Effect of Early Oral Hydration on Post Cesarean Outcomes

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Abstract: Background: The traditional approach where patients receive nothing orally till return of bowel function (passage of flatus or bowel motion), followed by slow advancement of feeds to a solid diet postoperatively is now challenged. Although somewhat controversial, there is increasing evidence demonstrating the safety of early oral hydration after uncomplicated cesarean section. This study aimed to identify the effect of early oral hydration on post-cesarean outcomes. **Design:** A **r**andomized controlled trial design was used and conducted at King Fahd Hospital of the University. Eastern Province-Saudi Arabian. Forty post-cesarean women under regional anesthesia were selected from the previously mentioned setting and divided equally and randomly into experimental and control groups according to random table number. The experimental group included 20 women who received oral hydration after 2 hours postoperatively (first drink) gradually and as tolerated and the control group included 20 women who received routine hospital oral hydration regimen postoperatively. One tool was used and entailed three parts. Part one (socio-demographic & obstetric data), part two (intra-operative data) and part three (GIT & other post cesarean outcomes). **Results:** Both groups were similar in respect to general characteristics & obstetrical data. Experimental group had significant earlier bowel sounds & bowel movement *P*= (0.001 & 0.003, respectively), earlier removal of Folly's catheter, ambulated with earlier median duration (12.5 & 25.6 hours and 15 & 28.5 hours, respectively) and significant shorter hospital stay with a median value of 3 days among the experimental group compared to 4 days among control group. **Conclusion & Recommendation:** Early oral hydration had benefits on return of bowel sound and motility, ambulation, breast feeding and resuming regular diet, decreasing duration of IV fluid administration and shortened hospital stay than the conventional IV regimen. So this study recommends early oral hydration for women who had uncomplicated cesarean section under regional anesthesia and recommends more researches to be done to assess patient's tolerability and satisfaction to early oral hydration.
[Sahar A.Al-Ghareeb, Eman R Ahmad, Haifa A Turki. **Effect of Early Oral Hydration on Post Cesarean Outcomes. .** *Am Sci* 2013;9(8):70-78]. (ISSN: 1545-1003). http://www.jofamericanscience.org. 11.

Key Words*:* Early oral hydration, post Cesarean outcomes.

1. Introduction

Cesarean sections are considered routine procedures and also the most common major hospital surgical procedure performed in the developed and developing world with a low chance of mortality for mother and child [(1-3)]. All surgeries involve the risk of infection, complications from anesthesia, internal injuries, postoperative adhesions and hemorrhaging [(2)]. However, as regards cesarean section it is a less commonly surgical operation associated with injury to the surrounding organs such as the bladder and bowel [(4)] Furthermore, the patient should receive approximately 3-4 L of IV fluids from the initiation of IV fluids replacement through the first 24 hours. As the shorter duration of IV hydration could protect the mother from the discomfort of frequent IV cannula changes, risks of fluid extravasations, and phlebitis.[(5)] The patient can be started on clear liquids 12-24 hours after an uncomplicated procedure, and diet can be advanced accordingly. When the patient is able to tolerate good oral intake, the IV fluids may be stopped [(6)]

Furthermore, women who had a caesarean section had solid food withheld for the first 24 hours in the belief that this would prevent gastrointestinal complications. [(1)] There is wide spread belief that postoperative ileus follows all intra-abdominal surgical procedures as a result of: anesthesia - and bowel manipulations**.** [(7)] However, caesarean sections are generally short operations involving minimal bowel manipulation or not, so it may not disrupt bowel function at all**.** [(5,8)]

Early initiation of oral hydration after caesarean delivery is safe and well tolerated and can be implemented without an increase in gastrointestinal symptoms or paralytic ileus [(7)] Drinking and eating again soon after caesarean section does not seem to cause any problems for women, and may even speed recovery. [(8)]

The logic behind early enteral feeding is that food intake can stimulate a reflex that produces coordinated propulsive activity and elicit the secretion of gastrointestinal hormones, causing an overall positive effect on bowel motility. Rather than waiting for bowel sounds to return after patients undergo surgery, we can try to get the gut working again sooner**.** [(9,10,11)] It is evident that the positive effect on the gastrointestinal tract from such stimulation by early oral hydration decreased the length of' postoperative ileus. [(7)] Furthermore, the cost of oral hydration is much less than the

daily cost of 3 liters of intravenous fluids, giving sets, cannulas. Also, the economic impact of early discharge from the hospital after an uncomplicated caesarean section cannot be over looked, for these, the early initiation of oral hydration after caesarean delivery is associated with a shorter hospital stay.[7]

Caesarean sections are generally short operations involving minimal, or no bowel manipulation, so early oral hydration after cesarean deliveries should not result in any complications and has other benefits, such as early ambulation and a shorter hospital stay. [4,12] Early oral hydration effectively maintains fluid balance and it is associated with successful breast feeding, less side effects than the conventional intravenous hydration.[6] Furthermore, good nutritional status contributes to postoperative wound healing and recovery and maintaining the bowel function postoperatively also aids in the healing process. In addition, early oral intake is associated with early recovery of normal bowel function that has been shown to be an important determinant for improving postoperative outcomes. [13] Several studies emphasized that early hydration after uncomplicated cesarean section had reduced the rate of ileus symptoms, mean time interval to bowel movement and duration of intravenous fluid administration. It is suggested that the early oral hydration regimen to be considered as it offers benefits to the patients such as less suffering from thirst and hunger, shorter hospital stay and save cost. [4,5]

Because studies done in this context are limited in KSA specially Eastern region, so this study is designed to initiate early oral hydration (2 hours) instead of 8 hours post cesarean under regional (spinal or epidural) anesthesia, and that is suspected to be essential in early return of bowel motility and other favorable post cesarean outcomes, such as early ambulation and discharge.

Hypothesis: Women who underwent cesarean births under regional anesthesia (spinal-epidural anesthesia) and started early oral hydration will have better post cesarean outcomes than those who receive routine hospital care for the same type of anesthesia.

Aim of the study: The aim of this study is to identify the effect of early oral hydration on post-cesarean outcomes.

Operational definition

1. **Early oral hydration** after cesarean section means initiating oral hydration two hours after operation. As the recovery time will be calculated from the time the patients entered the recovery room after operation until the time they could tolerate oral fluids immediately after arriving of the postpartum ward (2 hours postoperatively).
2. **Post cesarean outcomes** means, time of return bowel sounds, first passage of flatus, evidence of abdominal distension, receiving stool softener, presence of nausea or vomiting, mild ileus symptoms (anorexia, abdominal cramping, non-persistent nausea and or vomiting) or severe paralytic illeus (abdominal distension, >3 episodes of vomiting in 24 hours and inability to tolerate oral fluids or requiring nasogastric tube or abdominal X-ray) and other post cesarean outcomes as time of first ambulation, time of initiation of breast feeding & duration of hospital stay after operation.

Ethical approval

The study was approved by the University of Dammam ethical committee. An official permissions and approvals obtained from hospital administration, chairman of OBGYN department and chairman of nursing administration. An informed oral consent was taken from the women to participate in the study and informed oral approval was obtained from the OBGYN and anesthesiologist residents.

2. Subjects and Method:

Research Design:

An experimental research design was carried out in this study.

Setting

The study was carried out in the postpartum ward King Fahd University Hospital at Al-Khobar. Saudi Arabian. This hospital was chosen for data collection because it is a tertiary level care hospital and had acceptable admission rate of cesarean sections.

Participants

A total number of 40 post cesarean birth women from the previously mentioned setting was comprised the study subjects. They were divided equally and randomly into experimental and control groups according to random table number. The experimental group included 20 women who received oral hydration after 2 hours postoperatively (first drink) gradually and as tolerated and the control group included 20 women who received routine hospital oral hydration regimen postoperatively. Women who fulfilled the following criteria were included in the study:

Inclusion criteria:

- Uncomplicated pregnancies.
- Regional (spinal-epidural) anesthesia.
- (Uncomplicated) Planned and/or emergency cesarean section.

Exclusion criteria:

- Receiving general anesthesia.
- Having bleeding disorder.
- Having intraoperative bowel or bladder injury.
- Receiving magnesium sulfate treatment.
- Having medical diseases.

Tool of data collection

One assessment tool was used for data collection. It entailed three parts (I, II & III) that were developed and used by the researcher to achieve the aim of the study as following:

- Part I entailed data related to sociodemographic and obstetric data in both experimental and control groups upon admission as (women's age, level of education, occupation as a socio-demographic data) and height, weight for measuring body mass index and weeks of gestation, number of gravidity, parity, receiving regular antenatal care and indications of cesarean section as obstetrical data).
- Part II included data related to intraoperative findings as; NPO (nothing per oral) time before surgery, duration of surgery, IV fluid amount and estimated blood loss.
- Part III entailed data related to fluids received and GIT outcomes in specific as (Time onset for oral hydration, type of intravenous fluid and oral hydration, amount of intravenous fluids until discontinuation in ml/ 24 hours and time onset of bowel sound and motility) and other postcesarean outcomes as (time of folly's catheter removal, ambulation and initiation of breast feeding /hour and length of hospital stay/day).

Method

A randomized controlled trial was conducted between May 2012 to October 2012 at King Fahad Hospital of Dammam University in Khobar, Saudi Arabia. The institutional ethics committee approved the study protocol. A total of 40 eligible postcesarean women under regional anesthesia were selected according to the inclusion criteria and divided randomly by simple random sampling method. The previous mentioned setting was visited by the researcher 5 times a week from Saturday to Wednesday in the morning and afternoon duty's hours weekly throughout the mentioned period. The patients were assigned to the early oral hydration group (The experimental group) in which oral hydration started at 2 hrs postoperatively or the conventional regimen group (the control group) whose follow the routine hospital regimen of starting oral hydration at 8 hrs postoperatively). Oral informed consent was obtained from all participants after interviewing them to enroll in the study. The tool of data collection was developed and used by the researcher after reviewing the related literature. The tool content validity was tested by 5 juries who are experts in the maternity nursing and medical field. A pilot study was conducted on 10% of the studied women to test feasibility of tools and time required to be applied. Simple modification was done; the recruited women for pilot study were excluded from the study. Following the pilot study, the tool of data collection was reconstructed and made ready for use. All subjects had more than 2 hours of NPO time before surgery and had fulfilled cesarean section under regional anesthesia by an Obstetrics-Gynecology resident under the guidelines of the hospital. The researcher used the assessment tool, part one in assessing the general and socio- demographic characteristics and obstetrical data before the surgery for both groups, the average time needed to complete the assessment tool part one ranged between 5- 10 minutes, depending upon the degree of understanding and response of the interviewee. The researcher obtained an informed oral approval from the OBGYN and anesthesiologist residents in duty individually after giving them full instructions about the nature of the research, the average time needed about 10-15 minutes. During surgery, cases who met one of the exclusion criteria were omitted from the study for both groups. Assessment tool, part two (observational sheet related to intraoperative data) was used by the researcher to collect intraoperative data for both groups. The time of onset of surgery was designated as zero hour. The operative time was defined as the time from the onset of surgery to the completion of skin closure. The day of surgery (day 0) was considered to be the first 24 hours, the first postoperative day (day 1) encompassed the next 24-48 hours, the second postoperative day (day 2) covers the next 48-72 hours. Duration of intravenous fluid administration was defined as the time from the end of surgery to the removal of intravenous catheter. The researcher used the stethoscope before and immediately two hours after recovery and used it intermittently until auscultation of positive bowel sound and recorded it for both groups. Assessment tool, part three was used by the researcher for a period that started from admission to recovery room till discharge from the hospital for both groups to document data related to postcesarean outcomes; the regimen of IV fluids and oral hydration were processed as follows:

A) The control group received IV hydration for 24 hours postoperative and withheld oral hydration for 8 hours then sips of water advanced to liquid diet during the first day then soft diet on the second day. The researcher observed and recorded all the previously mentioned information included in the sheet for this group.

B) The experimental group received oral fluids 2 hours after surgery, starting gradually with 250cc clear fluids (water or juice) according to patient's tolerability and the researcher auscultated the intestinal sounds before and immediately after receiving 250 ml oral fluids as initial intake, then patient was encouraged by the well informed nurse in duty to drink the tolerable amount of fluid advanced to a soft diet gradually after auscultation of positive bowel

sounds by the researcher or the resident. According to the resident's evaluation of the patient's condition, the patient proceed to regular diet according to her tolerability, followed by discontinuation of IV fluid, removal of folly's catheter, encouraging breast feeding and ambulation by the in duty nurse for women in both groups. Researcher's responsibility was to fill the assessment sheet for the previously mentioned data for both groups and did not document the actual quantity of food ingested as it is mainly according to patient tolerability and needs. The researcher visited each mother in both groups daily till discharge and documented all the requirements in the assessment tool.

A comparison between the experimental and the control groups was done for all mentioned data to identify the effect of early oral hydration on post cesarean outcomes.

Statistical analysis:

Statistical analysis was carried out using the Statistical Package for Social Science (SPSS) version (17). Comparison between the experimental and control groups by using of chi-square test for qualitative variable and t test for quantitative variables at 95% confidence interval. A *p*-value < 0.05 was considered as statistically significant and highly significant when p-value was < 0.01. The test of normality for distribution of data was applied. It was observed that this test is statistically significant in relation to post cesarean outcomes i.e. the distribution is abnormal. Accordingly the mathematical presentation is by median and interquartile range. Moreover, the non-parametric test was utilized for statistical analysis. Spearman's correlation (as a measure for intensity of association) was calculated for two quantitative variables and if it is significant the regression equation (for prediction of the dependent by knowing the independent variables) is formulated. Studying the relation between the dependent variables and the independent ones was carried out

3. Results

A total of 40 postcesarean women were recruited in the study, their socio-demographic data were presented in **table (1**) shows that both groups were comparable regarding their socio-demographic characteristics.

Concerning obstetrical data, **table (2)** clarifies that there was no significant difference between the experimental and control groups regarding obstetrical data with respect to (gravidity, parity, number of abortions and gestational age). The majority (90%) of both groups received regular antenatal care and also the majority of them (85% & 90%, respectively) attended antenatal clinic initially during the first trimester. However the vast minority (5%) among both groups their initial visit started during the second trimester. No significant difference was apparent among both groups in respect to maternal and fetal indications of cesarean section.

Table (3) reveals that the majority among experimental and control groups (95% & 85%, respectively) had no nausea. Furthermore, no significant difference was observed among both groups regarding occurrence of vomiting. As regards the GIT patterns, the experimental group initiated bowel sounds significantly earlier with a median value of 3 hrs compared to (6.5 hrs) for the control group. Consequently the bowel movement returned significantly earlier with median duration of 29 hours among the experimental group compared to 54 hours among the control group. As regards occurrence of constipation, it was observed that only 15.8% among the experimental group compared to one-half (50%) of control group had constipation with a significant difference which clarified that early oral hydration decrease incidence of constipation among experimental group as RR=0.3, and 35% of occurrence of constipation is attributed to the routine hydration regimen as ARR=35%. From that finding we need to carry out the initiation of early oral hydration on about 3 post cesarean women in order to avoid one from having constipation as NNT~ 3%. Early oral hydration decrease incidence of paralytic ileus among experimental group as RR=zero, 10% of having paralytic ileus is attributed to routine hydration regimen as ARR= 10%, this finding indicates that we need to carry out the initiation of early oral hydration on 10 post cesarean women in order to prevent one case of having paralytic ileus as NNT=10 %.

As regards other post cesarean outcomes, **Table (4)** concludes that women who received early oral hydration removed their folly's catheter and ambulated earlier compared to women who received conventional IV therapy with median duration (12.5 & 25.6 hours and 15 & 28.5 hours, respectively). Furthermore, as regards breast feeding, about four-fifths (80% & 85%) among the experimental and control groups respectively lactated their babies with a median time of initiation 19.5 hours for the experimental group compared to 36 hours among the control group with significant difference. However, three out of four cases among the experimental group are not lactating for NICU admission compared to two cases out of three among the control group. As regards hospital stay, it was observed that a significant earlier hospital discharge with a median value of 3 days among the experimental group compared to 4 days among control group.

As shown in **table (5)**, early initiation of regular diet, bowel movement and early hospital discharge as dependent variables (Better post cesarean outcomes) are not significantly related to

either duration and indications of cesarean section as independent variables among experimental and control groups as *P*=0.8 & 0.6, *P* =0.07 & 0.1 & *P* =0.3 & 0.8, respectively.

Table (1): Distribution of study subjects according to their socio-demographic characteristics.

Variable	Experimental group (N=20)	Control group (N=20)	Test of significance
Age: Median (IQR)	32 (13.5)	30 (6.8)	Z=0.854 P=0.4
Educational Level:			
• Illiterate	0 (0.0)	1 (5.0)	
• Read & write	2 (10.0)	2 (10.0)	
• Primary	4 (20.0)	0 (0.0)	X^2_1=0.000 P=1
• Intermediate	2 (10.0)	5 (25.0)	
• High school	6 (30.0)	6 (30.0)	
• University and more	6 (30.0)	6 (30.0)	
Occupation:			
• **House wife**	14 (70.0)	16 (80.0)	X^2 = 0.533
• **Working**	6 (30.0)	4 (20.0)	*P* = 0.5
General characteristics (BMI)			
• Median (IQR)	24.2 (14.6)	25.5 (6.9)	Z=0.352 *P* =0.7

Z= Mann Whitney Test IQR =interquartile range

Table (2): Distribution of study subjects according to their obstetric history.

Obstetric history	Experimental group N=20	Control group N=20	Test of significance
Gravidity: Median (IQR)	3 (5.8)	3 (4)	Z=0.123 *P* =0.9
Parity: Median (IQR)	2 (6.0)	2 (2.8)	Z=0.069 *P* =0.9
Abortion number:			
No abortion	**13 (65.0)**	**15 (75.0)**	
1	4 (20.0)	2 (10.0)	X^2_1= 0.476
2	1 (5.0)	1 (5.0)	*P* = 0.5
3	1 (5.0)	1 (5.0)	
4	1 (5.0)	1 (5.0)	
Gestational age (Wks): Median (IQR)	38.0 (1.8)	38 (1.0)	Z=0.167 *P* =0.2
Antenatal care			
Regular	18 (90.0)	18 (90.0)	FETP=1
Irregular	2 (10.0)	2 (10.0)	
Time of initial visit			
1st trimester	17 (85.0)	18 (90.0)	
2nd trimester	1 (5.0)	1 (5.0)	FETP=1
3d trimester	2 (10.0)	1 (5.0)	

FET= Fisher's Exact Test

Table (3): Distribution of study subjects according to GIT findings as one of the post-cesarean outcomes.

Gastro-intestinal tract findings	Experimental group (N=20)	Control group (N=20)	Test of significance
Nausea:			
Occurrence:			
Yes	1 (5.0)	3 (15.0)	FET *P* =0.6
No	19 (95.0)	17 (85.0)	
Time (hours):			
Median (IQR)	3	8(6)	Z=1.414 *P* =0.2
Vomiting:			
Occurrence:			
Yes	0 (0.0)	1 (5.0)	
No	20 (100.0)	19 (95.0)	FET P= 1
Bowel motility:			
Initiation of bowel sound (hours)			
Median (IQR)	3(1.8)	6.5(2)	Z=4.582 *P* =<0.001
Bowel movement (hours):			
Median (IQR)	29(26.3)	54(35.5)	Z=2.964 *P* =0.003
Constipation			X^2= 5.584* *P* = 0.02
Yes	3 (15.8)	10 (50.0)	RR=0.3
No	17 (84.2)	10 (50.0)	ARR=35%
			NNT=2.9~3%
Laxative intake:			
Yes	3(15.8)	10(50.0)	X^2= 5.584* *P* = 0.02
No	17(84.2)	10(50.0)	
Laxative frequency:			
1	2 (66.7)	6 (60.0)	FET P= 1
2	1 (33.3)	2 (20.0)	
3	0 (0.0)	2 (20.0)	FET *P* = 0.5
Paralytic ileus			RR= 0
Yes	0 (0.0)	2 (10.0)	ARR= 10%
No	20 (100.0)	18 (90)	NNT=10%

RR = relative risk NNT= Number needed to treat ARR= Attributed relative risk * means significant difference

Table (4): Distribution of study subjects according to other post-cesarean outcomes.

Variable	Experimental group (N=20)	Control Group (N=20)	Test of significance
Foley's catheter Removal (hours)			Z=3.927* *P* =<0.001
Median (IQR)	12.5 (10.8)	25.6 (7)	
Ambulation initiation (hours)			
Median (IQR)	15 (10.8)	28.5 (5)	Z=4.256* *P* =<0.001
Breast feeding			
Yes	16(80.0)	17(85.0)	FET=1
No	4(20.0)	3(15.0)	
Initiation (hours)			
Median (IQR)	19.5 (14)	36 (21)	Z=3.478* *P* =0.001
Hospital stay (days)			Z=2.687* *P* =0.007
2	2 (10.0)	0 (0.0)	
3	10 (50.0)	5 (25.0)	
4	8 (40.0)	11 (55.0)	
5	0 (0.0)	4 (20.0)	
Median (IQR)	3 (1)	4 (0.8)	

Table (5): Multiple regression analysis models for the three better post-Cesarean outcomes as dependent variables and both duration and indication of surgery as independent variables among both groups.

Independent variables / groups	Better post cesarean outcomes		
	Initiation of regular diet	Bowel movement (GIT)	Hospital stay (other outcomes)
Experimental group			
F	0.259	3.120	1.274
P	0.8	0.07	0.3
Control group			
F	0.605	2.307	0.276
P	0.6	0.1	0.8

F means: Annova test for the models.
Independent variables mean the duration and indications of surgery.

4. Discussion

The traditional approach where patients receive nothing orally till return of bowel function (passage of flatus or bowel motion), followed by slow advancement of feeds to a solid diet postoperatively is now challenged. Although somewhat controversial, there is increasing evidence demonstrating the safety of early hydration after uncomplicated cesarean section.[12] The current study had been undertaken to assess the effectiveness of early oral hydration on post-cesarean outcomes, including: bowel functions, ambulation, breast feeding, folly's catheter removal, duration of received postoperative IV fluids and length of hospital stay.

This study shows that the socio-demographic and obstetrical characteristics (age, occupation, educational level, and BMI, gravidity, parity, gestational age and attending antenatal care) in the experimental and control groups are equivalent. **(Tables 1&2)** These findings were concurrent with several studies which found that no significant difference between both groups in respect to socio-demographic characteristics, and also in the same line with different studies. [1, 4, 5,12]

Taking into consideration the average postoperative gut dysmotility is widely reported as lasting 0 to 24 hours in the small intestine, 24 to 48 hours in the stomach, and 48 to 72 hours in the colon.[5] In this respect, the present study demonstrated that women in the early hydration group had a more rapid return of bowel function including bowel sounds, with a substantially significant shorter median postoperative time interval to the first active bowel sounds (3hrs) compared to (6.5 hrs) for the delayed hydration group. Based on this finding, the bowel movement returned significantly earlier with median duration of 29 hours among the experimental group compared to 54 hours among the control group **(Table 3)**. That explained the positive effect of early oral hydration on the gastrointestinal tract, where such stimulation may decrease the length of postoperative ileus. This finding was in line with **ADLJPA,**[7] who studied early initiation of oral feeding after caesarean delivery, mentioned that the women in early hydration group had more rapid return of bowel function than the delayed hydration group.

As regards postoperative GIT findings among the studied groups, **Watcha** [14] who studied postoperative nausea and vomiting, mentioned that postoperative nausea & vomiting complicates the lives of both patients and health care providers. In the current study, the majority among experimental and control groups (95% & 85%, respectively) had no nausea. However, only one case reported nausea among experimental group with median onset time 3 hours compared to 3 cases among the control group with median onset time 8 hours. Furthermore, no significant difference was observed among both groups regarding occurrence of vomiting. Similarly **ADLJPA** [7] found that the rate of gastrointestinal morbidity, including nausea and vomiting was not significantly different in the two studied groups.

However, the current study was in contrast with **Karmer** [15] who studied the effect of immediate feeding of cesarean patients on the incidence of ileus, found that more complaints of nausea were found in the late feeding group. Moreover, in the contrary with **Jeanne** [16] who applied a prospective controlled trial of early postoperative oral intake following major abdominal gynecologic surgery found that vomiting was more evident and frequent among the experimental group.

Furthermore, as regards occurrence of constipation, it was observed that only (15.8%) among the experimental group compared to one-half (50%) of control group had constipation with a significant difference. Consequently all constipated women among both groups received laxatives, in respect to frequency of receiving laxatives among experimental and control groups, it was clear that none among experimental group compared to (20%) among control group received laxatives for more than two times, with no significant difference, that would explain the benefit of early oral hydration on protecting the women from the occurrence of bowel discomfort that may present after exposure to anesthesia.

As regards other GIT findings, **Michael D**[17] mentioned that postoperative ileus can selectively affect the stomach, small intestine, or large intestine, each with different causes and clinical presentation and each managed differently. The finding of the present study revealed that no reported cases for experimental group compared to one-tenth (10%) among the control group had paralytic ileus, with no significant difference. This finding disagrees with **Varisara** [11] who found in his study that there is a statistical significant difference in respect to mild paralytic ileus symptoms, that it occurred more in conventional-fed patients. These results also confined another benefit of early oral hydration that it significantly decreased the incidence of constipation and protect from occurrence of paralytic ileus. **(Table 3)**

Concerning time of folly's catheter removal, the current study concluded that women who received early oral hydration removed their folly's catheter earlier than those in the conventional IV therapy with median duration (12.5 & 25.6 hours, respectively). **(Table 4)** This finding was in the same line with **Sumita**[18] who established a comparative study between early versus late oral feeding after cesarean section found that folly's catheter use was significantly less in time among the early hydration group compared to the control group.

Regarding initiation of ambulation, it was observed that the women in experimental group ambulated earlier than control group with significant difference. **(Table 4)** This could probably be explained as the adequate oral hydration enhanced early energy intake and early discontinuation of IV fluids that in turn may affect positively on postoperative ambulation. This finding is supported by **ADLJPA**[7] who found that women in early hydration group got out of bed (patient mobilization) significantly earlier ($p = 0.001$) than the control group.

Taking in consideration breast feeding, this study revealed that about four-fifths (80% & 85%) among the experimental and control groups respectively lactated their babies with a significant shorter median time of initiation (19.5) hours for the experimental group compared to (36) hours for the control group with significant difference. This may be attributed to those women who started oral hydration earlier than usual felt recovered and comfortable to breast feed their babies earlier than those who received conventional IV fluids. Similarly, **Teoh** [5] found that the early hydrated women had earlier commencement of breastfeeding than the delayed group.

Furthermore, length of hospital stay was found to be significantly shorter in the early hydration group as evidenced by median 3 days compared to 4 days among control group with a significant difference $P=0.007$ **(Table 4)**. This finding seems to add another benefit of early oral hydration on hospital stay among the experimental group. This finding was approved in **(Table 5)** which concluded that early initiation of regular diet, bowel movement and early hospital discharge as dependent variables (Better post cesarean outcomes) are not significantly related to either duration and indications of cesarean section as subject's characteristics among experimental and control groups $F=1.274$, $P=0.3$ & $F=0.276$, $P=0.8$, respectively. In the same line, **Baris,**[19] who studied early oral hydration after cesarean delivery performed under regional anesthesia found that the early hydrated group had significant shorter hospital stay, $P<0.05$, but disagrees with **ADLJPA**[7] who found that the average hospital stay was similar and not statistically significant in both group, (5.5 days versus 6.0 days).

The previous findings could focus the light on the great role of the early oral hydration on reducing the length of hospital stay which is leading to promote vacancy of beds for other patients. Additionally, the safety and efficacy of early oral hydration, as no woman would be discharged unless she was fine.

Conclusion

In the light of the main study findings, it was concluded that, early oral hydration for women who underwent uncomplicated cesarean section under regional anesthesia had benefits on return of bowel sounds and motility, early resuming to regular diet, decreasing the duration of intravenous fluid administration, early ambulation, shorter median time of initiation of breast feeding and it shortened the length of hospital stay which consequently affect on hospital cost than the conventional IV regimen.

Recommendations

Based on the findings of the present study it was recommended that:

- Early initiation of oral hydration after caesarean delivery should be offered to women who have had uncomplicated cesarean section under regional anaesthesia.
- More researches are required to assess patient's fatigue, tolerability, satisfaction to early oral hydration after uncomplicated cesarean section.
- The hospital policy should be flexible for recovered motivated women with good social support and easy access to transport, to be discharged earlier for promoting vacancy of beds and saving costs.
- Further studies needed to confirm the findings of this small study by means of multicenter, larger and more methodology sounds trials to produce generalization of the study findings.
- More studies needed to assess early regular diet compared to conventional postoperative

diet on the incidence and severity of postoperative ileus.
- Early oral hydration after uncomplicated CS should be included in OB/GYN nursing curriculum.

Acknowledgement:
We would like to acknowledge all women who participating in this study and the OBGYN and anesthesiologist residents and staff nurse for their valuable participation.

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