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Effect of Chewing Gum on Outcome Measures among Women Post Cesarean Section

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Abstract: *Aim: Investigate the effect of gum chewing on outcome measures among women post cesarean section. Design: Blinded controlled randomized clinical trial was adopted. Setting: The study was conducted at the obstetric and gynecologic department, Zagazig University Hospital. Sample:240women undergoing caesarean section, attended the study setting. They weredivided into 2 groups:chewing gum group (intervention)and controlgroup will have only the routine care. Tools:two tools (1)A structured interviewing questionnaire, and(2) Postoperative Assessment record were used in the current study. Results:It revealed that the time interval from end of cesarean section to first hearing of satisfactory intestinal sounds, first passage of flatus and first passage of bowel motion were significantly shorter in gum chewing group, also postoperative hospital stay was shorter in gum chewing group, and gum chewing group were satisfacted about chewing gum. Conclusion:Gum chewing after CS enhances early recovery from postoperative ileus,safe, well tolerated by patient, and associated with strongly satisfaction and agree about chewing gum..Recommendation:Gum chewing should be added to post cesarean care protocols.*

Keywords*: caesarean section, ileus, gum chewing, intestinal motility.*

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I. Introduction

Cesarean section is an operative procedure that is carried out under anesthesia whereby the fetus, placenta and membranes are delivered through an incision in the abdominal wall and the uterus. This is usually carried out after viability, i.e. 24 weeks of gestation onward. It is usually performed when a delivery would put the baby's or mother's life or health at risk; although in recent times it has been also performed upon request forchildbirths that could otherwise have been natural**(Weckesser etal., 2019).**

Cesarean section surgery is accompanying bysome post-operative alteration in autonomic nervous system, that give rise to lateness of intestinal function; and reducing bowel movement and driven problems **(Wen et al., 2017)**.

Ileus is one of the most common problems associated with abdominal surgery, which is defined as the inability to pass the intestinal content or a transitory stopping, delay in recommencement of regular bowel movement for three or five days after abdominal surgery**(Herman et al., 2019).** It is also considered as one of the foremost complications following abdominal surgery, which contributes, to prolong the hospital stay and increasing the cost of care, abdominal distention, and postoperative pain. In addition, it results in the inability of the mother to begin breastfeeding and ultimately lateness in recovery**(Mansour et al., 2016).**

The effective and harmless promotion of the recovery of gastrointestinal function after abdominal surgery and prevention of postoperative complications has begun widespread concern among medical and nursing staff **(Liu et al.,2017).** Gum-chewing is considered a form of sham feeding, which has been reported to stimulate bowel motility in humans. Following colectomy, postoperative gum chewing, as a form of sham feeding, has been suggested as a safe way to provide the benefits of early stimulation of the GIT without the complications seen with feeding**(Ali et al., 2019).**

The action mechanism of gum chewing in enhancing bowel motility was suggested to be direct stimulation of the cephalic-vagal reflex and indirect triggering the release of gastrointestinal hormones and increasing the secretion of saliva and pancreatic juice**(Wen et al., 2017).**

Gum-chewing shortens POI probably in a multi-factorial manner and early postoperative sham feeding enhances the recovery ofgastrointestinal motility after cesarean section (CS).This may be a safeand acceptable treatment modality in a modern fast-track regimen**(Doyle., 2019).**

The quality of the nursing care is very important for the mother to adapt to postpartum period in the postoperative period after caesarean operation and to prevent complications.Nurses can have a significant role in quickening the mother's healing process and easing her adaptation to a new life and role (**Sahin & Terzioğlu., 2015)**.

Significance of the Study:

Cesarean section is one of the most common obstetrical surgeries carried out all over the world **(Menashe et al., 2019).** In Egypt, the overall rate of delivery by CS has risen dramatically from 27.6% in 2010 to 52% in 2014 **(El-Zanaty & Ann, 2015)**. The increase in cesarean section rates is problematic for variety of causes. CS has been connected with the increased rates of women morbidity and mortality, unhealthy consequences of newborns and the increased cost of health care organizations **(Mansour et al., 2016)**.

Aim of the Study

This present study aimed to Investigate the effect of gum chewing on intestinal movement post cesarean section and Assess satisfaction of women with gum chewing.

Research Hypotheses:

Gum Chewing will improve intestinal movement Post cesarean section faster than those who do not and the women will be satisfied.

II. Subjects and Methods

Study Design

Blinded controlled, randomized clinical trial was adopted in this study to meet the aim of the study.

Study Sample

A consecutive random sample of 240 womenimmediately post-operative recruited in this study,according to the inclusion and exclusion criteria.

The sample size was calculated according to the following equation :

$$N = [(4\sigma 2)(Z(1-(\alpha/2)) + Z(1-ß))2] \div E2$$

N = total sample size

The sample size was calculated using open Epi information according to the following at power of study 80% and CI 95%. The onset of gas passage in the study group is 27.00±6.24and in the control group 29.40 ±6.44 **(Mohsenzadeh et al, 2013).**So, according to the calculations, the sample size was 120 women in each group. Total number was 240 women divided 2 groups; chew gum (intervention) and only the routine care without any intervention(each group involved 120 women).

Setting

The study conducted at the obstetric and gynecologic department, Zagazig university Hospital

Tools of Data Collection

There was two tools of data collection were used in this study to collect the needed data. This tools were prepared by the investigator based on the relevant literatures.

Tool (1): **A structured interviewing questionnaire:**

It was used to collect the information from the study women it consist of (3) parts:

Part (1): includes socio-demographic data as age, education, occupational.

Part (2):includes obstetrical history as number of Gravidity, number of Parity, Previous fetal losses, mode of previous deliveries, gestational age of current pregnancy, Indication of C.S, and number of previous C.S.

Part (3): includesmedical and surgical history, Preoperative data and operative data, and bowel habit.

Tool (2): Postoperative Assessment form:

It was comprised type and duration of operation as well as the assessment of the bowel status during examination and assessment of women satisfaction it consist of (2) parts:

Part (1): parameter of data:

- Bowel sounds: Presence or absence, timing of first heard and their character (strength and frequency)
- Indicators of peristaltic movement (Bowel movement, presence of bowel sound, Sensation of hunger and gas passage).
- Presence of ileus symptoms: absent or hypoactive bowel sounds non-passage of flatus or abdominal distension.
- Episodes of vomiting, with or without cramps abdominal pain; frequency, duration and timing.

Part (2): Include assessment of women satisfaction with gum chewing post operative.
Numericrating scale(NRS) is: "Not at all Satisfied," "Partly Satisfied," "Satisfied," "More than Satisfied," "Very Satisfied," numbering 1 to 5 as an interval scale**(Nie et al., 2017)**.
Part (3): Include assessment of women pain with gum chewing post operative.
The Wong-Baker FACES Pain Scale combines pictures and numbers for pain ratings, Six faces depict different expressions, ranging from happy to extremely upset. Each is assigned a numerical rating between 0 (smiling) and 10 (crying)**(Kempner., 2017).**

Content validity

The tool was revised by five expertises for clarity, relevance, applicability, comprehensiveness, understanding and ease for implementation. According to their suggestions, the modifications were applied.

Ethical considerations

Written approval was obtained from the women after a brief explanation of the study. The technique used was proven to be of no harm to the patients. Patients have had the right to refuse to participate or withdraw at any time during the trial with no consequences whatsoever on the care given. All data was kept confidential and was used only for research purposes.

Pilot study

A pilot study was carried out before starting the actual data collection. The purpose of the pilot study was to ascertain the clarity, and applicability of the study tools, and to identify the obstacles and problems that may be encountered during data collection. It also helped to estimate the time needed to fill in the questionnaire. It was done on 10% of the participants, and these were not included in the total sample of the research work to ensure stability of the answers.Based on the results of the pilot study, modifications, clarifications, omissions, and rearrangement of some questions were done.

Procedures

Preparatory phase:

This phase involved reviewing of related literature and theoretical knowledge of various aspects of the study subjects. This was achieved using text books, articles, internet periodicals, and other scientific journals. This helped in the selection and preparation of the data collection tools and in writing the review of literature.
1-Interviewing Phase: Before the intervention, in the selected immediately post-operative setting of the study, the researcher will introduce herself to the women, based on the pre-mentioned inclusion and exclusion criteria.Suitable subjects will be excused to participate in the study. Written consent will be taken, and data will be collected using the pre constructed tools through face to face interview.
2-Assessment Phase: Before the intervention, to assure blinding, the examiner will not be the researcher and will not know who of the patients will receive chewing gums and who will not.
3- Intervention phase:
Following complete recovery, women of the study group will be instructed to chew one stick of sugarless gum (Samara foods, Cairo, Egypt) for 15 minutes, every 8 hours(0,8,16). The researcher will provide each woman with required amount of gum sticks. Meanwhile, women in the control group will follow the postoperative hospital routine care. Each woman in both groups will be examined abdominally using a stethoscope to detect the intestinal movement every one hour, and the number of sticks taken by the patient will be recorded during the recording of vital data postoperatively, and will be asked to report immediately the time of either passing flatus or stool**(Wafaa., 2013).**Following each abdominal examination, the attending physician or nurse will fill the tool of the study mentioned earlier. In addition, patients will be asked about their opinion about the chewing gum as satisfied or not satisfied and any inconvenience if ever.
Statistical analysis: All collected data were organized, categorized, tabulated, entered, and analyzed by using Statistical Package for Social Sciences (SPSS) a software program version 14, which was applied to frequency tables and statistical significance. The statistical significance and associations were assessed using, the arithmetic mean, the standard deviation (SD), pearson chi-square test (X^2) and correlation (r) to detect the relation between the variables.

III. Results

Table(1)describes the demographic characteristics of the studied groups. As shown there were no statistical significant differences between the two groups regarding their age, education, residence, and occupational status.

Table (2)describes the selected postoperative symptoms of the studied groups. As shown, there was highly statistical significance difference between the two groups regarding the occurrence of selected postoperative symptoms such as feeling of hunger and thirsty.

Table(3)shows the resumptions between the studied groups regarding bowel function measures between the two groups. It revealed that there were highly statistical significant positive improvement differences between both groups regarding the first time of bowel sound, the passage of flatus, defecation, and length of hospital stay.

Table(4)shows the correlation ship among chewing gum group regarding postoperative outcome measures and their duration of chewing gum / min. As showen, there were statistical positive significance relations between the postoperative outcome measures in chewing gum group and their duration of chewing gum / min.

Table (5)shows that there was highly statistical significant relation between the postoperative outcome measures in chewing gum group and their age.

Table (6)shows that there was highly statistical significant relation in chewing gum groupbetween the postoperative outcome measures and their duration of surgery/ min

Table (1) percentage Distribution of the studied groups regarding their Socio demographic characteristics.

Variable	Control group		Study group		X2	P
	N	%	N	%		
Age (years)						
18-<20	2	1.7	2	1.7		
20-<25	29	24.2	22	18.3	2.7	>0.05
25-30	74	61.6	77	64.2		
31-37	15	12.5	20	16.7		
Mean ±SD	**27.0±3.5**		**27.5±3.5**			
Residence						
Rural	68	56.7	74	61.7	2.5	>0.05
Urban	52	43.3	46	38.3		
Education						
Illiterate	5	4.2	9	7.5	3.2	>0.05
Primary	19	15.8	12	10.0		
Secondary	75	62.5	73	60.8		
University	21	17.5	26	21.7		
Occupation						
Housewife	93	77.5	85	70.8	3.5	>0.05
Working / job	27	22.5	35	29.2		

Table (2): Percentage distribution of the studied groups regarding their selected postoperative symptoms (n=120).

Symptoms	Control group		Studygroup		X2	P
	N	%	N	%		
Postoperative hunger feeling/hr						
1-2	73	60.8	2	1.7	57.3	<0.001**
3	30	25.0	118	98.3		
4-8	17	14.2	0	0.0		
Mean±SD	2.5±1.5		3.0±0,2			
- Postoperative thirsty feeling/hr						
1	34	28.3	5	4.2	30.5	<0.001**
2	86	71.7	7	5.8		
3-6	0	0.0	93	77.5		
7-10	0	0.0	15	12.5		
Mean±SD	1.7±0.5		4.7±1.1.7			

Table (3): Comparison among the studied groups regarding postoperative outcomes after operation.

Variable	Controlgroup Mean ± SD		Studygroup Mean ± SD		T	p
Time of first intestinal sound(hours):	7.8	±1.4	5.1	±1.6	14.0	<0.001**
Time of first passage of flatus: (hours):	9.5	±2.5	7.8	±2.0	5.9	<0.05*
Time of first passage of motion: (hours):	15.1	±2.1	8.5	±1.9	25.4	0.001**
Time of first opening of bowel :(hours):	18.6	±3.8	10.7	±2.7	18.4	<0.001**
Hospital stay (hours)	33.7	±1.2	27.3	±2.6	6.35	<0.05*

Table (4):Correlationship among Chewing Gum Group regarding postoperative outcome measures and their duration of chewing gum / min.

Postoperative outcome	**Duration of chewing gum / min**		
	5	10	15
Time of first intestinal sound(hours)	0.67*	0.75**	0.80**
Time of first passage of flatus (hours)	0.67*	0.72**	0.77**
Time of first passage of motion (hours)	0.70**	0.74**	0.79**
Time of first opening of bowel (hours)	0.69*	0.73**	0.81**--
Hospital stay (hours)	0.70**	0.72**	0.82**-

Table (5) Correlationship among chewing gum group regarding postoperative outcome measures and their age.

Postoperative outcome	Age of women in gum group		
	18-<25	25-30	30-37
Time of first intestinal sound(hours)	0.83**-	0.75**	0.70**
Time of first passage of flatus: (hours)	0.86**-	0.77**	0.72**
Time of first passage of motion: (hours)	0.88**-	0.79**	0.73**
Time of first opening of bowel (hours)	0.85**-	0.73**	0.70**
Hospital stay (hours)	0.94**-	0.90**	0.86**

Table(6)Correelationship among chewing gum group regarding postoperative outcome measures and their duration of surgery/ min.

Postoperative outcome	Duration of surgery/ min		
	30	25	20
Time of first intestinal sound (hours)	**0.68***	**0.72****	**0.77**-**
Time of first passage of flatus (hours)	**0.69***	**0.74****	**0.80**-**
Time of first passage of motion (hours)	**0.70****	**0.76****	**0.82**-**
Time of first opening of bowel (hours)	**0.68***	**0.70****	**0.79**-**
Hospital stay (hours)	**0.73****	**0.77****	**0.83**-**

IV. Discussion

Cesarean section is prone to cause a series of postoperative complications. Postoperative ileus is an impaired condition of gastrointestinal, most likely to occur with day 4 postoperatively.The average incidence of postoperative ileus is about 20%**(Zhang et al., 2019).**

Ileus is a serious complication that alters digestive functions after abdominal operations.Abdominal distention, nausea and vomiting are expected complains after CS.The manipulation of bowel during surgery negatively impacts gut motility. Bowel sounds can be slow to return postoperatively and the patient may experience postoperative ileus**(Courtney and Mary., 2019).**

A large number of studies have shown that early feeding can effectively promote the recovery of gastrointestinal function after cesarean section, hover, some patients performed high intolerance, and delayed feeding is related to increase cell break-down, delay the time of wound healing and increase the risk of infection, thereby increasing medical costs **(Manzoor et al., 2018).**

In the same line, **Ciardulli et al., (2018),** conducted study in Italy, about Chewing gum improves postoperative recovery of gastrointestinal function after cesarean delivery. They found that, chewing gum group had a significantly lower time to first flatus, first bowel sounds, less duration of stay, lower time to first feces and to the first feeling of hunger.

In the present study, there were no statistical significant differences among two groups regarding their age, education, residence, and occupational status. In the same line, **Mansour et al., (2016)**supported that, the results of the current study. They conducted study in Egypt, about, (Chewing Gum after Cesarean Section).They found that, there were no statistically significant differences between both groups regarding their general characteristics; age group, educational level, work and residence.

The finding of the present study, indicated that there was highlystatistical significant differences among two groups concerning the occurrence of postoperativeileus related to selected postoperative symptoms such as feeling of hunger and thirsty. **Ali et al., (2019),** supportedthe results of the current study,who conductedstudy in Pakistan, aboutChewing Aid in Routine Postoperative Orders reduce Postoperative Ileus after Cesarean Section,They found that, women in study group reported to feel hungry early before control group.

Also,thestudy of**AL-Harbawia & Hasan., (2018),**supportedthe results ofthe current study**,**who conductedstudy in Iraq, about Evaluation of postoperative gum chewing role in stimulating bowel motility.They found that there wasstatistical significant reduction in mean time for the first feeling of hunger postoperatively,first passage of flatus in and first bowel movement in gum chewing group .

V. Conclusion

Gum chewing after CS enhances early recovery from postoperative ileus, safe, well tolerated by patient, associated with rapid resumption of intestinal motility and shorter hospital stay.

In the light of the findings of the current study the researcher recommends:
Non-sugared gum chewing should be added to post cesarean care protocols.
Further study:
Replicate the present study with larger populations and different settings.
Investigate the effect of non-sugared gum on intestinal functions after gynecologic operations

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