowel movement. Bloating, gases, anal irritation and a burning sensation may occur shortly after the administration, but in most cases are only brief in duration.

Accordingly, throughout the 3rd assessment, small volume of stool and ability to pass stool are noticeably improved among the group who using hydrotherapy, while moderate improvement occurs among the group who using laxatives. These could explain the effect of water on the body to add fluids to the colon and bulk to stools, making bowel movements softer and easier to pass, but laxative only works on the lumen of the colon meanwhile has some side effect. Moreover, Olson, (2013) and O'Han, Gallarano & Kaharick, (2013) explained that repeated use of suppositories to combat constipation can make the problem worse in the long run. Suppositories only temporarily stimulate the colon walls and do not strengthen it; because the colon may become used to, and dependent upon suppositories to function which can actually weaken the colon muscles. When those muscles are weak they lack the peristalsis action necessary to keep fecal matter moving through the colon. On the other hand Johanson, (2007) reported that clinical trials suggest that some laxatives increase stool frequency and improve consistency. However, Ramkumar & Rao, (2007) and Chaussade & Minic, (2007) commented that the duration of most of these studies was relatively short, ranging from 72 hours to 4 weeks. Lastly, Cohn, (2010) concluded that combination of encouragement of fluids and laxatives may be useful to overcome constipation problem.

Part III: The differences between the two methods of relieving constipation.

The current study revealed that the total mean score of total constipation assessment was different between the two groups. Therefore, hypotheses were accepted. As the hydrotherapy group had lower total constipation scores than the laxative group. This could explain the effect of non-pharmacological effect of hydrotherapy which would relieve constipation safer than pharmacological effect by using laxative; which could cause some side effect of pharmacology. Wald, (2012) mentioned that Laxatives are most commonly used for treatment of constipation, but frequent use of these drugs may lead to some adverse effects. The primary limitations of laxatives are the lack of effectiveness in alleviating global symptoms of constipation and the associated adverse effects.

It was also come out from the study that there is a difference between the two groups in intestinal sound rate between the three assessments. That intestinal sound in hydrotherapy group was increased, but not exceeding normal range, while in laxative group; the sounds exceeded the normal range; this could explain the side effect of using suppository. These results coincide with The Colon Therapist Network, (2013) who reported that using colon hydrotherapy and natural remedies to relieve constipation are better than laxatives. Also, drugstore chemical laxatives should be avoided when having constipation. They can become habit-forming, may damage colon and cause serious side effects if used for too long. Sometimes these laxative drugs actually create or exacerbate a complicated problem trying to relieve constipation. To keep body in chemical balance, it is preferably use natural remedies for constipation. On the other hand, Lloyd, (2013) mentioned that constitutional hydrotherapy can be effective for chronic constipation; however, hydrotherapy is not a treatment modality that has undergone extensive research.

Mather, (2013) reported that utilizing the healing power of water, and Picco, (2013) added that drinking extra fluids including water ,can have a beneficial influence in preventing and treating constipation. Whereas, Cohn, (2010) encouraged combination of fluids and laxatives which may be infrequently useful to overcome constipation problem. Finally, Mentis & Kang (2011) and Eoff J. & Lembo (2008) reported that a lack of evidence-based algorithms leaves many providers to treat patients empirically. Health team personnel can assist patients to provide information on treatment options.

5- Conclusion:

The current study focused on pharmacologic therapies in the form of laxative and non-pharmacological in the form of hydrotherapy to relieve postoperative constipation for orthopedic patients. The results revealed the acceptance of hypotheses of the current study. As well as revealed a statistical significant difference between the

two groups in the total constipation assessment scores, and concluded that acute constipation can be relieved with the use of hydrotherapy and glycerin suppositories with reserve to be used infrequently.

6- Recommendation:

The study recommends the following: Hydrotherapy may be tried as a non-pharmacological constipation relieving modality for its safety compared to pharmacological treatment. Consideration should be given to the population to be treated with hydrotherapy (glycerin suppository). Adults are in a better situation to use this treatment modality more safely. A definite cost for treatment of constipation needed to be indicated in Egypt as it is in all over the world. Further research is warranted to conduct studies in nursing to relieve patient's constipation for different types of hospitalized patient and in different hospital settings to applied evidenced based nursing practice.

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