

Effect of Gum Chewing on Resumption of Bowel Functions and duration of postoperative ileus after cesarean section

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Abstract:

Background: Cesarean section delivery is the most common surgery which associated with postoperative decreased bowel movements. Gum chewing stimulates bowel motility and decrease duration of postoperative ileus. **Aim of the study:** The aim of the current study was to evaluate the effect of gum chewing on resumption of bowel functions and reducing ileus after cesarean section delivery. **Subjects & methods: Research design:** A Quasi-experimental design was adopted in the current study. **Setting:** The study was conducted at the postpartum unit in Benha University Hospital during the period from September 2013 to February 2014. **Subjects:** A convenience sample including 218 mothers was divided into two groups study group (n= 112) and control group (n= 106). **Tools of data collection:** Two tools were used for data collection, interviewing schedule sheet and bowel function examination sheet. The study group chewing sugar free gum and the control group received ordinary nursing care. **Results** of the study showed highly statistically significant differences in the time of resumption of bowel function and symptoms of postoperative ileus between the groups understudy ($p < 0.000$), which were significantly shorter in the gum-chewing group compared to those of the control group. **Conclusion;** bowel motility after cesarean section was early return by gum chewing which is an inexpensive, convenient, safe, effective, physiologically based intervention and well-tolerated method for mothers in post-cesarean section. **Recommendations:** Chewing gum after cesarean section is recommended to be disseminated to maternity hospitals protocols and added into nursing curriculum.

Key words: Gum chewing; Ileus; Cesarean section; postoperative ileus; Bowel functions; Nursing

Introduction:

Cesarean section is the most common abdominal obstetrical surgery associated with postoperative central nervous system changes which lead to decrease bowel movements among women.⁽¹⁾ Post-operative ileus is referred to the delay, lasting for three to five days, in resumption of regular bowel movement following abdominal surgery⁽²⁾, and is one of the major problems of post-abdominal surgery along with increased hospital stay, postoperative pain, abdominal distension, inability to start feeding, breastfeeding, and eventually delay in recovery.⁽³⁾

Ileus occurs in cases of opioid and drug interaction and abdominal surgery, especially in operations with excessive manipulation, and temporarily contributes to stop peristalsis (bowel movement); the related mechanism is probably

dysfunction in parasympathetic system activity (inhibitory neurons).⁽⁴⁾ Since, gynecology and obstetrics professionals have traditionally withheld postoperative oral intake to cesarean patients until the return of bowel function characterized by symptoms such as bowel movements, passage of flatus, defecation, and feeling of hunger, when the first passage flatus or stool is noted it shows an initial return of bowel function.⁽⁵⁾

The treatment of paralytic postoperative ileus (PPOI) has traditionally been supportive, with nasogastric decompression, intravenous fluids, and watchful waiting.⁽⁶⁾ The new research was focusing on treat the major cause of PPOI. One of these treatments is based on the physiologic theory of "sham feeding." Gum chewing is a

form of sham feeding, which could encourage gastrointestinal motility through cephalic-vagal stimulation.⁽⁷⁾ Gum chewing causes a person feel faint due to stomach stimulation and secretion of gastric and digestive juices, it provokes the person to eat and increases peristaltic bowel movements and hastens ileus recovery.⁽⁸⁾

The gum chewing intervention could significantly shorten the time to first flatus and time to first bowel movement. Additional benefits of the gum chewing intervention are that it is inexpensive, well tolerated, widely available, physiologically based, and effective.⁽⁹⁾ It has also been recently considered by researchers as a strategy toward ileus reduction, the beneficial effect of gum chewing has been approved in the resumption of bowel function.⁽¹⁰⁾ The postpartum period is a time of major physical and psychological transition for the new mother and the entire family. Nursing care during postpartum period takes the physical and psychological needs of the mother and family into consideration.⁽¹¹⁾

Significance of the study:

Despite numerous advances in surgical technique and preoperative care, paralytic postoperative ileus (PPOI) continues to be one of the most common and expected concomitants of abdominal surgery especially cesarean section. It affects 15-20% of post cesarean (abdominal surgery) women. PPOI can occur despite efforts to minimize surgical trauma and manipulation of the bowel so, maternity nurse as a primary postoperative care provider has a vital role in early prevention of postoperative complication for postpartum women utilizing non-pharmacological intervention that had no effect on breast feeding.⁽¹⁾ Postoperative ileus (POI), a common postoperative complication, increases length of stay and costs. Although bowel rest and delayed oral intake were once thought to help prevent

POI, newer evidence shows that chewing gum can be beneficial. Therefore, the aim of the current study was to evaluate the effect of gum chewing on resumption of bowel functions among postpartum mothers after cesarean delivery.

Aim of the study:

The aim of the present study was to evaluate effect of gum chewing on resumption of bowel functions and duration of postoperative ileus after cesarean section

Research hypotheses:

- * Research Post cesarean section women who chewed free sugar gum resume their bowel functions earlier than those who don't.
- * Post cesarean section women who chewed free sugar gum had low incidence of postoperative ileus than these who don't.

Subjects and methods:

Research Design:

A quasi-experimental design was used in this study.

Setting:

The current study conducted at Postpartum Unit affiliated to Benha University Hospital.

Subjects:

The total number of primipara, para one and two cesarean section delivery at obstetric and gynecological medicine department at Benha University Hospital for the previous last six months was 475 women.⁽¹²⁾ So, expected number of study subjects for the next six months was calculated by the following formula⁽¹³⁾ to be 218 women.

$$n = \frac{N}{1 + N(e)^2}$$

Where: n= sample size, N= population, e= margin error (0.05)

A Simple random sample of 218 postpartum with CS, they were assigned into two groups as their selection: the first three months 106 women were recruited as control group, while at the second 3 months

(112) of women were recruited at the intervention group. Both groups were recruited according to the following criteria:

1. Elective CS.
2. Para (0,1,2)
3. Under general anesthesia.
4. No intra or postoperative complication.
5. Able to chew gum.
6. No obstetrical complication as diabetes, pre-eclampsia.

Tools of Data Collection:

Two tools were used to collect the necessary data for the study:

- **First tool: Interview schedule sheet:** It included general characteristics, parity and body mass index.
- **Second tool: bowel function examination sheet:** It involved data about; abdominal distension, nausea, vomiting, time of first intestinal sound, time of first flatus, time of passage of motion and hospitalization duration.

Content validity and reliability:

Tools were submitted to a panel of three experts in the field of maternity nursing and medical surgical nursing to test the content validity. Modification was carried out according to the panel judgment on clarity of sentences and appropriateness of content. Reliability statistics of bowel function examination sheet tools was done using Cronbach's Alpha it was (0.865)

Pilot study:

A pilot study was conducted on 10% of the total sample to test the feasibility of the study and applicability of the tool and to find out the possible obstacles and problems that might face the researcher and interfere with data collection and to detect any problems peculiar to the statements as sequence of questions and clarity. It also helped to estimate the time needed for data collection. After conducting the pilot study, it was found that the sentences of the tools were clear and relevant, but few words have been modified according

to pilot study results. The samples of the women included in the pilot study were excluded from the main study sample.

Field work:

The present study proceeded as follows:

- Data were collected from the beginning of July 2013 till the end of December 2013.
- **Group I (intervention group):** 112 postpartum women who met the inclusion criteria of the study after caesarean section general characteristics and obstetrical history were collected. Each woman was encouraged to chew one stick of a commercially available sugarless gum for 15 min every 2 hours, starting 2 hours after surgery, and then bowel function was observed every 4-6 hours. No gum chewing during sleep period. Gum chewing was stopped when the passage of flatus occurred as oral intake of fluids and soft foods were allowed.
- **Group II (control group):** 106 postpartum women who met the inclusion criteria of the study after caesarean section general characteristics and obstetrical history were collected, ordinary nursing care was provided to them. They were taken nothing per mouth postoperatively and also, were not given oral or rectal bowel stimulants after CS. The participants were allowed to sip small amounts of water 12 hours postoperatively, and then bowel function was observed every 4-6 hours.

Administrative and ethical considerations:

An official letter from the Faculty of Nursing, Benha University was directed to the responsible authorities to obtain their permission to conduct the study after explaining its purpose. Written approvals were obtained from Benha University Hospital administrators and head of the

concerned department.

The purpose of the study was explained to each woman and a written consent was obtained from each of those who agreed to participate. They were assured about confidentiality and privacy and that this information will be used only for research purposes only.

Statistical design:

The data were analyzed by using SPSS, (Statistical Package for Social Sciences), soft-ware program version 15, which was applied to frequency tables, data were summarized using 1) the arithmetic mean as an average, describing the central tendency of observation for each variable studied; 2) the standard deviation as a measure of dispersion of results around the mean; and 3) the frequency and percentage of observations for each variable studied. Statistical significance and association were assessed using chi-square test, independent (t) test to compare mean scores between study and control group. A significant level value was considered when $p \leq 0.05$ and A highly significant level value was considered when $p \leq 0.001$.

Results:

Table (1): Shows general characteristics of both intervention and control group. It reveals that, there was no statistically significant difference between both groups regarding their socio demographic data; age, educational level, residence, and occupation ($p > 0.05$).

Table (2): Reveals no statistically significant differences between the intervention and the control groups concerning reproductive history; gravidity, parity, gestational age and numbers previous cesarean section delivery ($p < 0.05$).

Table (3): Manifests that the differences between the intervention and the control groups was not statistically significant regarding their preoperative indicators; weight, height, body mass index, time of

fasting before surgery, and duration of surgery.

Table (4): Displays that the intervention group had lower means than the control group regarding; the first bowel sound (10.16 ± 1.52 & 15.83 ± 0.95) respectively, the first passage of flatus (19.96 ± 1.84 & 24.84 ± 1.45) respectively, the first defecation (20.26 ± 3.25 & 36.92 ± 2.94) respectively, the feeling of hunger (11.72 ± 3.73 & 15.99 ± 5.17), and hospital stay duration (32.79 ± 8.98 & 47.89 ± 6.12) respectively. However, the differences between both groups for the previously mentioned items was highly statistically significant for the intervention group ($p < 0.001$).

Table (5): Shows symptoms of postoperative ileus among the studied participant in both intervention and control group, it reveals that there was a highly statistically significant differences between two group regarding; feeling of abdominal distention, nausea, and vomiting ($p < 0.001$).

Discussion:

The aim of present study was to evaluate the effect of gum chewing on resumption of bowel functions among postpartum mothers after cesarean delivery. This aim was highly significantly achieved through the present study findings. According to the results yielded by the present study, there was no a statistically differences between intervention and control group regarding their socio-demographic characteristics, obstetrical history and preoperative indicators, gum chewing after caesarean section was useful in early resumption of bowel function; there was a statistically significant difference in bowel function resumption between the intervention and control groups ($p < 0.000$).

The main results of the current study demonstrated that the intervention group had lower means time than the control group regarding; the first bowel sound

(10.16 ± 1.52 & 15.83 ± 0.95), the first passage of flatus (19.96 ± 1.84 & 24.84 ± 1.45), the first defecation (20.26 ± 3.25 & 36.92 ± 2.94), the feeling of hunger (11.72 ± 3.73 & 15.99 ± 5.17), and hospital stay duration (32.79 ± 8.98 & 47.89 ± 6.12) respectively. These results were consistent with Ledari et al.⁽¹⁴⁾ study who found that, the mean of postoperative interval of; the first bowel movement (20.89 ± 8.8 versus 27.93 ± 9.3 hours, $P = 0.004$), the first feeling of hunger (10.37 ± 6.0 versus 16.33 ± 9.3 hours, $P = 0.005$), the first passage of flatus (25.02 ± 5.8 versus 31.08 ± 9.7 hours, $P = 0.003$), and the first defecation (31.17 ± 5.3 versus 40.08 ± 8.8 hours, $P = 0.000$) respectively, which were significantly shorter in the gum-chewing group compared to those of the control group. These findings may be due to that gum chewing acts by stimulating intestinal motility through cephalic vagal reflex and by increasing the production of gastrointestinal hormones associated with bowel motility.

The current study result is in accordance with Shang et al.,⁽¹⁵⁾ who observed that, Bowel sounds were 5 hours earlier in the gum-chewing group (mean 18.2 hours) than in the control group (mean 23.2 hours). Passing flatus was 5.3 hours earlier in the control group (mean 34.6 hours) than in the control group (mean 39.9 hours). The differences between the two groups were highly statistically significant ($p < 0.001$). Moreover Craciunaset al.,⁽¹⁶⁾ also concluded that, chewing gum for 30-60 minutes at least three times a day appears to be effective in reducing the incidence and consequences of POI following caesarean sections.

Furthermore, the current study was in accordance with a very recent study of Zhu et al.,⁽¹⁷⁾ who mentioned that, mothers in the chewing gum group have a reduction of 6.42 hours for time to first flatus, 3.62 hours for time to first bowel sound, 6.58 for

time to first stool and 5.94 hours for length of hospital stay than the control group, this may be attributed to that gum chewing is associated with early recovery of bowel motility and shorter length of hospital stay for women after caesarean section. In addition, Li et al.,⁽¹⁸⁾ suggested that, chewing gum following abdominal surgery offers benefits in reducing the time of postoperative ileus.

The present study findings go in line with Rashad et al.,⁽¹⁹⁾ who found that study group had lower means time than the control one regarding the time of feeling the first intestinal movement (2.93 ± 1.14 & 8.13 ± 4.27) respectively; the time of hearing the first intestinal sounds (3.47 ± 1.38 & 9.03 ± 4.29) respectively; the time of the first flatus (3.90 ± 1.37 & 9.97 ± 3.87) respectively and the time to the first bowel movement (5.33 ± 1.71 & 13.30 ± 2.11) respectively. However, the relationship between both groups for the previously mentioned items was highly statistically significant (<0.0001).

Moreover, in a study conducted by Wronski⁽²⁰⁾ who noticed that, the gum-chewing group passed flatus and defecated before those in the control group. As well, the same findings were found by Kafali et al.,⁽²¹⁾ who observed that, Bowel sounds appeared in a significantly shorter duration of time in the study group, the mean being 5.9 h as compared to 6.7 h in the control group ($p < 0.01$). The first passage of flatus postoperatively was 22.4 h in the gum-chewing group and 31 h in the control group ($p < 0.001$).

The main results of the current study demonstrated that the intervention group had lower means time than the control group regarding; the first bowel sound (10.16 ± 1.52 & 15.83 ± 0.95), these findings are in consistency with Abd El-Maeboud et al.,⁽²²⁾ in the study to evaluate the effect of gum chewing on stimulating early return of bowel motility after caesarean section. They study a

sample of 200 patients after elective caesarean section in Egypt in 2010; the mean time of defecation was 21.1 ± 4.7 hours and 30.00 ± 8.2 hours earlier in intervention than the control group. On the other hand Akhlaghi et al.,⁽²³⁾ in the study to evaluate the effect of gum chewing on prevention of post cesarean ileus, they recorded that there was no statistically differences between study and control group as regards to the first bowel sounds (14.7 hours vs. 16.6 hours; $P=0.569$).

Regarding the symptoms of POI among participants in both intervention and control group the present study revealed that there was a highly statistical significant difference between both groups, as abdominal distension affected 54.7% of control group as compare with 12.3% of intervention group, regarding nausea as a one of POI symptoms, it was found that it affected 64.2% of control group as compare with 8.9 % of intervention group. Moreover POI vomiting symptom affect 53.8% of control group as compare with 7.1% of intervention group. These findings may be related to the effect of hexitols that are present in sugarless chewing gums might also be playing a role in the amelioration of POI because these are known to cause gastrointestinal symptoms such as gas, bloating, and abdominal cramps. The same findings were found by Abd El-Maeboud et al.,⁽²²⁾ in the study to evaluate the effect of gum chewing on stimulating early return of bowel motility after caesarean section, they added that there was a highly statistical significant difference between groups in relation to the POI symptoms.

Conclusion:

Bowel function after CS was enhanced by gum chewing. Gum chewing is an inexpensive, convenient, safe, effective, and physiologically based intervention that significantly decreasing the time to

the passage of flatus, bowel movements, and feeling of hunger in women undergoing cesarean section delivery, that decrease their risk to postoperative ileus.

Recommendations:

Based on the findings of the present study, the following recommendations were suggested:

- Health education to women about the effect of free sugar gum chewing and its effect on bowel function.
- It is recommended to use free gum chewing on a large sample with different geographical areas.

Further study:

- Free sugar gum chewing could be recommended to be included in maternal hospitals protocol for early resumption of bowel function and prevent postoperative ileus.
- Free sugar gum chewing for bowel function enhancement may be added in maternal nursing curricula of nursing schools in Benha city.

Table (1): Frequency of the studied participant as regards to their general characteristics (N= 218)

General characteristics	Intervention group (N= 112)		control group (N= 106)		X ²	p-value
Age in years						
▪ 20-	14	12.5	12	11.3	0.163	>0.05
▪ 25-less than 30	48	42.9	44	41.5		
▪ 30-36	50	44.6	50	47.2		
Mean ±SD	26.53±4.19		26.15±4.16			
Educational qualification						
▪ Read and write	19	17.0	17	16.0	0.300	>0.05
▪ Secondary	74	66.1	68	64.2		
▪ University	19	17.0	21	19.8		
Residence						
▪ Rural	19	17.0	12	11.3	1.42	>0.05
▪ Urban	93	83.0	94	88.7		
Occupation						
▪ Occupied	65	58.0	72	67.9	2.28	>0.05
▪ Housewife	47	42.0	34	32.1		

Table (2): Distribution of the studied participant regarding to their reproductive history (N= 218)

Reproductive history	Intervention group (N= 112)		control group (N= 106)		X ²	p-value
Gravidity						
▪ Primigravida	56	50.0%	51	48.1%	0.510	>0.05
▪ Gravida (2)	34	30.4%	30	28.3%		
▪ Gravida (3)	22	19.6%	25	23.6%		
Parity						
▪ Para(0)	56	50.0%	51	48.1%	0.83	>0.05
▪ Para(1)	36	32.1%	35	33.0%		
▪ Para(2)	20	17.9%	20	18.9%		
Gestational age	39.62±1.32		39.66±5.86		t=0.246*	0.806
Previous CS delivery						
▪ Yes	37	33.0%	27	25.5%	1.50	>0.05
▪ No	75	67.0%	79	74.5%		

* Independent t test was used to compare mean score study and control group

Table (3): Distribution of the studied participant according to their preoperative indicators (N= 218)

Preoperative indicators	Intervention group(N= 112) Mean ±SD	control group (N= 106) Mean ±SD	t-test	p-value
▪ Weight	75.36±13.45	74.54±16.78	0.396	0.692
▪ Height	163.71±8.78	162.21±8.13	1.308	0.192
▪ Body mass index	28.15±5.71	28.45±5.89	0.386	0.700
▪ Fasting time before surgery	6.21±1.13	6.30±1.31	0.581	0.562
▪ Duration of surgery(min)	41.38±5.54	42.31±1.34	1.20	0.231

Table (4): Resumption of bowel function after cesarean section in intervention and control group (N= 218)

Bowel function	Intervention group(N= 112) Mean \pm SD	control group (N= 106) Mean \pm SD	t-test	p-value
▪ The first bowel sound (hour)	10.16 \pm 1.52	15.83 \pm 0.95	33.17	<0.001**
▪ The first passage of flatus(hour)	19.96 \pm 1.84	24.84 \pm 1.45	21.75	<0.001**
▪ The first defecation (hour)	20.26 \pm 3.25	36.92 \pm 2.94	39.73	<0.001**
▪ Feeling of hunger (hour)	11.72 \pm 3.72	15.99 \pm 5.17	6.95	<0.001**
▪ Duration of hospital stay (hour)	32.79 \pm 8.98	47.89 \pm 1.34	6.12	<0.001**

**highly statistical significant difference

Table (5): Distribution of the studied samples according to their postoperative ileus symptoms (N= 218)

Postoperative ileus symptoms	Intervention group (N= 112)	control group (N= 106)	X ²	p-value
▪ Abdominal distension	13 12.3%	58 54.7%	31.03	<0.001**
▪ Nausea	10 8.9%	68 64.2%	72.27	<0.001**
▪ Vomiting	8 7.1%	57 53.8%	56.57	<0.001**

**highly statistical significant difference

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