

Original Article

The Effect of Gum Chewing, Early Oral Hydration, and Early Mobilization on Intestinal Motility After Cesarean Birth

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Keywords

gum chewing,
early oral hydration,
early mobilization,
intestinal motility,
cesarean section,
nursing

ABSTRACT

Aim: The aim of the study was to investigate the effect of gum chewing, early oral hydration, and early mobilization after cesarean birth on intestinal sounds, passing gas, and intestinal evacuation.

Design: Randomized controlled study. Setting: This study was conducted at the Obstetrics Service of the one Obstetrics and Child Diseases Hospital.

Participants: A total of 240 females divided into 8 groups of 30 subjects each were included within the scope of the sample.

Methods: The women who underwent cesarean birth were divided into eight groups by using 2³ factorial test levels, depending on the use of three different methods of gum chewing, early oral hydration, and early mobilization. No intervention was applied to the women in the control group. For the other seven groups, the intestinal sounds were checked every 30 minutes with a stethoscope over the abdomen and the first time of passing gas and the first evacuation time were recorded by asking the mother. The data were evaluated with numbers, mean, and percentage calculations, Student's *t* test, one-way variance analysis, correlation, and Tukey HSD test.

Results: The intestinal sounds were heard earlier, gas was passed earlier, and bowel movements were earlier in the first group that received all interventions compared to the other groups ($p < .05$). The patient could not be discharged before 48 hours had passed after the cesarean birth according to the hospital protocol and the time of discharge was therefore not affected by interventions.

Linking Evidence to Action: All of the three different interventions, such as gum chewing, early oral hydration, and early mobilization after cesarean birth, increase intestinal motility. The interventions are recommended during postoperative routine care to shorten hospital stay and prevent postoperative ileus.

INTRODUCTION

Cesarean section is one of the most reliable abdominal surgical operations. Although cesarean section can be life-saving for the mother and baby when necessary, it carries the risk of causing more problems than vaginal birth (Izveren & Dal, 2011; Markey & Brown, 2002). Complications after cesarean section are similar to other abdominal surgeries such as appendectomy, inguinal hernia surgery and laparotomy (Izveren and Dal 2011). Among these potential complications are atelectasis, wound infection, paralytic ileus, urinary retention, and urinary tract infection. These complications also are among the most common problems after cesarean birth (Izveren & Dal, 2011). Some of these problems involve the gastrointestinal system (GIS). General anesthesia, surgical intervention in the abdominal region, trauma, narcotic analgesic use, and manual handling of the intestines during surgery lead to decreased gastrointestinal peristalsis. Nausea, vomiting, gastric dilatation, paralytic

ileus, abdominal distension, and constipation are among the GIS-related problems (Brenner, 2000; Çilingir & Bayraktar, 2006).

These problems lead to a longer hospitalization duration and are a serious financial burden due to the increase in hospital costs. On the contrary, the return of intestinal motility in a short time after cesarean birth has increased in importance as the multidisciplinary approach of Fast Track Surgery or the Enhanced Recovery After Surgery (ERAS) protocol, also known as the multimodal approach, have been developed (Kehlet, 2008; Kehlet & Wilmore, 2005; White et al., 2007). New evidence-based approaches are recommended in this protocol instead of traditional approaches for surgery and anesthesia. The use of this protocol has been observed to facilitate oral food intake in the postoperative period and significantly shorten hospitalization duration (Bozkırlı et al., 2012; Nygren, Thorell, & Ljungqvist, 2003). The approaches suggested in the ERAS

protocol can be applied after the cesarean surgery and, thereby, help speed up the healing process after cesarean surgery in the postoperative period.

Cesareans occur as an alternative method to maintain the health of the mother and the baby when vaginal delivery is risky or impossible. Worldwide, there is an increasing tendency toward cesarean birth as it prevents pelvic relaxation or enables the gynecologists to determine the time and duration of the birth. Also, cesareans may be preferred by mothers because of the fear of labor pain, the will to terminate the birth quickly, and the idea that cesarean birth is reliable (Coşkun et al., 2007; Dölen & Ozdegirmenci, 2004; Güney et al., 2006; Konakçı & Kılıç, 2002).

A high cesarean section rate is present in several countries. However, the cesarean birth rate suggested by the World Health Organization (WHO) in 2000 is 15%. According to the WHO report (2009), between 2000 and 2008, the average cesarean birth ratio in the world was 13.9%. This prevalence varies among countries. For example, the rate of cesarean section in Brazil is 41.1%, Mexico 36.1%, Portugal 34.0%, United States 30.2%, and Germany 27.8% (WHO, 2007). In Turkey, the rate of cesarean birth was 21.2% in 2003, 36.7% in 2008, and increased to 48.5% in 2013 (Hacettepe University, 2013).

INTESTINAL MOTILITY AFTER CESAREAN BIRTH

Cesarean birth causes problems such as endometriosis, wound infection, urinary tract infections, hemorrhage, postpartum hemorrhage, adhesion, hematoma, thrombophlebitis, venous and pulmonary embolism, coagulopathies, as well anesthesia-related problems (Berkman, 2004; Dölen & Ozdegirmenci, 2004). These problems are the leading causes of maternal morbidity and mortality during the postpartum period (Gizzo, Patrelli, Gangi, et al., 2013; Gizzo, Patrelli, Rossanese, et al., 2013; Gizzo, Saccardi, Patrelli, et al., 2013; Gizzo et al., 2014).

The length of hospitalization may be extended due to problems mostly caused by anesthesia; these include atelectasis, aspiration, pneumonia in the respiratory system, urinary retention, kidney dysfunction in the urinary system, nausea, vomiting, gastric dilatation, paralytic ileus, and adominal distension in the gastro intestinal system. Postoperative ileus is an important problem after abdominal surgery, which is the temporary breakdown of intestinal motility. Among the practices used to return intestinal motility, there is abdominal massage as well as interventions such as start of early nutrition, early postoperative mobilization, and chewing gum (Emma, Ros, Ken, Steve, & Stephen, 2009; Leier, 2007).

In Turkey, randomized controlled trials related to the return of intestinal motility in the early period are limited. Therefore, this study aimed to enable nurses to take an active role in the recovery process of the patients in order to discharge the patients from the hospital in a shorter time.

Minimizing the complications that may occur after cesarean section can be achieved with the use of high

quality, efficient, and evidence-based nursing care. We believe that anesthesia complications after cesarean birth can be decreased and the women who are given chewing gum, engaged in early oral hydration, and mobilized early can recover faster. Nurses can have a significant role in accelerating the mother's healing process and facilitating her adaptation to a new life and role, and can therefore contribute to the national economy with such evidence-based care.

The Purpose of the Study

The aim of the study was to investigate the effects of gum chewing, early oral hydration, and early mobilization after cesarean birth on intestinal sounds, passing gas, and intestinal evacuation.

Research Hypothesis

- H₀: There is no difference between the groups that were instructed to chew gum and provided with early oral hydration and early mobilization after cesarean birth in terms of the start of intestinal motility.
- H₁: There is a difference in at least one of the groups that were instructed to chew gum and provided with early oral hydration and early mobilization after cesarean birth in terms of the start time of intestinal motility.

METHODS

This randomized controlled intervention study with three intervention groups was conducted at the Ordu Obstetrics and Child Diseases Hospital Obstetrics Service between 11 March, 2011, and 17 November, 2011.

Different combinations of interventions were needed to compare the mean differences among these groups. Consequently, groups were formed using a factorial design. We used 2³ factorial test levels and conducted the study with 8 different groups. The number of women included in the sample and the type of intervention are shown in Table 1. The sample included 240 participants (8 groups of 30). This number was determined to be sufficient to detect the differences in the groups, with 95% power and 5% error rate and the effect size was 13,314. The inclusion criteria were: delivering cesarean section under the general anesthesia, at least primary school graduation, no medical history, complication-free pregnancy, no history of GI problems with previous pregnancy, and a single baby pregnancy.

According to the hospital protocol in the Obstetrics and Gynecology Services, the permanent urethral catheters of the women are removed 8 hours after surgery and the women are then mobilized. A total of 3,000 mL intravenous fluids are administered in the postoperative period. Oral fluid intake is started 8 hours (even if intestinal motility has not started) after the cesarean is performed under general anesthesia.

There were three different interventions in the study, including gum chewing, early oral hydration, and early mobilization.

Table 1. Groups Included in the Sample

Group no.	Study group			Sample size
Group	Chewing gum	Early oral hydration	Early mobilization	<i>n</i>
1	+	+	+	30
2	+	+	-	30
3	+	-	+	30
4	+	-	-	30
5	-	+	+	30
6	-	+	-	30
7	-	-	+	30
8	-	-	-	30
Total		240		

The Chewing Gum Group

The women in this group were instructed to chew sugar-free gum for 15 minutes every 2 hours, starting 2 hours after the cesarean surgery. The women did not chew gum during the night (12:00 a.m.–8:00 a.m.). They were followed up until the start of the intestinal motility and passing gas. At that point, they were then allowed to start oral intake and gum-chewing activity was completely ended.

Early Oral Hydration Group

The women in this group were instructed to drink 50 mL of water at an average of 3.5 hours after the cesarean birth, and 100 mL water every hour in the following hours. The women continued to drink water until intestinal sounds were heard.

Early Mobilization Group

The women in this group were instructed to mobilize after sitting 10 minutes in bed in order to prevent hypotension, starting from the fourth hour after the cesarean birth. The women walked three times a day, approximately 5–10 m when they felt good.

With the permission of the gynecologists, conforming to the specified hospital protocol, the intervention groups were decided (groups of gum chewing, early oral hydration, and early mobilization). The patients who were not allowed for inclusion by their doctors were chosen for the control group.

Permission was obtained from the Ethical Committee and the women who agreed to participate in the study provided written informed consent.

Statistical analysis was with number, mean, and percentage calculations, Student's *t* test for pairwise comparisons, one-way variance analysis in triple comparisons, correlation tests, and the Tukey HSD test for pairwise comparisons to determine the groups creating the difference.

RESULTS

Thirty-five percent of the women who participated in the research were at or under the age of 25, 35% of the women are at or above age 31. The other remaining 30% were 26–30 years. Nearly half of the women (44.9%) graduated from high school or university, the other remaining 55.1% were primary school graduates. More than half (52.9%) were married for less than 5 years. A small percentage (10.9%) stated they exercised (e.g., walked) regularly. A total of 17.1% of the women who participated in the study expressed that they consumed food (e.g., bananas, milk, tea, wheat, and pomegranate) that leads to constipation and 11.2% said they consumed food (e.g., figs, grapes, plums, spinach, and cabbage) that causes diarrhea.

Nearly half of the women (45.8%) had experienced two or three pregnancies, with 16.7% having at least one miscarriage and 8.4% at least one abortion. Of the women who participated in the study, 66.3% had at least one living child and the last type of birth was mostly (66.7%) cesarean section. The last pregnancy had been planned in 76.7% of the women.

The distribution of the intestinal functions (i.e., intestinal sounds, passing gas, intestinal bowel movement time, and discharge times) of the women who participated in the study after cesarean section according to the groups are seen in Table 2 and Figure 1. Intestinal bowel movements occurred earliest (mean, 7.89 ± 1.20 hours) in the first group with all interventions (i.e., gum chewing, early oral hydration, and early mobilization) and latest (mean, 16.00 ± 1.69 hours) in the eighth group where none of the interventions were used. The intestinal sounds were heard a minimum of 5.1 hours and a maximum 10.2 hours later in the first group who had all interventions.

The time to passing gas was shortest (mean, 15.13 ± 1.70 hours) in the first and longest (mean, 29.01 ± 4.44 hours) in the eighth group. Time to passing gas was a minimum 5.3 hours and a maximum 11.1 hours later in the first group where all the interventions were used.

The time to bowel movement after cesarean birth was shortest (mean, 57.20 ± 5.52 hours) in the first group and longest (mean, 78.91 ± 4.92 hours) in the eighth group. Bowel movements occurred at a minimum of 48.8 hours and maximum of 70.5 hours later in the first group where all the interventions were used.

There was a difference of several hours between the groups although discharge times were not affected by the interventions. The women in the first group who participated in the study were discharged in 56.22 ± 2.70 hours and the women in the eighth group in 54.99 ± 2.59 hours on average.

In all the groups which were provided early oral hydration (the 1st, 2nd, 5th, and 6th groups) intestinal motility occurred

Table 2. The Distribution of the Effect of Certain Characteristics of Women on Intestinal Functions

Age	Time of intestinal sounds are heard (h)					Time of passing gas (h)					Time of bowel movement (h)					Discharge time (h)					
	n	M	SD	F	p	Diff	M	SD	F	p	Diff	M	SD	F	p	Diff	M	SD	F	p	Diff
25 and younger	84	10.77	2.983	2.357	.097	—	20.31	5.569	2.967	.053	—	64.80	8.928	1.873	.156	—	54.56	3.005	0.371	.691	—
26-30 years	72	10.22	2.862				19.90	5.462				64.21	8.945				54.59	3.109			
31 and older	84	11.26	3.117				21.97	6.007				66.85	9.268				54.92	2.901			
Exercise																					
Yes	26	10.83	3.245	0.104	.917	—	21.01	5.571	0.226	.822	—	65.62	9.932	0.165	.869	—	54.61	3.679	-0.166	.868	—
No	214	10.77	2.991				20.74	5.774				65.31	9.003				54.71	2.909			
Number of pregnancies																					
1	81	10.81	3.116	0.992	.372	—	20.75	5.540	1.527	.219	—	65.09	9.181	1.235	.293	—	54.70	2.987	0.003	.997	—
2-3	110	10.53	3.067				20.24	5.690				64.73	9.261				54.68	3.057			
4 and over	49	11.26	2.694				21.96	6.116				67.13	8.464				54.73	2.919			
Occurrence of any problem																					
Yes	38	9.66	2.645	-2.45	0.06	—	19.25	5.392	-1.777	0.077	—	62.87	8.887	-1.869	0.067	—	54.55	2.798	-0.335	0.738	—
No	202	10.99	3.066				21.05	5.774				65.81	9.070				54.73	3.035			

Note. The distribution of the effect of certain characteristics of women on intestinal functions is seen on Table 2. We found no statistically significant difference between the groups in terms of hearing intestinal sounds, passing gas, bowel movement, or discharge durations according to the age group, drinking herbal tea status, consuming foods causing constipation or diarrhea, exercise status, number of pregnancies, postoperative problems, and last type of birth ($p > .05$). h = hours.

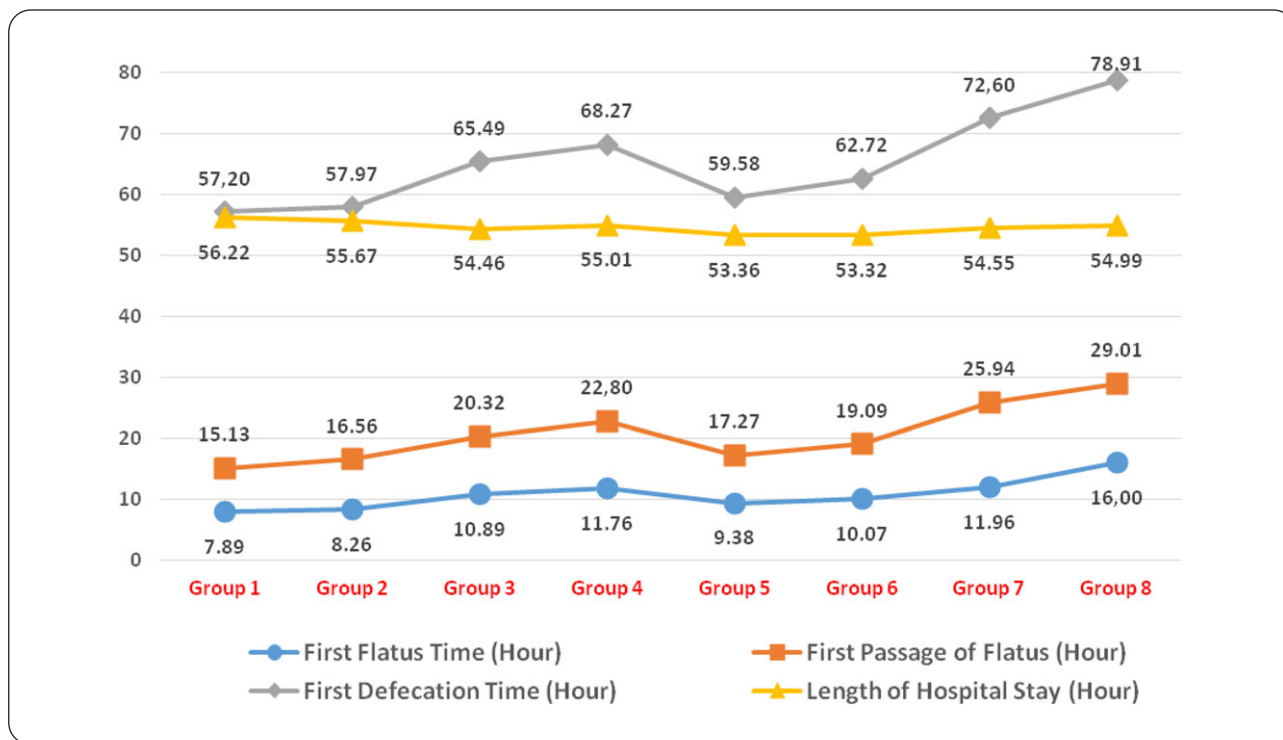


Figure 1. Distribution of the Intestinal Functions of Women after Cesarean Birth According to the Groups.

much faster; on the other hand, the early mobilization had less effect on accelerating intestinal motility when compared with the implementation of only chewing gum and early oral hydration.

DISCUSSION

Some obstetrical complications, both maternal and fetal, are responsible for the high rate of elective or urgent cesarean section when nonreassuring fetal status occurs, such as diabetic pregnancy (Gizzo, Patrelli, Gangi, et al., 2013; Gizzo, Patrelli, Rossanese, et al., 2013; Gizzo, Saccardi, Patrelli, et al., 2013). Therefore, some gastrointestinal problems such as postoperative ileus, abdominal distension, and constipation can be seen in women following caesarean birth due to the effect of general anesthesia. Also, using oxytocin or carbetocin for the prevention of hemorrhage during cesarean section has some gastrointestinal effects, such as nausea, vomiting, and abdominal pain (Gizzo, Patrelli, Gangi, et al., 2013; Gizzo, Patrelli, Rossanese, et al., 2013; Gizzo, Saccardi, Patrelli, et al., 2013).

The evidence-based interventions examined in this study are based on the avoidance of postoperative complications, reduced postoperative pain, early mobilization, and early oral feeding. It questions old habits such as nasogastric tube use as well as late oral feeding (Terzioğlu et al., 2013).

When compared to traditional surgery, the evidence-based interventions decrease hospitalization duration without increasing complications and re-hospitalization (Ersoy &

Gündoğdu, 2007). Chewing gum (Asao et al., 2002; Choi et al., 2011; Duluklu, 2012; Garshasbi & Behboudi, 2012; Harma, Barut, Arkan, & Harma, 2009; Matros et al., 2006; Noble, Haris, Hosie, Thomas, & Lewis, 2009; Parnaby, MacDonald, & Jenkins, 2009; Quah, Samad, Neathay, Hay, & Maw, 2006; Shang et al., 2010; Terzioğlu et al., 2013; Vasquez, Hernandez, & Garcia-Sabrido, 2009; Watson, Griffiths, Lama-parelli, & Watson, 2008), early oral hydration (Anderson et al., 2003; Barlow, Price, & Reis, 2011; Bisgard & Kehlet, 2002; Fanning & Valea, 2011; Hur et al., 2011; Mülayim, Çelik, Kaya, & Yanik, 2008; Terzioğlu et al., 2013), and early mobilization (Basse et al., 2002; Brenner, 2000; Ersoy & Gündoğdu, 2007; İzveren & Dal, 2011; Mahesh, 2009; Markey & Brown, 2002; Ramirez et al., 2012; Terzioğlu et al., 2013) have been shown to shorten the recovery period and inpatient time in some studies.

Gum chewing takes the place of eating in a virtual way and has become an alternative method to improve postoperative intestinal function in patients. Chewing sugar-free gum is recommended for 15–30 minutes at least three times a day in addition to classical procedures for the return of intestinal functions and prevention of postoperative ileus after gynecological surgery (Fannig & Valea, 2011). Early oral fluid intake is thought to accelerate intestinal motility to shorten the inpatient duration and to be safe when there are no problems following cesarean surgery under general anesthesia (Al-Takroni, Parvathi, Mendis, Hassan, & Quanibi, 1999; DiFronzo, Yamin, Patel, & O’Connell, 2003). Mobilization after surgery ensures that the stomach and intestines that have been affected by the

anesthesia return to their previous functioning pattern quicker. Mobilization of patients in early period and performing exercises are therefore of great importance. The women encouraged to mobilize early were reportedly discharged earlier than other women in the studies of Mahesh (2009), Terzioğlu et al. (2013), and Lodh and Bhattacharjee (2009).

Gum Chewing, Early Oral Hydration, and Early Mobilization

Bowel sounds after cesarean section were heard 7.89 ± 1.20 hours later on average in the first group where all three interventions (gum chewing, early oral hydration, and early mobilization) were used and 16.00 ± 1.69 later in the control group in our study (Table 3, Figure 1). Abd-el Maeboud, Ibrahim, Shalaby, and Fikry (2009) reported a duration of 10.9 hours in the gum chewing group and 15.6 hours in the control group for the return of intestinal motility sounds after cesarean section. Malhotra, Khanna, Pasrija, Jain, and Agarwala (2004) reported intestinal motility sound to return 7.73 hours on average after cesarean section in the group provided early oral hydration although the time in the control group was 11.54 hours. Terzioğlu et al. (2013) found a return of intestinal motility in 4.95 hours where they used all three interventions after abdominal gynecological surgery. We also heard intestinal sounds earlier in the group where all three interventions were used (mean 8.29 hours) than the group where only gum chewing and early oral hydration were used.

The time of passing gas of the women in the implementation group and in the control group was compared. The time of passing gas in the women who were provided gum chewing, early oral hydration, and early mobilization was 15.13 ± 1.70 hours later. The women in the control group were found to pass gas 29.01 ± 4.44 hours later. Kafalı et al. (2010) reported that women in the group that chewed gum passed gas 22.4 hours after cesarean birth on average although the value for the control group was 31 hours. Shang et al. (2010) evaluated the intestinal functions of women after cesarean birth and the time of passing gas was shorter (mean 34.6 hours) in women who chewed gum and 5.3 hours earlier than the value of the control group (mean 39.9 hours) on average. Mülayim et al. (2008) reported that women who participated in early oral hydration passed gas 12.1 hours after cesarean birth on average whereas the value for the control group was 24.1 hours. The results we obtained in our study are parallel to those from other studies (Kafalı et al., 2010; Mülayim et al., 2008; Shang et al., 2010; Terzioğlu et al., 2013).

Evaluation of time to the first bowel movement after cesarean birth in the groups showed that the mean duration was 57.20 ± 5.52 after surgery in the group where gum chewing, early oral hydration, and early mobilization were used and 78.91 ± 4.92 hours in the control group. The time to first bowel movement in the intervention group in our study is similar to that reported in the intervention group in other studies (Adupa, Wandabwa, & Kiondo, 2003; Harma et al., 2009; Hillard,

Patolia, Toy, & Barker, 2000; Kocaman, 2003; Orji, Olabode, & Ogunniyi, 2009). This result indicates that the early start of intestinal motility also shortens first bowel movement time.

The time to discharge as decided by the physician was not influenced by gum chewing, early oral hydration, or early mobilization in our study and the women in the group with all three procedures were even discharged 2 or 3 hours later than the women in the other intervention groups. The patient cannot be discharged before 48 hours following a cesarean birth according to the protocol of the hospital where our study had been conducted. The time of discharge was therefore independent of gum chewing, early hydration, and early mobilization in our study. Abd-el Maeboud et al. (2009), Orji et al. (2009), Patolia, Hilliard, Toy, and Baker (2001), and Hillard et al. (2000) have reported earlier discharge after surgery for patients given early oral fluids.

Problems After Implementation

We did not encounter any problems related to gum chewing, early oral hydration, and early mobilization in the women who had undergone a cesarean section in this study. Nausea, vomiting, and dizziness seen in some study intervention patients also were seen in the 8th group that received no intervention. The difference between the study intervention groups in terms of the development of any problems after cesarean section was found to be statistically insignificant ($p > .05$). Abd-el Maeboud et al. (2009) also investigated the effect of gum chewing after cesarean birth on intestinal functions and found no complication due to chewing gum, similar to our study. Malhotra et al. (2004) reported nausea in 7% of the women provided early oral hydration and 16% of the women in the control group but the difference between the groups was not statistically significant ($p > .05$).

The women in our study complained most about not being able to pass gas (47.5%). Intestinal motility after surgery can be delayed due to manipulation of the intestines during surgery, surgical stress, postoperative effects of the anesthesia, and the opioid analgesics used. Problems such as the inability to pass gas, the inability to have a bowel movement, hospital infections, and delayed wound healing in the early period after cesarean birth may delay discharge from the hospital.

The Aim of Nursing Care

The fundamental aim of nursing care on the study unit at Ordu Obstetrics and Child Diseases Hospital Obstetrics Service is to systematically and in a planned way observe and follow the patients who have delivered a baby through cesarean section. Nurses help the mothers adjust to the new role of mother and maintain independence in performing their daily activities in the early postoperative period. In this respect, precautions to prevent the complications after delivery should be taken; the problems should be detected in the early postoperative period and the patients should be helped to become self-sufficient in their bio-physiological, physiological, and sociocultural lives. Nurses will contribute to the profession by ensuring

Table 3. The Distribution of the Intestinal Functions of Women After Cesarean Birth According to the Groups

	CG EOH EM	Intestinal sounds	Passing gas	Bowel movement	Discharge
		hearing (h)	time (h)	time (h)	time (h)
		Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Group 1	+++	7.89 ± 1.20	15.13 ± 1.70	57.20 ± 5.52	56.22 ± 2.70
Group 2	++-	8.26 ± 1.35	16.56 ± 1.63	57.97 ± 5.54	55.67 ± 2.84
Group 3	+ - +	10.89 ± 1.73	20.32 ± 3.59	65.49 ± 7.55	54.46 ± 3.46
Group 4	+ - -	11.76 ± 1.86	22.80 ± 3.60	68.27 ± 3.92	55.01 ± 2.50
Group 5	- + +	9.38 ± 2.19	17.27 ± 1.61	59.58 ± 4.32	53.36 ± 2.91
Group 6	- + -	10.07 ± 2.13	19.09 ± 3.99	62.72 ± 7.25	53.32 ± 2.94
Group 7	- - +	11.96 ± 2.09	25.94 ± 5.71	72.60 ± 5.57	54.55 ± 2.97
Group 8	- - -	16.00 ± 1.69	29.01 ± 4.44	78.91 ± 4.92	54.99 ± 2.59
Statistical analysis	<i>f</i>	60.753	54.711	53.437	3.747
	<i>p</i>	.000	.000	.000	.001

Note. CG = chewing gum; EOH = early oral hydration; EM = early mobilization.

the early recover of the patients with the use of chewing gum, early oral hydration, and early mobilization after the cesarean section. **WVN**



LINKING EVIDENCE TO ACTION

- The use of gum chewing, early oral hydration, and early mobilization in patients following cesarean section is aimed to minimize possible complications that patients may develop, shorten the hospitalization duration, and decrease inpatient care costs.
- Evidence-based interventions, such as those implemented in this study, will provide more beds and care time for patients that need emergency cesarean section, and decrease the workforce loss of the patient and patient's relatives.
- Early discharge of patients can lead to decreased workload of nurses, increase the motivation of nurses through the use of evidence-based care procedures, and increase the quality of life of the patients.

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