

Study of different types of gum in induction of earlier gastrointestinal recovery after elective cesarean section: A randomized controlled trial

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Abstract

Background: Cesarean section (CS) is a crucial surgical technique that is done when vaginal birth have pre-identified or emergent danger for both mother and baby. After any abdominal procedures, including CS, digestive functions are adversely compromised. Post-surgical autonomic nervous system change leads to disruption in intestinal activities, notably, motility. Ileus is characterized as a 3 to 5-day delay in the regular bowel motions of individuals. It is one of the most frequent post-surgeries which prolong the length of hospitalization, postoperative discomfort, stomach distension, difficulty to eat after the operation or to start breastfeeding and eventually to postpone the healing period. Chewing gum stimulates the stomach, gastric secretion and digestive materials, because of which the individual will be able to consume and there will be more peristaltic movements in their digestive system. Therefore, gum-chewing appears to successfully expedite patients' recovery from ileus. The research is aiming to examine the impact of chewing various kinds of gum on GIT motility recovery time in women after elective cesarean birth. Methods: This is Randomized controlled experiment, was conducted out at department of obstetrics and gynecology at Benha University Hospital on 625 women split into 5 groups: (Group A-control group-) (n=125): Kept on intravenous fluids for 24 h, (Group B) (n=125): received oral fluids 6 h postoperatively, (Group C) (n=125): received sugarless gum, (Group D) (n=125): will get peppermint gum, (Group E) (n=125): received cinnamon gum. Results: There was no statistically significant difference detected between the analyzed groups for demographic data and features of the studied patients. there was no statistically significant difference detected between the study groups for Miscarriage, Surgical history, prior CD and indication of CD. There was statistically significant reduction in the operational time in group B than group A, C, D and E. Also the table reveals that there was no statistically significant difference between the five examined groups regarding pethidine requirement. There was no statistically significant difference identified between group D and E regarding audible bowel sound although there was statistically significant difference observed between both groups and the other three groups. Also the data reveals that there was statistically significant difference between group A and B and also between B and C regarding audible bowel sound. there was statistically significant difference between the Group A,B,C and D however there was no statistical significant difference between Group D and E related time to first pass flatus. there was statistically significant difference between the Group A,B,C and D however there was no statistical significant difference between Group D and E related time to first pass feaces. There was statistically significant difference between the Group A and B but there was no statistical significant difference between Group C, D and E for parentral fluid volume and IV fluid time. there was statistically significant difference between group A,B and group C,D and E regarding incidence of vomiting. There was statistically significant difference between group A and group B, C and also between group A,B,C and D,E regarding incidence of abdominal distension. There was statistically significant difference between group A and B and between group A,B and the other 3 groups regarding incidence of postoperative ileus. There was statistically significant difference between the all analyzed groups except between group D and E regarding the length of hospital stay. There was statistically significant increase in the time to hungry sensation in group A and B than group C, D and E with p-value <0.001. There was statistically significant increase in the time until audible bowel sound (hours) in group A and B than group C and also in group C than group D and E with p-value <0.001. There was statistically significant increase in the time to first to pass flatus between group A, B than the other 3 groups and in group c than group D and E with p-value <0.001. Conclusion: Our study has further supported that gum chewing is associated with early recovery of intestinal function after caesarean section, which may be helpful to reduce the time to first passage of flatus, first defecation, first bowel sound, and first bowel movement and shorten the length of hospital stay. Xylitol containing gum is more effective on recovery of intestinal function than sugarless gum and there is no difference of various tastes of xylitol gum on recovery of intestinal functions.

Key words: gum, induction, gastrointestinal recovery, elective cesarean section.

1. Introduction

Cesarean delivery (CD) has risen to the status of one of the most often performed major surgeries on a daily basis across the globe. In 2014, Egypt's demographic and health study ranks it third in the world. The prevalence of CS has risen to 52%, according to the data [1].

An important cause of postoperative pain and an extended hospital stay following abdominal surgery

is postoperative gastrointestinal dysfunction, particularly postoperative ileus. Nausea, vomiting, and discomfort in the abdomen may all be side effects of this condition [2].

After a colonoscopy, the most common complication is postoperative ileus (POI), which may cause severe constipation and oral intake difficulty. It is most often caused by a non-mechanical damage to the gastrointestinal system that disrupts regular bowel

movement. Most surgeons also consider POI, at any level, an expected physiological reaction to any open abdominal surgical surgery [3].

Poisoned intestines (POI) is estimated to cost between \$5000 and \$10,000 in the United States, resulting in an annual total of one billion dollars [4]. As a result, many methods of enhancing the restart of gastrointestinal motility following CD were put to the test in clinical trials. Chewing gum and drinking coffee in the morning are just a few examples [5].

Endometrial and gynaecological operations are included in the ERAS programme, which provides standardised perioperative care for patients who have undergone surgery [6]. Patients gain clinically (shorter hospital stays, fewer problems, and fewer readmissions), while health systems profit financially from ERAS (reduction in cost). A number of strategies were evaluated in a clinical study to improve the gastrointestinal motility following CD. Early oral intake, early ambulation, chewing gum, and coffee use are all examples of these behaviours..

In clinical studies, chewing gum after abdominal surgery and CD was shown to shorten the time it took for gastrointestinal functions to return to normal [7]. In this research, we will investigate if chewing motions or the composition of gums such as peppermint or cinnamon have an influence on GIT motility.

GIT motility recovery in women following elective caesarean birth was examined in this research to see whether various forms of gum chewing affected it.

2. Patients and Methods

Study type:

Randomized controlled trial.

Study setting:

The study was conducted at department of obstetrics and gynecology at Benha University Hospital and

Study period:

The study was conducted in the period from January 2020 to December 2020 after being approved by the local research ethics committee.

Study population:

Six hundred twenty-five women will be included in this study distributed into 5 groups;

- Group A -control group- (n=125): Kept on intravenous fluids for 24 h.
- Group B (n=125): will receive oral fluids 6 h postoperatively.
- Group C (n=125): will receive sugarless gum.
- Group D (n=125): will receive peppermint gum.
- Group E (n=125): will receive cinnamon gum.

Recruitment:

It was done in the outpatient clinic of Benha university hospital and Dar El Salam general hospital

Inclusion criteria:

- Women age between 20 and 35 years
- Term, singleton, viable and healthy pregnancy
- Scheduled for planned CD; either first or repeated

Exclusion criteria:

- Emergency cesarean deliveries
- Multiple pregnancies
- Polyhydramnios
- Abnormal placentation (placenta previa and/or accrete)
- History of medical disorders, bowel disease, gastrointestinal operations or dental prosthesis (could be affected by prolonged chewing)

Intervention:

All eligible women were fully counseled about the trial potential side effects before an informed written consent was signed by each participant. Eligible and consented women were enrolled and divided randomly into five groups through sealed envelope method which was withdrawn by the patient herself. Each envelope was marked with a serial number and had a card defines the intervention type. Once participant had been allocated to one arm of the study, it could not be changed.

Group (A) was the control group; women of this group were kept on intravenous fluids for 24 h, unless recovery of intestinal function took place early. Group (B) women started oral clear fluids after OR discharge by 6 h.

Women in group (C) received sugarless gum 2 h after their operating room (OR) discharge. Women in group (D) received peppermint gums and group (E) women received cinnamon gums. They were instructed to chew it at least for half an hour and at 2-h interval during daytime. Gum chewing was stopped all over the night (12:00 midnight) to allow women to sleep.

Assuring the women's compliance to gum use was done by counting and recording the number of empty sticks during the routine observations of their vital signs. Women was guided to stop chewing gum with the passage of stool and they were allowed starting regular oral intake. Intestinal sounds was checked for all groups at six to eight hours interval postoperatively. Clear fluids and soft foods were allowed orally to start with their first bowel motion.

All women should have the same operative techniques; All the operations were performed in the morning under general anesthesia using Pfennanstiel's skin incision. All patients receive 1 g of ceftriaxone for perioperative prophylaxis after umbilical cord clamping. The uterine incision in all groups will closed with a continuous two layers of Vicryl 0. The visceral peritoneum left unsutured while the parietal peritoneum closed with Vicryl 2-0. The rectus sheath will be closed with a continuous single layer of Vicryl 1. Finally, the skin was closed by subcuticular Vicryl 2-0.

The time when surgery was ended discharging the woman from the operative room after full recovery marked as the 0 hours. For analgesia all women received two rectal doses of 100mg diclofenac sodium 12 hours apart. The need for extra use of pethidine was recorded. None of the oral or rectal intestinal stimulants were used after CD. The same postoperative regimen for ambulation was used for all groups.

The criteria to consider the woman fit for hospital discharge were stable vital signs for at least 24 h, full ambulation without assistance, passage of a stool and urine, tolerance to solid food and absence of postoperative complication

Primary outcome measure:

The time of first passage of stool (the most objective outcome, it can be recorded accurately).

The secondary outcome measure:

- The time of the first passage of flatus.
- The first hearing of normal intestinal sounds.
- The duration of hospital stay.
- The duration of parenteral therapy by intravenous fluids.

- The time of initiating breast-feeding.
- The cost of hospital stay.

Statistical analysis

Data were collected, revised, coded and entered to the Statistical Package for Social Science (Released 2015. IBM SPSS Statistics for Windows, Version 23.0. Armonk, New York: IBM Corporation). The quantitative data were presented as mean, standard deviations and ranges when parametric and median, inter-quartile range (IQR) when data found non-parametric. Also qualitative variables were presented as number and percentages.

The previous table shows that there was no statistically significant difference found between the studied groups regarding demographic data and characteristics of the studied patients. Table (1)

The previous table shows that there was no statistically significant difference found between the studied groups regarding miscarriage, Surgical history, previous CD and indication of CD (p>0.05). Table (2)

3. Results

Table (1) Comparison between the five studied groups regarding demographic data and characteristics.

		Group A No. = 125	Group B No. = 125	Group C No. = 125	Group D No. = 125	Group E No. = 125	Test value	P- value	Sig.
Age	Mean ± SD	28.44 ± 3.93	28.42 ± 4.07	28.26 ± 4.13	28.67 ± 4.22	28.84 ± 3.91	0.393•	0.814	NS
	Range	22 – 35	22 – 35	22 – 35	22 – 35	22 – 35			
BMI	Mean ± SD	28.40 ± 2.82	28.51 ± 2.73	28.62 ± 2.49	28.35 ± 2.56	28.42 ± 2.70	0.198•	0.940	NS
	Range	24 – 33	24 – 32.9	24.2 – 33	24 – 33	24 – 32.9			
Parity	Median(IQR)	1 (1 - 2)	1 (0 - 2)	2 (1 - 2)	1 (1 - 2)	2 (1 - 2)	1.620‡	0.805	NS
	Range	0 – 4	0 – 4	0 – 4	0 – 4	0 – 4			
Gestational age	Mean ± SD	38.98 ± 1.45	38.79 ± 1.53	38.91 ± 1.31	39.14 ± 1.32	38.84 ± 1.29	1.242•	0.292	NS
	Range	37 – 41	37 – 41	37 – 41	37 – 41	37 – 41			

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value < 0.01: highly significant (HS)

•: One Way ANOVA test; ‡: Kruskal Wallis test

Table (2) Comparison between the five studied groups regarding Miscariage, surgical history, previous CD and indication of CD

		Group A		Group B		Group C		Group D		Group E		Test value	P- value	Sig.
		No.	%	No.	%	No.	%	No.	%	No.	%			
Miscarriage	No	120	96.0%	116	92.8%	118	94.4%	121	96.8%	120	96.0%	2.801	0.592	NS
	Yes	5	4.0%	9	7.2%	7	5.6%	4	3.2%	5	4.0%			
Surgical history	No	112	89.6%	114	91.2%	110	88.0%	108	86.4%	103	82.4%	5.215	0.266	NS
	Yes	13	10.4%	11	8.8%	15	12.0%	17	13.6%	22	17.6%			
Previous CD	No	77	61.6%	87	69.6%	86	68.8%	72	57.6%	78	62.4%	5.625	0.229	NS
	Yes	48	38.4%	38	30.4%	39	31.2%	53	42.4%	47	37.6%			
	Malpresentation	27	21.6%	33	26.4%	33	26.4%	18	14.4%	21	16.8%			
Indications of CD	Fetal macrosomia	8	6.4%	15	12.0%	14	11.2%	10	8.0%	20	16.0%	23.671	0.097	NS
	Maternal request	24	19.2%	23	18.4%	18	14.4%	31	24.8%	24	19.2%			
	Cephalopelvic disproportion	18	14.4%	16	12.8%	21	16.8%	13	10.4%	13	10.4%			
	Repeat CD	48	38.4%	38	30.4%	39	31.2%	53	42.4%	47	37.6%			

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value < 0.01: highly significant (HS)

*:Chi-square test

Table (3) Comparison between the five studied groups regarding the outcome.

		Group A No. = 125	Group B No. = 125	Group C No. = 125	Group D No. = 125	Group E No. = 125	Test value	P- value	Sig.
Operative time (minutes)	Mean ± SD	59.09±12.17	57.16±10.20	61.18 ± 9.70	60.10 ± 9.58	60.42 ± 9.10	2.892•	0.022	S
	Range	39 – 80	43 – 80	44 – 77	44 – 78	44 – 78			
Pethidine need	No	100 (80.0%)	99 (79.2%)	94 (75.2%)	104 (83.2%)	102 (81.6%)	2.823*	0.588	NS
	Yes	25 (20.0%)	26 (20.8%)	31 (24.8%)	21 (16.8%)	23 (18.4%)			
Hunger feeling (hours)	Mean ± SD	13.13 ± 4.36	13.94 ± 5.42	10.14 ± 4.22	9.59 ± 4.27	9.64 ± 4.31	26.251•	0.000	HS
	Range	6 – 22	4 – 24	3 – 18	2 – 18	2 – 18			
Audible Bowel sound (hours)	Mean ± SD	23.20 ± 2.62	19.23 ± 3.06	15.49 ± 2.44	10.74 ± 1.71	10.46 ± 1.70	674.152•	0.000	HS
	Range	19 – 36	14 – 26	11 – 22	7 – 15	7 – 14			
Time to first pass flatus (hours)	Mean ± SD	31.07 ± 2.30	27.15 ± 3.07	23.90 ± 2.87	16.66 ± 2.02	16.45 ± 2.08	828.163•	0.000	HS
	Range	26 – 36	21 – 36	17 – 30	11 – 22	12 – 22			
Time to first pass stool (hours)	Mean ± SD	35.86 ± 2.85	31.96 ± 3.09	27.78 ± 3.14	22.26 ± 2.40	22.12 ± 2.32	586.077•	0.000	HS
	Range	29 – 43	24 – 40	21 – 38	16 – 29	18 – 29			
Parenteral Fluid volume (l)	Mean ± SD	3.11 ± 0.24	3.14 ± 0.34	2.23 ± 0.62	2.26 ± 0.62	2.26 ± 0.61	109.761•	0.000	HS
	Range	2.7 – 3.5	2.5 – 3.7	1.1 – 3.3	1.2 – 3.3	1.2 – 3.3			
IV fluids duration (hours)	Mean ± SD	29.90 ± 1.32	28.30 ± 0.72	18.50 ± 0.71	18.34 ± 0.65	18.38 ± 0.64	6005.859•	0.000	HS
	Range	28 – 32	27 – 29	17 – 20	17 – 20	17 – 20			

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value < 0.01: highly significant (HS)

*:Chi-square test; •: One Way ANOVA test

Table (4) Post Hoc analysis by LSD.

	Post Hoc analysis by LSD									
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Operative time (minutes)	0.136	0.105	0.432	0.304	0.002	0.023	0.012	0.403	0.552	0.809
Hunger feeling (hours)	0.160	0.000	0.000	0.000	0.000	0.000	0.000	0.344	0.388	0.933
Audible Bowel sound (hours)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.350
Time to first pass flatus (hours)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.512
Time to first pass stool (hours)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.699
Parenteral Fluid volume (l)	0.694	0.000	0.000	0.000	0.000	0.000	0.000	0.605	0.631	0.971
IV fluids duration (hours)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.118	0.246	0.655

* P1: Group A Vs Group B P6: Group B Vs Group D

* P3: Group A Vs Group D P8: Group C Vs Group D

* P5: Group B Vs Group C P10: Group D Vs Group E

* P2: Group A Vs Group C P7: Group B Vs Group E

* P4: Group A Vs Group E P9: Group C Vs Group E

The previous table shows that there was no statistically significant difference found between the studied groups regarding miscarriage, Surgical history, previous CD and indication of CD (p>0.05). Table (3)

The previous table shows that there was statistically significant decrease in the operative time in group B than group A, C, D and E. Also, the table shows that there was no statistically significant difference between the five studied groups regarding pethidine need.

The previous tables show that there was no statistically significant difference found between group D and E regarding audible bowel sound while there was statistically significant difference found between both groups and the other three groups. Also, the table shows that there was statistically significant

difference between group A and B and also between B and C regarding audible bowel sound.

The previous tables show there was statistically significant difference between the Group A,B,C and D but there was no statistical significant difference between Group D and E regarding time to first pass flatus

The previous tables show there was statistically significant difference between the Group A,B,C and D but there was no statistical significant difference between Group D and E regarding time to first pass faeces.

The previous tables show there was statistically significant difference between the Group A and B but there was no statistical significant difference between Group C,D and E regarding parenteral fluid volume and IV fluid duration. Table (4)

Table (5) Comparison between five groups as regarding vomiting times, abdominal distension and postoperative ileus.

		Group A		Group B		Group C		Group D		Group E		Test value*	P-value	Sig.
		No.	%	No.	%	No.	%	No.	%	No.	%			
Vomiting times	No	112	89.6%	114	91.2%	122	97.6%	123	98.4%	124	99.2%	21.709	0.000	HS
	Yes	13	10.4%	11	8.8%	3	2.4%	2	1.6%	1	.8%			
Abdominal Distension	No	96	76.8%	113	90.4%	114	91.2%	119	95.2%	120	96.0%	32.939	0.000	HS
	Yes	29	23.2%	12	9.6%	11	8.8%	6	4.8%	5	4.0%			
Postoperative Ileus	No	114	91.2%	118	94.4%	123	98.4%	125	100%	125	100%	24.277	0.000	HS
	Yes	11	8.8%	7	5.6%	2	1.6%	0	0.0%	0	0.0%			

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value <0.01: highly significant (HS)

*:Chi-square test

The previous table show there was statistically significant difference between group A,B and group C,D and E regarding occurrence of vomiting

The previous table show that there was statistically significant difference between group A and group B,C and also between group A,B,C and D,E regarding occurrence of abdominal distension.

The previous table show that there was statistically significant difference between group A and B and between group A,B and the other 3 groups regarding occurrence of postoperative ileus.

Table (6) Comparison between five groups as regarding hospital stay duration (hours).

Hospital stay duration (hours)	Group A No. = 125	Group B No. = 125	Group C No. = 125	Group D No. = 125	Group E No. = 125	Test value	P-value	Sig.
Mean ± SD	44.90 ± 4.46	40.85 ± 5.01	34.66 ± 3.48	27.32 ± 2.61	27.10 ± 2.57	561.840	0.000	HS
Range	39 – 57	3 – 50	30 – 45	20 – 35	23 – s35			

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value <0.01: highly significant (HS)

*: One Way ANOVA test

The previous table show that there was statistically significant difference between the all studied groups except between group D and E regarding the duration of hospital stay.

Table (7) Kaplan Meier analysis for the comparison between the five studied groups regarding hunger feeling (hours)

Group	No.	Hunger feeling (hours)								Log Rank Test		
		Mean	SE	95% CI		Median	SE	95% CI		X2	P-value	Sig.
				Lower	Upper			Lower	Upper			
Group A	125	13.128	0.39	12.364	13.892	13	0.556	11.91	14.09	106.354	<0.001	HS
Group B	125	13.936	0.485	12.985	14.887	13	0.798	11.436	14.564			
Group C	125	10.136	0.377	9.396	10.876	10	0.645	8.737	11.263			
Group D	125	9.592	0.382	8.843	10.341	9	0.838	7.357	10.643			
Group E	125	9.64	0.385	8.885	10.395	10	0.726	8.576	11.424			
Overall	625	11.286	0.196	10.903	11.67	11	0.268	10.475	11.525			

The previous table shows that there was statistically significant increase in the time to hunger feeling in group A and B than group C, D and E with p-value <0.001.

Table (8) Kaplan Meier analysis for the comparison between the five studied groups regarding audible bowel sound (hours)

Group	No.	Audible bowel sound (hours)								Log Rank Test		
		Mean	SE	95% CI		Mean	SE	95% CI		X2	P-value	Sig.
				Lower	Upper			Lower	Upper			
Group A	125	23.2	0.234	22.741	23.659	23	0.327	22.359	23.641	857.535	<0.001	HS
Group B	125	19.232	0.274	18.695	19.769	19	0.284	18.443	19.557			
Group C	125	15.488	0.218	15.061	15.915	15	0.25	14.509	15.491			
Group D	125	10.736	0.153	10.436	11.036	11	0.221	10.566	11.434			
Group E	125	10.456	0.152	10.158	10.754	10	0.238	9.534	10.466			
Overall	625	15.822	0.218	15.395	16.25	15	0.353	14.309	15.691			

The previous table shows that there was statistically significant increase in the time till audible bowel sound (hours) in group A and B than group C and also in group C than group D and E with p-value <0.001.

Table (9) Kaplan Meier analysis for the comparison between the five studied groups regarding time to first pass flatus (hours).

Group	No.	Time to first pass flatus (hours)				Log Rank Test						
		Mean	SE	95% CI		Mean	SE	95% CI		X2	P-value	Sig.
				Lower	Upper			Lower	Upper			
Group A	125	31.072	0.205	30.669	31.475	31	0.217	30.575	31.425	897.057	<0.001	HS
Group B	125	27.152	0.275	26.613	27.691	27	0.328	26.356	27.644			
Group C	125	23.904	0.257	23.4	24.408	24	0.317	23.378	24.622			
Group D	125	16.656	0.18	16.302	17.01	16	0.294	15.423	16.577			
Group E	125	16.448	0.186	16.083	16.813	16	0.254	15.502	16.498			
Overall	625	23.046	0.252	22.553	23.54	23	0.426	22.165	23.835			

The previous table shows that there was statistically significant increase in the time to first to pass flatus between group A,B than the other 3 groups and in group c than group D and E with p-value <0.001.

Table (1) Kaplan Meier analysis for the comparison between the five studied groups regarding time to first pass stool (hours).

Group	No.	Time to first pass stool (hours)				Log Rank Test						
		Mean	SE	95% CI		Mean	SE	95% CI		X2	P-value	Sig.
				Lower	Upper			Lower	Upper			
Group A	125	35.864	0.255	35.364	36.364	35	0.339	34.336	35.664	798.186	<0.001	HS
Group B	125	31.96	0.276	31.418	32.502	32	0.372	31.271	32.729			
Group C	125	27.776	0.281	27.225	28.327	28	0.376	27.262	28.738			
Group D	125	22.256	0.214	21.836	22.676	22	0.24	21.529	22.471			
Group E	125	22.12	0.208	21.713	22.527	22	0.124	21.756	22.244			
Overall	625	27.995	0.243	27.52	28.471	28	0.455	27.108	28.892			

The previous table show that the time to first pass stool was significantly longer in group A & B compared to group C, D& E. in group C than group D and E (p<0.001).

Table (2) Kaplan Meier analysis for the comparison between the five studied groups regarding IV fluid duration (hours).

Group	No.	IV fluid duration (hours)				Log Rank Test						
		Mean	SE	95% CI		Mean	SE	95% CI		X2	P-value	Sig.
				Lower	Upper			Lower	Upper			
Group A	125	29.896	0.118	29.665	30.127	30	0.193	29.623	30.377	629.768	<0.001	HS
Group B	125	28.296	0.064	28.17	28.422	28	0.111	27.782	28.218			
Group C	125	18.504	0.064	18.379	18.629	19	0.029	18.942	19.058			
Group D	125	18.336	0.058	18.223	18.449	18	0.089	17.826	18.174			
Group E	125	18.384	0.058	18.271	18.497	18	0.091	17.822	18.178			
Overall	625	22.683	0.213	22.265	23.101	19	0.072	18.859	19.141			

The previous table show that the IV fluid duration was significantly higher in group A & B compared to group C, D& E. (p<0.001).

Table (3) Kaplan Meier analysis for the comparison between the five studied groups regarding hospital stay duration (hours).

Group	No.	Hospital stay duration (hours)				Log Rank Test						
		Mean	SE	95% CI		Mean	SE	95% CI		X2	P-value	Sig.
				Lower	Upper			Lower	Upper			
Group A	125	44.904	0.399	44.121	45.687	45	0.58	43.863	46.137	810.032	<0.001	HS
Group B	125	40.848	0.448	39.97	41.726	40	0.247	39.515	40.485			
Group C	125	34.664	0.312	34.053	35.275	35	0.156	34.695	35.305			
Group D	125	27.32	0.233	26.863	27.777	27	0.25	26.51	27.49			
Group E	125	27.104	0.23	26.654	27.554	27	0.136	26.734	27.266			
Overall	625	34.968	0.322	34.337	35.599	35	0.516	33.988	36.012			

The previous table show that the length of hospital stay was significantly longer in group A & B compared to group C, D& E. (p<0.001).

4. Discussion

In terms of demographics and patient characteristics, the research in our hands discovered no statistically significant differences between the groups analysed.

Elgzar & Ghattas [8] found no statistically significant differences in socio-demographic characteristics between the two groups studied in their randomised controlled clinical trial on the effect of non-sugared gum chewing with early ambulation on the recovery of bowel function after elective caesarean section.

Another study [9] by Shabaan & Dieb looked at the function of gum chewing in helping caesarean section patients restore their intestinal motility, and found that the two groups were statistically equivalent in terms of demographics.

Xylitol gum chewing has been shown to restore postoperative bowel function following caesarean section, however Lee et al. [10] observed no statistically significant changes in the socio-demographic parameters of the study groups.

The randomised controlled study by Jakkaew & Charoenkwan [11] showed no statistically significant changes in socio-demographic variables between the groups tested.

There was no statistically significant difference identified between the analysed groups regarding miscarriage, surgical history, prior CD, and CD indications, according to the findings of this study.

Elgzar & Ghattas [8] observed no statistically significant variations in obstetrical history across the groups they analysed, which is in line with our own findings.

No statistically significant differences were found between the two groups of patients investigated by Jakkaew & Charoenkwan [11].

A statistically significant reduction in operating time was seen in group B over the other four groups studied. No statistically significant differences in pethidine use were found among the five groups tested.

There was also no statistically significant difference identified between groups D and E when it came to audible bowel sound, but the other three groups had statistically significant differences. The findings also demonstrated a statistically significant difference in audible bowel sound between groups A and B as well as B and C.

In addition, we found a statistically significant difference in the time to first pass flatus between Groups A, B, C, and D, but no statistically significant difference between Groups D and E. There was a statistically significant difference in the time to first pass faeces between Groups A, B, C, and D, but not between Groups D and E.

In terms of parenteral fluid volume and IV fluid time, there was a statistically significant difference between Groups A and B, but none between Groups C, D, or E.

Non-sugar gum users showed statistically significant improvements in all of their bowel functions, according to the findings of Elgzar & Ghattas [8].

The findings of Shabaan & Dieb [9] support ours, showing a statistically significant difference between the two groups in the auscultation of the initial intestinal sounds, the passage of flatus, and the transit of stools (P value 0.001,0.001,0.001, respectively).

It was shown that chewing gum significantly reduced the time between the first passage of flatus and the first faeces or bowel movement in agreement with our findings by Wen et al. [12].

There were 17 randomised studies (including approximately 3000 women) that looked at the effects of chewing gum on the recovery of bowel function after a caesarean section, as reported by Morais et al. [13] in their meta-analysis (CS). A median reduction in the time to first flatus passage of seven hours was noted, and this impact was consistent across all subgroup analyses. More than 60% less ileus was seen in the intervention group when chewing gum was used instead of the control group. After a caesarean section, chewing gum may help speed up the passing of stool by around nine hours.

When comparing gum chewing groups to control groups, Lee et al. [10] found that gum chewing was a helpful intervention for women who had undergone caesarean section, but there was a significant difference in the time it took for the gum-chewing groups to recover bowel sounds and pass their first flatus compared to the control groups (12.8 hr and 24.3 hr, respectively). No significant differences in time to first defecation were found regardless of which research group was compared.

This study found that there was a statistically significant difference in the frequency of vomiting between groups A, B, and C, D, and E. There was also a statistically significant difference in the incidence of abdominal distension between groups A and B, C and D and E. There was a statistically significant difference in the incidence of postoperative ileus between groups A and B, as well as between groups A, B, and the three other groups studied.

Abdominal discomfort and nausea were shown to be statistically more common in the early-ambulation group than in the early-ambulation group that chewed non-sugared gum. There is no statistically significant difference between the two groups, even though there is a larger rate of vomiting in the early ambulation alone group than in group 1.

We found that there was no statistically significant difference in the presence of abdominal distension, postoperative vomiting, patient satisfaction, and obstetric problems between the two groups of patients.

There was no statistically significant difference between the two groups in terms of the occurrence of fever, abdominal distension, vomiting and cramps according to the research by Jakkaew & Charoenkwan [11].

The present findings showed that there was a statistically significant difference in the length of hospital stay between all analysed groups, except for group D and E.

When compared to the control group, there was a statistically significant difference in the length of stay in the hospital.

Gum chewing has been shown to reduce the duration of hospital stay, according to Wen et al. [12]'s findings in a systematic review and meta-analysis.

According to a study by Morais et al. [13], chewing gum reduced the length of hospitalisation by roughly eight hours.

In contrast to our data Elgzar & Ghattas [8] observed that there was no statistically significant difference in hospital stay between groups.

With a p-value 0.001, we found that group A and B had an increase in the time it took to feel hungry compared to group C, D, and E.

Our findings are in line with those of Elgzar & Ghattas [8] who found a statistically significant difference between groups in the time it took for subjects to experience their initial signs of hunger.

When it comes to the time it takes for a person to feel hungry, Jakkaew & Charoenkwan [11] found that there was no statistically significant difference between both groups.

Chewing gum did not give any substantial improvements in the time before the first signs of hunger, according to a systematic study by Wen et al. [12].

With a p-value 0.001, the current findings showed that there was an increase in the duration to audible bowel sound (hours) for group A and B, as well as group C, compared to group D and E.

Elgzar & Ghattas [8] also found a statistically significant difference between groups in the time it took for the bowel sound to become audible, which is in line with our findings.

There was a statistically significant difference in the initial normal intestinal sounds between the two groups, as shown by Shabaan & Dieb [9].

To our surprise, Wen et al. [12] found that chewing gum reduced the duration between the first passage of flatus, the first faeces sound, and the first bowel movement, which is in line with our findings.

As a result of the intervention, Morais et al. [13] found that first bowel noises were heard approximately five hours earlier.

The time it takes for bowel sounds to return was also shown to be significantly different in the research by Lee et al. [10].

A substantial difference was detected between groups A, B, and C and D and E, all with p-values 0.001 when it came to passing the first flatus.

There was a statistically significant difference between the two groups for the time to the first flatus passage (P value=0.001), in keeping with our findings.

Chewing gum has been shown to reduce the time it takes to pass a flatus, according to a comprehensive review and meta-analysis by Wen et al [12].

The study by Morais et al. [13] found that gum chewing shortened the average time to first flatus passing by roughly seven hours.

However, although Lee et al. [10] found that post-cesarean section women who chewed gum experienced a reduction in the time until their first passage of flatus by 17.05 hours compared to those in the control group (12.8 hours and 24.3 hours, respectively), there were significant differences in the mean time until their first passage of flatus between the gum-chewing groups and those in the control group.

An earlier flatus passage was found by Ajuzieogu et al. [14] in accordance with our findings (P = 0.04).

Finally, in accordance with the literature, the current research found that the time to first pass stool, IV fluid length, and hospital stay duration differed significantly across the analysed groups.

Ajuzieogu et al. [14] also found that passage of stool was earlier (P=0.035), which is in line with our findings, and studies by Shabaan & Dieb [9], Wen et al. [12], and Morais et al. [13] also found a significant reduction in the length of hospital stay, whereas a study by Elgzar & Ghattas [8] found no significant reduction in hospital stay.

5. Conclusion

Chewing gum after a caesarean section may assist to speed up the recovery of intestinal function and minimise the duration of the hospital stay. Using gum to aid in the recovery of intestinal function after caesarean section is a safe, easy, and economical method that should be promoted for clinical usage.

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