

# Effects of Acupressure and Gum Chewing on the Post Operative Nausea and Vomiting After Caesarean Section Under Spinal Anesthesia

Original  
Article

Mai Mostafa Zaitoun<sup>1</sup>, Ahmed Ismail Heraiz<sup>1</sup>, Hebatallah M. Fawzy<sup>2</sup>, Abdalla Mohamed Goda Mohamed<sup>3</sup>, Ahmed M. Fahmy<sup>3</sup>, Eslam Sobhy Almaghawry Mohamed<sup>3</sup> and Mohamed Ahmed Mahmoud Wasfy<sup>1</sup>

<sup>1</sup>Department of Obstetrics and Gynecology, Faculty of Medicine, Zagazig University, Egypt

<sup>2</sup>Public Health and Community Medicine

<sup>3</sup>Intensive Care and Pain Management

## ABSTRACT

**Background:** Postoperative nausea and vomiting (PONV) are common and distressing complications experienced by patients undergoing cesarean section procedures performed under spinal anesthesia. PONV can delay hospital discharge, increase healthcare costs, and negatively impact patient satisfaction and quality of recovery.

**Aim:** To reduce abdominal distension and difficulty in defecating due to GIS immobility by using various techniques (e.g., chewing gum, acupressure).

**Methods:** This cohort study comprised 260 pregnant women who presented to the maternity hospital at Zagazig university hospitals for elective caesarean section between January 2021 and January 2022. Spinal anesthesia was used for their caesarean section. All the patients were classified into 4 groups: Group I (control group), Group II (patients received ondansetron), Group III (patients applied acupunctures) and Group IV (patients that used chewing gum).

**Results:** The VAS for nausea and vomiting showed significant differences between each group and the control group. The groups that received acupuncture and ondansetron showed the most improvements. Regarding the VAS for pain, every group differed significantly from the control group with the ondansetron group demonstrating the greatest improvement. Regarding flatus passage, all groups significantly differed from the control group. The acupuncture group exhibited the greatest improvement, followed by the ondansetron group. All groups differed significantly from the control group in terms of stool passing; the ondansetron group exhibited the greatest improvement, followed by the chewing gum group.

**Conclusion:** It is important to think about prophylaxis to prevent PONV in every obstetric patient undergoing a cesarean section. Both acupressure and sugar-free gum chewing were effective in reducing the frequency and severity of post-operative discomfort following vasectomy while the patient was under spinal anesthesia.

**Key Words:** Acupressure, caesarean section, gum chewing, post operative nausea and vomiting.

**Received:** 21 August 2024, **Accepted:** 27 October 2024

**Corresponding Author:** Mai Mostafa Zaitoun, Department of Obstetrics and Gynecology, Faculty of Medicine, Zagazig University, Egypt, **Tel:** +2 011 4889 9047, **Email:** mai\_zaitoun@hotmail.com

**ISSN:** 2090-7265, 2025, Vol. 15

## INTRODUCTION

One of the most popular surgical procedures performed worldwide is the caesarean section<sup>[1]</sup>. Following a caesarean section, postoperative problems might also include trouble flatulating, difficulty defecating, loss of appetite, nausea, and vomiting due to the gastrointestinal system (GIS) decreased motility<sup>[2]</sup>.

After being discharged from a hospital or surgical care facility, symptoms are referred to as post-discharge nausea and vomiting (PDNV). Postoperative nausea and vomiting

(PONV) is the term used to describe nausea, vomiting, or retching that happens in the post anesthesia care unit (PACU) or in the first 24 to 48 hours following surgery<sup>[4]</sup>.

PONV can result in a number of complications in addition to discomfort for the patient, including electrolyte imbalance, acid-base imbalance, esophageal rupture, pulmonary aspiration, pneumothorax, increased intracranial pressure, ruptured sutures, wound dehiscence, bleeding, extended hospital or PACU stays, fatigue, anxiety, unanticipated readmission or hospitalization, and higher medical expenses. An additional factor influencing

patients' dissatisfaction with their surgical experience is the distressing symptoms of PONV/PDNU<sup>[5]</sup>. PONV prophylaxis may be financially beneficial if the hospital adopts a logical multimodal strategy that takes procedural and patient risk factors into account<sup>[6]</sup>.

Postpartum women might be discharged earlier if they receive the appropriate medical attention from medical professionals throughout the recovery phase. Thus, it is best to use non-invasive, inexpensive, and simple procedures to ensure that, throughout the recovery period, the first spontaneous flatulation and defecation occur as soon as possible. Chewing gum and consuming coffee during the postoperative phase may facilitate early GIS motility following abdominal surgery, hence reducing the duration of flatulence, defecation, and recovery<sup>[7]</sup>.

Chewing gum simulates the act of eating by preventing food from being swallowed. As a result, it can promote GIS motility by halting the onset of early feeding-related problems, such as nausea and vomiting. Gum chewing-induced GIS motility is a common and affordable method that many people experience on a daily basis. Gum chewing is a well-tolerated intervention by patients during the recovery phase, according to several studies<sup>[8]</sup>.

Acupuncture is one type of traditional medicine that blends and blends with modern medicine. It is widely acknowledged that acupuncture is an ancient Chinese medicinal practice that dates back at least 4,000 years. It is well recognized as a successful therapeutic choice for the therapy of functional GI problems and postoperative nausea and vomiting<sup>[9]</sup>. The process of acupuncture involves passing the tips of tiny, stainless-steel needles through the skin to certain places known as acupoints<sup>[10]</sup>.

In traditional acupuncture, the implanted needles are manually moved in a variety of sophisticated combinations, including thrusting, elevating, twisting, and spinning<sup>[11]</sup>. Acupressure is the application of pressure using a sharp object or the tips of fingers in place of needles. A safe and noninvasive method for individuals undergoing abdominal surgery is acupressure. Research has demonstrated the effectiveness of acupressure in treating gastrointestinal issues. One research, which focused on women who had undergone transabdominal hysterectomy, found that noninvasive acupressure was able to greatly improve GI motility<sup>[12]</sup>.

Therefore, this study aimed to reduce abdominal distension and difficulty in defecating due to GIS immobility by using various techniques (e.g., chewing gum, acupressure) to reduce complications that the mother may face during the postpartum period following a caesarean section under spinal anesthesia.

---

## SUBJECTS AND METHODS

---

### *Study design*

Cohort study.

### *Study setting*

This study was carried out at Zagazig University Hospitals' postpartum unit in the obstetric and gynecological department.

### *Inclusion criteria*

Women with singleton pregnancy between ages of 20 to 40 years old. Having reached the 37<sup>th</sup> or 42<sup>nd</sup> week of pregnancy, the procedure will be performed under spinal anesthetic.

### *Exclusion criteria*

Women suffering from long-term illnesses (diabetes, high blood pressure, constipation, irritable bowel syndrome, reflux gastroenteritis). Women who presented by nausea or vomiting within the last 72 hours of operation. Patients presented by nausea or vomiting within the last 72 hours of operation. Patients with allergy to ondansetron or are not indicated to take it. Patients having carpal tunnel syndrome. Patient with infection at the site of acupuncture application. Women who had damage to their bladders and intestines during surgery. emergence of any postoperative complications (patients experiencing postpartum hemorrhage over 1000 ml, patients receiving magnesium sulfate therapy for hypertension, and patients with a body temperature higher than 38 C).

### *Sample size*

Assuming that acupuncture and gum chewing significantly impacted GIS motility as reported by Goymen *et al.*<sup>[13]</sup>. At 80% power and 95% CI, the estimated sample was 260 cases, 65 cases in each group. Open Epi

**Group (I)** (control group): the hospital procedure was applied to the members of this group. They received no medicine to help them urinate or flatulate.

**Group (II)** (patients received Ondansetron): the participants in this group will receive Ondansetron 8 mg IV infusion before the end of the surgery by 15 min.

**Group (III)** (patients applied acupunctures): the acupunctures were applied 30 min before surgery at P6 acupoint in bilateral forearm and it were removed 6 hours post operation.

**Group (IV)** (patients that used chewing gum): two hours after beginning oral intake, the participants in this group chewed sugar-free gum for fifteen minutes every two hours. (2 h following cesarean delivery).

The patient gave her informed permission to be included in the research and was given the option to withdraw from it at any time.

All the patients who were included in the study were subjected to full history taking, physical examination as (vital signs, heart, and lung examination), laboratory investigation (CBC, Coagulation profile, random blood sugar, liver, and kidney functions). For the group that applied acupuncture, the acupunctures were inserted 30 min before induction of anesthesia.

Ten minutes before operation, all patients had been received 0.01mg/kg atropine IV, 1-3 mg midazolam IV to provide anxiolysis and sedation, 10 mg Metoclopramide IV, 20 mg Famotidine IV and then all the patients were subjected to spinal anesthesia for elective caesarean section.

After delivery of the baby, oxytocin infusion 10-20 IU/L, Fentanyl IV (1ug/kg) were given. And before the end of the surgery the patients of Group II received Ondansetron 8 mg IV infusion over 15 min. postoperatively, all the patients received warmed crystalloids according to their body weight and blood loss. Also, they received (1mg/kg) meperidine IM when complaining from pain. Rescue antiemetic treatment in the form of metoclopramide 10mg was administrated if the patient complained of persistent nausea lasting longer than 15 min or experienced repeated episodes of vomiting.

The following criteria were assessed: number of postoperative emetic episodes (immediate postoperative) after 15 min, 30 min, 1<sup>st</sup> hour, 2<sup>nd</sup> hour, 4<sup>th</sup> hour, 8<sup>th</sup> hours, 16<sup>th</sup> hour and 24<sup>th</sup> hour. Patient satisfaction score from number (1) to (5) as Number "1": is very unsatisfied Number "1": is very unsatisfied, Number "2": is unsatisfied, Number "3": is poor satisfied, Number "4": is satisfied and Number "5": is very satisfied.

Usage of Visual Analogue Scale (VAS) for nausea and vomiting from number (0) to (10) as Number "0": is no nausea or vomiting, Number "1,2,3": are mild nausea or vomiting, Number "4,5,6": are moderate nausea or vomiting, Number "7,8,9": are severe nausea or vomiting and Number "10": is intractable nausea or vomiting.

Usage of Visual Analogue Scale (VAS) for pain from number (0) to (10) as Number "0": is no pain, Number "1,2,3": are mild pain, Number "4,5,6": are moderate pain, Number "7,8,9": are severe pain and Number "10": is intractable pain. The time of passage of flatus and the 1<sup>st</sup> defecation were reported.

### **Statistical Analysis**

The data were loaded into the statistical package for the social sciences (SPSS version 27.0) program to be analyzed<sup>[14]</sup>. The following tests were used to determine if differences were significant based on the kind of data—qualitative data is represented as numbers and percentages, whereas quantitative data is generally represented by mean  $\pm$  SD. Determine the difference and relationship of the qualitative variable using the paired Chi-square test ( $X^2$ ). *P values* were set at less than 0.05 and less than 0.001 for outcomes that were considered highly significant. The Kruskal Wallis test was utilized to assess quantitative variables that were not normally distributed between more than two groups under study. An ANOVA analysis was conducted to predict the degree of nausea and vomiting following surgery in each group, with a significance threshold of  $P < 0.05$ .

### **RESULTS**

As shown in (Table 1), there was statistically insignificant difference between the studied groups as regard the basic demographic, anthropometric and clinical data including age, gravidity, parity, operation duration, number of previous operations and history of previous nausea & vomiting.

As shown in (Table 2), there was highly significant difference between the studied groups as regarding occurrence and frequency of nausea and vomiting which was found to be significantly lower among ondansetron group compared to the other three groups (control, acupuncture, and chewing gum groups) after 15 and 30 minutes. After 1 hour, both groups ondansetron and acupuncture were found to be significantly lower in nausea and vomiting occurrence compared to other groups. After 4 and 8 hours, chewing gum group was found to experience the lowest frequency of vomiting occurrence. After 16 hours, the acupuncture group was the best. Regarding post-operative emetic episodes, ondansetron group was found to be the least one in experiencing these episodes followed by both groups acupuncture, and chewing gum (41.6%, versus 67.7%).

As shown in (Table 3), the VAS for nausea and vomiting showed significant differences between each group and the control group. The groups that received acupuncture and ondansetron showed the most improvements. Regarding the VAS for pain, every group differed significantly from the control group with the ondansetron group demonstrating the greatest improvement.

As shown in (Table 4), regarding flatus passage, all groups significantly differed from the control group. The acupuncture group exhibited the greatest improvement, followed by the ondansetron group. All groups differed

significantly from the control group in terms of stool passing; the ondansetron group exhibited the greatest improvement, followed by the chewing gum group.

As shown in (Table 5), every group showed statistically

significant changes in patient satisfaction as compared to the control group when using ondansetron and chewing gum. The acupuncture group showed the most improvement among the groups.

**Table 1:** Baseline characteristics of the studied groups.

Variable	Group I (n=65)	Group II (n=65)	Group III (n=65)	Group IV (n=65)	P
<b>Age: (years)</b>					0.232
Mean ± SD	28.7 ± 5.6	29.3 ± 5.7	28.1 ± 5.1	30.1 ± 6.3	(NS)
<b>Operation time</b>					0.218
Mean ± SD	42 ± 8.2	40 ± 9.6	39.1 ± 9.4	40.3 ± 9.1	(NS)
<b>Gravidity:</b>					
Once:	11 (16.9%)	11 (16.9%)	8 (12.3%)	11 (16.9%)	
Twice:	16 (24.6%)	22 (33.8%)	28 (43.1%)	19 (29.2%)	
Three times:	22 (33.8%)	25 (38.5%)	19 (29.2%)	22 (33.8%)	0.221
Four times:	13 (20%)	4 (6.2%)	10 (15.4%)	9 (13.8%)	(NS)
Five times:	3 (4.6%)	3 (4.6%)	0 (0%)	2 (3.1%)	
Six times:	0 (0%)	0 (0%)	0 (0%)	2 (3.1%)	
<b>Parity:</b>					
No:	13 (20%)	11 (16.9%)	8 (12.3%)	12 (18.5%)	
Once:	17 (26.2%)	26 (40%)	33 (50.8%)	20 (30.8%)	0.111
Twice:	28 (43.1%)	22 (33.8%)	14 (21.5%)	26 (40%)	(NS)
Three times:	6 (9.2%)	4 (6.2%)	10 (15.4%)	5 (7.7%)	
Four times:	1 (1.5%)	2 (3.1%)	0 (0%)	2 (3.1%)	
<b>Number of previous operations:</b>					
No:	15 (23.1%)	14 (21.5%)	8 (12.3%)	16 (20.4%)	
One:	20 (30.8%)	26 (40%)	33 (50.8%)	24 (36.9%)	0.071
Two:	26 (40%)	22 (33.8%)	14 (21.5%)	21 (32.3%)	(NS)
Three:	4 (6.2%)	3 (4.6%)	10 (15.4%)	4 (6.2%)	
<b>History of previous nausea &amp; vomiting:</b>					
No:	65 (100%)	65 (100%)	65 (100%)	65 (100%)	1.00 (NS)

**Table 2:** Frequency of nausea and vomiting among the studied groups.

Variable	Group I (n=65)	Group II (n=65)	Group III (n=65)	Group IV (n=65)	P
<b>At 15 mins:</b>					
No:	48 (73.8%)	62 (95.4%)	55 (84.6%)	56 (86.2%)	0.007
Once:	15 (23.1%)	2 (3.1%)	8 (12.3%)	9 (13.8%)	0.009
Two times:	2 (3.1%)	1 (1.5%)	2 (3.1%)	0 (0%)	0.52
<b>At 30 mins:</b>					
No:	46 (70.8%)	65 (100%)	44 (67.6%)	55 (84.6%)	<0.001
Once:	17 (26.2%)	0 (0%)	21 (32.3%)	10 (15.4%)	<0.001
Two times:	2 (3.1%)	0 (0%)	0 (0%)	0 (0%)	0.10
<b>At 1 hour:</b>					
No:	44 (67.7%)	65 (100%)	65 (100%)	53 (81.5%)	<0.001
Once:	21 (32.3%)	0 (0%)	0 (0%)	12 (18.5%)	(HS)
<b>At 2 hours:</b>					
No:	52 (80%)	60 (92.3%)	65 (100%)	60 (92.3%)	0.001
Once:	13 (20%)	5 (7.7%)	0 (0%)	5 (7.7%)	(S)
<b>At 4 hours:</b>					
No:	32 (49.2%)	58 (89.2%)	46 (70.8%)	61 (93.8%)	<0.001
Once:	32 (49.2%)	7 (10.8%)	19 (29.2%)	4 (6.2%)	<0.001
Two times:	1 (1.5%)	0 (0%)	0 (0%)	0 (0%)	0.39
<b>At 8 hours:</b>					
No:	38 (58.5%)	54 (83.1%)	47 (72.3%)	59 (90.8%)	<0.001
Once:	26 (40%)	11 (16.9%)	18 (27.7%)	6 (9.2%)	<0.001
Two times:	1 (1.5%)	0 (0%)	0 (0%)	0 (0%)	0.39
<b>At 16 hours:</b>					
No:	53 (81.5%)	60 (92.3%)	65 (100%)	56 (86.2%)	0.003
Once:	12 (18.5%)	5 (7.7%)	0 (0%)	9 (13.8%)	(S)
<b>At 24 hours:</b>					
No:	65 (100%)	60 (92.3%)	65 (100%)	52 (80%)	<0.001
Once:	0 (0%)	5 (7.7%)	0 (0%)	13 (20%)	(HS)
<i>P-Value</i>	<0.001	0.003	<0.001	0.216	
<b>Post-operative emetic episodes:</b>					
0:	1 (1.5%)	38 (58.5%)	17 (26.2%)	17 (26.2%)	
1:	12 (18.5%)	17 (26.2%)	30 (46.2%)	29 (44.6%)	
2:	26 (40%)	10 (15.4%)	14 (21.5%)	18 (27.7%)	
3:	21 (32.3%)	0 (0%)	4 (6.2%)	1 (1.5%)	<0.001
4:	4 (6.4%)	0 (0%)	0 (0%)	0 (0%)	(HS)
5:	1 (1.5%)	0 (0%)	0 (0%)	0 (0%)	

**Table 3:** VAS among the studied groups.

Variable	Group I (n=65)	Group II (n=65)	Group III (n=65)	Group IV (n=65)	P
<b>VAS for nausea and vomiting:</b>					
No nausea:	0 (0%)	24 (36.9%)	26 (24.6%)	14 (21.5%)	<0.001
Mild:	15 (23.1%)	34 (52.3%)	41 (63.1%)	51 (78.5%)	(HS)
Moderate:	37 (56.9%)	7 (10.8%)	5 (7.7%)	0 (0%)	
Severe:	13 (20%)	0 (0%)	3 (4.6%)	0 (0%)	
<b>VAS for pain:</b>					
No pain:	9 (13.8%)	13 (20%)	6 (9.2%)	2 (3.1%)	<0.001
Mild:	46 (70.8%)	43 (66.2%)	42 (64.6%)	27 (41.5%)	(HS)
Moderate:	10 (15.4%)	9 (13.8%)	12 (18.5%)	26 (40)	
Severe:	0 (0%)	0 (0%)	5 (7.7%)	10 (15.4%)	

**Table 4:** Time to passage of flatus and stool among the studied groups.

Variable	Group I (n=65)	Group II (n=65)	Group III (n=65)	Group IV (n=65)	P
<b>Flatus passage:</b>					<0.001
Mean ± SD	6.1 ± 1.3 <sup>a</sup>	5.1 ± 1.1 <sup>b,c,d</sup>	4.9 ± 1.6 <sup>b,c,d</sup>	5.1 ± 1.3 <sup>b,c,d</sup>	(HS)
<b>Stool passage:</b>					<0.001
Mean ± SD	9.2 ± 2.4 <sup>a</sup>	7.1 ± 1.4 <sup>b,c,d</sup>	7.3 ± 1.9 <sup>b,c,d</sup>	7.3 ± 1.8 <sup>b,c,d</sup>	(HS)

Different letters denote significant difference.

**Table 5:** Patient satisfaction among the studied groups.

Variable	Group I (n=65)	Group II (n=65)	Group III (n=65)	Group IV (n=65)	P
Satisfaction:					
Very unsatisfied	5 (7.7%)	0 (0%)	10 (15.4%)	0 (0%)	
Unsatisfied:	25 (38.5%)	2 (3.1%)	15 (23.1%)	2 (3.1%)	<0.001
Poor satisfied	24 (36.9%)	14 (21.5%)	14 (21.5%)	14 (21.5%)	(HS)
Satisfied:	9 (13.8%)	32 (49.2%)	11 (16.9%)	32 (49.2%)	
Very satisfied:	2 (3.1%)	17 (26.2%)	15 (23.1%)	17 (26.2%)	

## DISCUSSION

The cesarean section, the most prevalent surgical technique, affects the autonomic nerve system and may cause gastrointestinal issues<sup>[3]</sup>. After surgery, nausea and vomiting are nevertheless frequent and upsetting side effects. These include postoperative nausea and vomiting (PONV) and post discharge nausea and vomiting (PDNV)<sup>[15]</sup>. These issues have a severe influence on the length of breastfeeding and the attachment between a mother and her kid during the postpartum period, which is a delicate time for both parties. As a result, it's essential that bowel motions begin early in women who undergo cesarean sections<sup>[6]</sup>.

Acupressure is a type of traditional Chinese medicine in which the body's particular spots are pressured. The proposed mechanism of action is that stimulation of the P6 point can help regulate autonomic nerve function and modulate nausea and vomiting reflexes<sup>[16]</sup>. Chewing gum has also been investigated as a potential non-pharmacological intervention for PONV. Gum chewing is thought to stimulate the production of saliva and gastrointestinal hormones, which may help restore normal gut motility and reduce nausea<sup>[17]</sup>.

This study aimed to reduce abdominal distension and difficulty in defecating due to GIS immobility by using various techniques (e.g., chewing gum, acupressure) to reduce complications that the mother may face during the postpartum period following a caesarean section under spinal anesthesia.

The current study indicated a very significant difference in the frequency and incidence of nausea and vomiting across the analyzed groups, with the ondansetron group experiencing much less of these symptoms than the other three groups (control, acupuncture, and chewing

gum groups) after 15 and 30 minutes. After 1 hour, both groups ondansetron and acupuncture were found to be significantly lower in nausea and vomiting occurrence compared to other groups. After 4 and 8 hours, chewing gum group was found to experience the lowest frequency of vomiting occurrence. After 16 hours, the acupuncture group was the best. Regarding post-operative emetic episodes, ondansetron group was found to be the least one in experiencing these episodes followed by both groups acupuncture, and chewing gum (41.6%, versus 67.7%).

Helmy *et al.*<sup>[18]</sup> illustrated that at two hours following a cesarean section, there were no statistically significant differences in nausea, vomiting, stomach pain, or distention between the chewing gum and control groups. Conversely, four, six, and eight hours after the cesarean section. Compared to the control group, the chewing gum group experienced gastrointestinal issues to a considerably lesser mean degree following a cesarean section.

Current findings regarding VAS score clearly revealed that VAS for nausea and vomiting showed significant differences between each group and the control group. The groups that received acupuncture and ondansetron showed the most improvements. Regarding the VAS for pain, every group differed significantly from the control group with the ondansetron group demonstrating the greatest improvement.

These results were compatible with Abdelhak *et al.*<sup>[16]</sup> who cleared that the post-treatment 4-point verbal description scale and the simplified postoperative nausea and vomiting severity assessment revealed that the acupuncture group's response to the control group had significantly decreased. The most likely explanation for stimulation has to do with how the body naturally produces opioids and controls neurotransmitters. Acupuncture stimulates both type I and type II sensory fibers, which

activates the spinal cord. These impulses travel to the raphe nucleus, midbrain, and periaqueductal gray matter. They also affect the chemoreceptor trigger zone (CTZ), which innervates vomiting centers.

This was in accordance with Unulu and Kaya<sup>[19]</sup> who revealed that applying p6 acupressure with a wristband significantly reduced nausea and improved postoperative patient comfort; in several cases, it even resulted in complete remission. Ghada *et al.*<sup>[20]</sup> showed that both unilateral and bilateral wristband techniques had statistically significant effects in reducing nausea and vomiting after cesarean sections, with bilateral being more effective. Moghadam and Khoravi<sup>[21]</sup> found that women receiving p6 acupressure had less nausea and vomiting.

Additionally, Elgzar *et al.*<sup>[22]</sup> stated that severity of postoperative nausea and vomiting was less in women had gum chewing after cesarean section compared to control group. Yin *et al.*<sup>[23]</sup> indicated a very significant difference between the study and control groups in postoperative gastrointestinal symptoms, including nausea, vomiting, abdominal discomfort, and distention.

The present study found that regarding flatus passage, all groups significantly differed from the control group. The acupuncture group exhibited the greatest improvement, followed by the ondansetron group. All groups differed significantly from the control group in terms of stool passing; the ondansetron group exhibited the greatest improvement, followed by the chewing gum group.

In agreement with our findings, Kanza *et al.*<sup>[8]</sup> stated that the application of acupressure to acupuncture point ST36 caused flatulence and feces to occur at a much earlier time. You *et al.*<sup>[24]</sup> reported that the individuals in the acupressure-treated group were released sooner, and they also had their first flatulence and excrement earlier. Ng *et al.*<sup>[25]</sup> indicated that the electroacupuncture group experienced a shorter hospital stay and an earlier first defecation than the other groups.

This was in line with Xu *et al.*<sup>[26]</sup> who stated gum chewing shortened the duration of the study group's hospital stay compared to the control group and reduced the times to the first intestinal sound, first flatus passage, first faecal passage, first drinking fluids, first feeling comfortable, and early breastfeeding initiation. Helmy *et al.*<sup>[18]</sup> demonstrated that the study group's mean post-operative intestinal function parameters were significantly shorter than those of the control group following a cesarean delivery.

On the other hand, Kiyat and Sut<sup>[27]</sup> reported that there was no variation in the timing of the first bowel movements or the onset of hunger between the gum chewing and control groups. This might be the result of adjustments made during the procedure, anesthesia's aftereffects, the use of opioid analgesics, or various study environments.

Unlikely, Abadi *et al.*<sup>[28]</sup> showed that the group receiving acupressure experienced a shorter time to pass their first flatus, but there was no statistically significant difference in the time to their first bowel movement between the groups.

Hsiung *et al.*<sup>[29]</sup> illustrated that patients who received regular acupressure treatments following surgery showed a shorter time to first flatus passage compared to the control group; however, there was no statistically significant difference in the time to first defecation between the groups.

The time to passage of first flatus and time to first defecation in the current study were similar to some other studies but differed from others. This variation can be explained by the fact that a different kind of anesthetic was used during the procedure, the women in the study group mobilized faster than the other groups, and they started oral intake two hours after the operation. In addition, the body continues to operate normally when the acupuncture sites are stimulated appropriately. This also speeds up the passage of electromagnetic impulses and releases substances into the circulation. Therefore, acute conditions (such cesarean sections or abdominal operations) may benefit more from acupuncture and acupressure than chronic illnesses.

Concerning patient satisfaction, every group showed statistically significant changes in patient satisfaction as compared to the control group when using ondansetron and chewing gum. The acupuncture group showed the most improvement among the groups.

### ***Point of strength***

There is statistically insignificant difference regarding basic characteristics ensuring matching of the studied groups to avoid confounders.

### **CONCLUSION**

It is important to think about prophylaxis to prevent PONV in every obstetric patient undergoing a cesarean section. Both acupressure and sugar-free gum chewing were effective in reducing the frequency and severity of post-operative discomfort following vasectomy while the patient was under spinal anesthesia. These techniques are low-cost, easy to implement, and have minimal side effects, making them attractive options for PONV prophylaxis in this patient population.

### **CONFLICT OF INTERESTS**

There are no conflicts of interest.

## REFERENCES

---

1. Souza JP, Betran AP, Dumont A, De Mucio B, Gibbs Pickens CM, Deneux-Tharaux C, Ortiz-Panozo E, Sullivan E, Ota E, Togoobaatar G, Carroli G. A global reference for caesarean section rates (C-Model): a multicountry cross-sectional study. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2016 Feb;123(3):427-36.
2. Lavand'homme P. Postoperative cesarean pain: real but is it preventable?. *Current Opinion in Anesthesiology*. 2018 Jun 1;31(3):262-7.
3. Elvir-Lazo OL, White PF, Yumul R, Eng HC. Management strategies for the treatment and prevention of postoperative/postdischarge nausea and vomiting: an updated review. *F1000Research*. 2020;9.
4. Gan TJ, Belani KG, Bergese S, Chung F, Diemunsch P, Habib AS, Jin Z, Kovac AL, Meyer TA, Urman RD, Apfel CC. Fourth consensus guidelines for the management of postoperative nausea and vomiting. *Anesthesia & Analgesia*. 2020 Aug 1;131(2):411-48.
5. Lin Y, Tiansheng S, Zhicheng Z, Xiaobin C, Fang L. Effects of ramosetron on nausea and vomiting following spinal surgery: a meta-analysis. *Current Therapeutic Research*. 2022 Jan 1;96:100666.
6. Pinheiro JP, Duarte HA, Marques FB, Garcia AF, Fernandes BB, Fernandes KB, Poli-Frederico RC, Fernandes MT. Characterization of the prevalence and intensity of nausea and vomiting in postoperative period in a tertiary hospital: an observational study. *British Journal of Medical & Health Sciences (BJMHS)*. 2021 Jan;3(1).
7. Rabiipoor S, Yas A, Navaei J, Khalkhali HR. Does coffee affect the bowel function after caesarean section?. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 2018 Jan 1;220:96-9.
8. Kanza Gül D, Şolt Kırca A. Effects of acupressure, gum chewing and coffee consumption on the gastrointestinal system after caesarean section under spinal anaesthesia. *Journal of Obstetrics and Gynaecology*. 2021 May 19;41(4):573-80.
9. Shi K, He F, Tang Y, Xiao X, Zhang J, Jin Y, Wang Y, Zhang Q. Acupuncture PC6 for postoperative nausea and vomiting at different times: A protocol for systematic review and meta analysis. *Medicine*. 2020 May 29;99(22):e20452.
10. Wahaab S, Gouse HS, Saleem SM. Pseudo Intestinal Obstruction Treated by Acupuncture - A Case Report. *Asian Journal of Pharmaceutical Research and Health Care*. 2020 Sep 9:157-61.
11. Myint AS, Rieders B, Tashkandi M, Borum ML, Koh JM, Stephen S, Doman DB. Current and emerging therapeutic options for gastroparesis. *Gastroenterology & Hepatology*. 2018 Nov;14(11):639.
12. Bakar A, Safaat A, Qomariah SN. The ST-36 acupressure increased gut motility to sectio caesarea patients with subarachnoid block anesthesia. *Indian Journal of Public Health Research and Development*. 2019;10(8):2735-9.
13. Goymen A, Simsek Y, Ozkaplan SE, Ozdurak HI, Akpak YK, Semiz A, Oral S. Effect of gum chewing and coffee consumption on intestinal motility in caesarean sections.
14. IBM corp. IBM SPSS statistics for windows, Version 27.0. Armonk, NY:IBM corp., 2020.
15. Hailu S, Mekonen S, Shiferaw A. Prevention and management of postoperative nausea and vomiting after cesarean section: A systematic literature review. *Annals of Medicine and Surgery*. 2022 Mar 1;75:103433.
16. Abdelhak RA, Botla AM, Mohamed MF, Hassan ES. effect of acupressure on emesis post cesarean section. *Egyptian Journal of Physical Therapy*. 2024 Jun 1;18(1).
17. Bowe R, Irwin R, Browne G, Harbison M, Gallen S, Yore PJ, MacGearailt E, Popivanov P, Tan T. Chewing Gum for Prevention of Nausea and Vomiting After Elective Caesarean Section: a Pilot Randomised Controlled Trial. *SN Comprehensive Clinical Medicine*. 2022 Nov 14;4(1):257.
18. Helmy Mohammed Elsherif S, Ahmed Hassan Omran A, Abdallah ElSayed Afifi H, Ouda Abed Elmenam S. Effect of Gum Chewing on Gastrointestinal Problems among Primipara Women Immediately after Cesarean Section. *Journal of Nursing Science Benha University*. 2023 Jan 1;4(1):939-53.
19. Ünülü M, Kaya N. The effect of Neiguan point (P6) acupressure with wristband on postoperative nausea, vomiting, and comfort level: a randomized controlled study. *Journal of PeriAnesthesia Nursing*. 2018 Dec 1;33(6):915-27.

- 
20. Ghada E, HANAFY HM, BOUSY AE, SHOKRY A. Unilateral versus bilateral wrist band in alleviating nausea and vomiting in post cesarean section. *The Medical Journal of Cairo University*. 2018 Mar 1;86(March):1033-9.
  21. Direkvand-Moghadam A, Khosravi A. Effect of acupressure on post-operative nausea and vomiting in cesarean section: a randomised controlled trial. *Journal of clinical and diagnostic research: JCDR*. 2013 Oct;7(10):2247.
  22. Elgzar WT, Ghattas VN. The Effect of Non-Sugared Gum Chewing With Early Ambulation versus Early Ambulation Only on Recovery of Bowel Function after Elective Cesarean Section. *American Journal of Nursing Research*. 2019;7(6):965-73.
  23. Yin Z, Sun J, Liu T, Zhu Y, Peng S, Wang J. Gum chewing: another simple potential method for more rapid improvement of postoperative gastrointestinal function. *Digestion*. 2013 Apr 10;87(2):67-74.
  24. You XM, Mo XS, Ma L, Zhong JH, Qin HG, Lu Z, Xiang BD, Wu FX, Zhao XH, Tang J, Pang YH. Randomized clinical trial comparing efficacy of simo decoction and acupuncture or chewing gum alone on postoperative ileus in patients with hepatocellular carcinoma after hepatectomy. *Medicine*. 2015 Nov 1;94(45):e1968.
  25. Ng SS, Leung WW, Mak TW, Hon SS, Li JC, Wong CY, Tsoi KK, Lee JF. Electroacupuncture reduces duration of postoperative ileus after laparoscopic surgery for colorectal cancer. *Gastroenterology*. 2013 Feb 1;144(2):307-13.
  26. Xu C, Peng J, Liu S, Qi DY. Effect of chewing gum on gastrointestinal function after gynecological surgery: A systematic literature review and meta-analysis. *Journal of obstetrics and gynaecology research*. 2018 May;44(5):936-43.
  27. Kiyat ZE, Sut HK. The effect of xylitol gum chewing after cesarean on bowel functions: a randomized controlled study. *Journal of PeriAnesthesia Nursing*. 2022 Dec 1;37(6):913-7.
  28. Abadi F, Shahabinejad M, Abadi F, Kazemi M. Effect of acupressure on symptoms of postoperative ileus after cesarean section. *Journal of acupuncture and meridian studies*. 2017 Apr 1;10(2):114-9.
  29. Hsiung WT, Chang YC, Yeh ML, Chang YH. Acupressure improves the postoperative comfort of gastric cancer patients: a randomised controlled trial. *Complementary Therapies in Medicine*. 2015 Jun 1;23(3):339-46.
-