The Effect Of Gum Chewing On Bowel Sounds, Passing Intestinal Gas, and Early Discharge From Hospital In Early Post-Caesarean Period: A systematic review.

First Author Name: Semra Akköz Çevik, Assistant Professor, Gaziantep University of Faculty of Health Sciences ,Department of Gynecology and Obstetric.

Second Author Name: Mürüvvet Başer, Professor, Erciyes University of Faculty of Health Sciences ,Department of Gynecology and Obstetric.

Correspondent Author: Semra Akköz Çevik
Adress: Gaziantep University of Faculty of Health Sciences, Gaziantep, Turkey.
e-mail: s_akkoz@hotmail.com
Telephone: 0342 360 60 60/76754

Key Words: Caesarean; exercise; gum chewing; postoperative bowel movement; early discharge; postoperative care; postoperative mobilisation; early feeding.

ABSTRACT

Background: Caesarean operation is the most significant surgical intervention that affects central nervous system and decelerates bowel movements in the postoperative period. Postoperative ileus is the most significant post-abdominal surgery problem that prolongs the duration of hospital stay, causes pain and distension, delays oral feeding, causes respiration difficulty and increases hospital costs. Conducted studies show that practices such as gum chewing ensure that bowel functions start in a short time through early feeding and mobilisation and shorten the duration of hospital stay.

Objective: This systematic review mentions the effects of gum chewing on bowel sounds, passing intestinal gas and early discharge from hospital in early post-Caesarean period.

Study Design: This is a systematic review

Method: 87 articles in total were reviewed on international databases such as BMJ journals, EBSCO host - Academic Search Complete, and ELSEVIER Science Direct (SciVerse) and 34 of them were found to be related with the subject in question. A total of 34 articles examining the effects of gum chewing on bowel sounds, passing intestinal gas and early discharge from hospital in early post-Caesarean period were used in this compilation.

Results: A total of 34 articles showed that practices such as early feeding,gum chewing in the post period of Caesarean operation ensure that bowel functions recover in a short time.

Conclusion: Conducted studies have showed that practices such as early feeding, gum chewing, and early mobilisation in the post period of both other abdominal operations and Caesarean operation ensure that bowel functions recover in a short time and shorten the duration of hospital stay.

Key Words: Caesarean; exercise; gum chewing; postoperative bowel movement; early discharge; spinal anaesthesia; general anaesthesia; postoperative care; postoperative mobilisation; early feeding

INTRODUCTION

Caesarean operation is the most significant surgical intervention that affects central nervous system and decelerates bowel movements in the postoperative period. Postoperative ileus is the most significant post-abdominal surgery problem that prolongs the duration of hospital stay, causes pain and distension, delays oral feeding, causes respiration difficulty and increases hospital costs [1-2]. Conducted studies show that practices such as gum chewing ensure that bowel functions start in a short time through early feeding and mobilisation and shorten the duration of hospital stay. This review mentions the effects of gum chewing on bowel sounds, passing intestinal gas and early discharge from hospital in early post-Caesarean period.

1. Caesarean

Caesarean section is defined as the birth of fetus through the incision of placenta and membranes through abdominal (laparotomy) and uterus wall (hysterotomy) [3-5]. Generally caesarean section is performed if vaginal delivery is not possible to be safely completed or if there is a significant increase risk in maternal and/or fetal morbidity and mortality in vaginal delivery.

Caesarean rate which was 36.7% according to Turkish Demographic and Health Survey (TNSA) conducted in Turkey in 2008 was found to be 48% in the TNSA in 2013 [6]. The Caesarean rate aimed by the World Health Organization by taking maternal and perinatal mortality rates into account is 15% [7]. As of the year 2013, caesarean rate is 23% in WHO European Region and 30% in high-income group countries (Germany, Belgium, Italy, etc.) [8].

Caesarean is generally conducted when vaginal delivery is not possible to safely take place and when it is believed that delaying the delivery longer would seriously put the fetus, the mother or both in danger [9].

Caesarean operation is conducted in cases of previous Caesarean operations, cephalopelvic disproportion (CPD), reasons related to dynamic dystocia and soft birth canal, presentation and position anomalies, development anomalies of fetus, fetal distress, exceeding the duration, and multiple gestations [3, 5, 10]. It can also be conducted in cases of placenta praevia, ablatio placentae, placenta insertion anomalies, cord prolapsus or presentation upon the request of the mother or a substantial baby [3, 5, 10].

The most significant contraindication for Caesarean operation is the absence of appropriate indications. Pyogenic infections on the abdominal wall, abnormal or exanimate fetus, and the absence of suitable conditions are other contraindications [5].

Spinal and general anaesthesia are frequently used in Caesarean operation. The anaesthetic agent given to nervous system affects the anterior and posterior nerve roots of spinal cord in the subarachnoid space, dorsal root ganglion, synapses on anterior and posterior horns and the canals going up and down to the spinal cord parenchyma after operation [11]. Cerebral blood flow has been indicated to have minimal changes during high spinal anaesthesia. The decrease in the cerebrovascular resistance maintains the hypotension-related low blood flow on the pre-block level [12].

Spinal anaesthesia causes changes in arterial resistance, beat volume, heart rate, cardiac output and arterial blood pressure [12]. Generally the spinal anaesthesia with a sensorial level up to T4 does not disrupt pulmonary ventilation. High spinal anaesthesia is thought to be disrupting respiration. However, although it is thought that ventilation is disrupted among patients with a sensorial block higher than T4, the inspiratory capacity has been observed to decrease at a rate of 20% even when all thoracic spinal nerve roots are blocked. Yet, expiratory reserve volume and the ability of coughing decrease significantly. Bronchial spasm and the feeling of being unable to breathe called effective dyspnoea could be observed due to predominant vagal effect after high spinal block [13].

High spinal anaesthesia has a very limited effect on renal function, glomerular filtration rate and effective renal plasma flow (5- 10% decrease). The bladder function that returns to normal the last in spinal anaesthesia and therefore postoperative urinary retention may be observed [12].

Spinal anaesthesia may delay trauma-related adrenal response. Increased blood steroid levels and eosinopenia are not observed in spinal anaesthesia unlike other operations under general anaesthesia [12].

2. Changes In Gastro-Intestinal System After Caesarean Section And Nursing Care

The preganglionic sympatric fibres from T5 and L1 inhibit bowel movements. As the vagus nerve's effect cannot be inhibited under spinal anaesthesia, peristaltism is normal, anal sphincter is relaxed and gastric discharge increases. If splenic nerves which are the efferent fibres of spleen are blocked, its volume can increase 2–3 times. Hepatic blood flow decreases in parallel with the decrease in arterial pressure [12].

The anaesthetic agents used during operation cause peristaltic movements to temporarily stop. This condition, called as paralytic ileus, generally disappears between 24 and 48 hours. Bowel movements can be inhibited for a few days due to the traumatisation and irritation of intestines due to abdominal operations such as Caesarean section. Stomach peristaltism returns to normal after 24-48 hours and colon movements after 48 hours. Post-operative hypomotility often causes mild abdominal distension due to the strain of colons with gas. In the first 48-72 hours in the post-operation period, there usually are no bowel sounds. The return of normal peristaltism is often expressed by the patient/individual with mild cramps, hearing gas sounds and the start of feeling hungry [14]. Following abdominal operations, the deceleration of gastrointestinal system (GIS) motility and the change of nutritional habits may cause development of symptoms such as nausea, vomiting, abdominal distension and hiccup which lead to serious distress for the patient/individual after operation. In addition, this condition prolongs the duration of discharge from the hospital and therefore increases costs. In this regard, it is very important for women who underwent Caesarean section to start early bowel movements [15].

The quality of the nursing care is very important for the mother to adapt to post-partum period in the postoperative period after Caesarean operation and to prevent complications. In this period, the following practices and approaches should be conducted by nurses in order to prevent development of problems and complications related to GIS and not to start bowel sounds.

Abdominal distension can be eased or prevented through stimulation of intestinal motility in the postoperative period by helping the patient stand up frequently in early period. Bowel sounds and the presence of gas in the passage, which are proof of normal intestinal peristaltism, should be regularly evaluated. A normal diet should be started after bowel sounds return. This also helps simplifying the return of normal peristaltism. Patients should be encouraged by telling them passing intestinal gas is desired and required. The gas pain starting on the 2^{nd} or 3^{rd} days after operation can be reduced by standing up and frequently changing positions [15].

Nurses should evaluate the conditions that restrict the patient's movements and the patient's movement ability, ensure that the patient gets enough rest and help him/her with deep breathing and coughing exercises as well as active-passive and Range of Motion (ROM) exercises in order to prevent problems that develop due to inaction after operation. It has been reported that when position changes are performed under appropriate conditions, complications related to respiration system and gastrointestinal system may be reduced. Therefore, nurses should get the patient do exercises of turning in bed in every two hours if the patient is inactive and encourage the patient for early ambulation [16].

3. The Effect Of Gum Chewing On Gastro-Intestinal System After Caesarean Operation

It is emphasized in the 2012 theme of International Council of Nurses that in addition to postoperative nursing care, nurses should also use reliable, economical, easy-to-use and beneficial practices in order to reduce the negative effects of problems that patients encounter [17]. Practices such as postoperative standing up in early period, gum chewing and early liquid intake which are easy-to-use, economical and reliable after abdominal operations are seen to be used popularly in the recent times. These approaches are thought to reduce the early recovery and duration of discharge from hospital. Therefore, early liquid intake, early mobilisation and gum chewing as an artificial feeding method called as sham feeding are used in order to start bowel movements in a short time in many studies.

METHODS

Study design: This is a systematic review.

Setting and sample: 87 articles in total were reviewed on international databases such as BMJ journals, EBSCO host - Academic Search Complete, and ELSEVIER Science Direct (SciVerse) and 34 of them were found to be related with the subject in question.

Data collection: A total of 34 articles examining the effects of gum chewing on bowel sounds, passing intestinal gas and early discharge from hospital in early post-Caesarean period were used in this compilation.

RESULTS: A total of 34 articles examining the effects of gum chewing on bowel sounds, passing intestinal gas and early discharge from hospital in early post-Caesarean period have showed that practices such as early feeding, gum chewing, and early mobilisation in the post period of both other abdominal operations and Caesarean operation ensure that bowel functions recover in a short time and shorten the duration of hospital stay.

DISCUSSION: In the study of Taşdemir and Çelik (2010), they conducted with 384 women who underwent surgical operations, and determined that the first time of starting oral feeding, the first time of standing up and the first time of passing intestinal gas created a significant difference in the development of abdominal distension [18]. Abdominal distension did not develop in women who were fed early, stood up early and passed intestinal gas early after operation. No significant correlations was found between deep breathing, coughing and bed exercises, and the development of abdominal distension in the same study [18]. In a study conducted by Macmillan et al. (2000), no statistically significant difference was found between the early-fed group and the control group in terms of hearing bowel sounds and passing intestinal gas [19]. Similarly, in the study of Kovavisarach and Atthakorn (2005), the first gas-passing time was sooner in the early-fed group than the control group, however this difference was not found to be statistically significant [20].

Some studies have reported that gum chewing affects bowel functions positively and significantly reduces the duration until the first time of hearing bowel sounds, passing gas and defecation. In the study of Harma et al.(2009), 76 women who had caesarean section with general anaesthesia were divided into three groups: women chewing sugared gums, women chewing sugar-free gums and the control group. Hearing bowel sounds started in the group of women chewing sugared gums at the earliest and this difference was also found to be statistically significant. Three groups were similar in terms of passing intestinal gas and defecation [21]. In the study conducted by Abd-el-Maebud et al. (2009), with 200 women who underwent caesarean section with general anaesthesia; hearing bowel sounds, passing intestinal gas and defecation times were found to be significantly shorter in the group of women chewing gums than the control group [22]. In the study of Asao et al. (2002), the durations of expelling intestinal gas and defecation after colectomy were found to be significantly shorter in the group of patients chewing gums than the control group [23]. Similarly, in the study of Satij (2006), bowel functions started earlier in the gum group than the control group [24]. Noble et al. (2009), obtained similar results in their meta-analysis study conducted on 9 randomized studies. According to these results, duration of passing intestinal gas was shorter in gum chewing group than control groups in all 9 studies. In 8 studies for which meta-analysis was conducted, bowel sounds were found to be heard earlier in the gum chewing group than control group [25]. Çevik (2014) conducted a study in three groups as gum, exercise and control groups in order to determine the effects of bed exercises and gum chewing on bowel sounds, passing intestinal gas and early discharge from hospital after caesarean section. In this study conducted with 120 women majority of whom were multipara, had an average number of 3 infants and received general anaesthesia and spinal anaesthesia, it was determined that bowel movements, passing intestinal gas and defecation started earlier in the gum group than the exercise and control groups after Caesarean operation [26]. Similar results have been obtained from the other conducted studies [27- 34].

CONCLUSION: Consequently, caesarean operation is the most significant intervention that decelerates bowel movements in the postoperative period by affecting central nervous system. Conducted studies have showed that practices such as early feeding, gum chewing and early mobilisation ensure that bowel functions return back to normal in a short period of time and shorten the duration of hospital stay after both other abdominal operations and caesarean operation.

References

1. Mohsenzadeh LF, Barat S, Delavar MA, Banihosini SZ, Khafri S. Sugar-Free Gum Chewing Reduces Ileus After Cesarean Section in Nulliparous Women: A Randomized Clinical Trial. Iran Red Cres Med J. 2013;15(4):1-15. http://dx.doi.org/10.5812/ircmj.6458.x
2. Hayes D. Stoma care nursing implications of postoperative ileus: A literature review. Journal of Stomal Therapy 2012; 32(2): 18-20.
3. Newnham j, Hobel C. Operative obstetrics. In: Hacker N, Moore G, editors. Essentials of Obstetrics and Gynecology. 1 nd ed. United States of America, WB Saunders Company; 1986. p. 237-238.
4. Morgan E, Mikhail M. Clinical Anesthesiology. In: Nurettin Lüleci, translator. Istanbul, Nobel Medical Bookstores; 2002. p. 711.
5. De Cherney AH, Nathan L. Cesarean section. In: Current Obstetric and Gynecologic Diagnosis and Treatment; 2003. p. 518- 529.
6. Hacettepe University Institute of Population Studies [2014], "2013 Turkey Demographic and Health Survey". Hacettepe University Institute of Population Studies, T.R. Ministry of Development and TÜBİTAK, Ankara, Turkey [cited 2015 June 17]. Available from: http://www.hips.hacettepe.edu.tr/TDHS_2013_main.report.pdf
7. World Health Organization. Appropriate technology for birth. Lancet 1985; 2(8452): 436-7.
8. Başara BB, Güler C, Yentür KG, Pulgat E. General Directorate of Health Research, The Ministry of Health of Turkey Health Statistics Yearbook, 2012. Ankara; 2013. P. 57. [cited 2015 June 17]. Available from: http://sbu.saglik.gov.tr/Ekutuphane/kitaplar/hsy2012.pdf.
9. Has R, Saygılı H. Birth operations. In: Berkman S, editor. Birth Information, Istanbul, Nobel Medical Bookstores; 2004. p. 64- 66.
10. Cunningham FG, Gant NF, Leveno KJ. Cesarean section and postpartum hysterectomy. In: Williams Obstetrics 2001; p. 537- 565.
11. Collins VJ,editor. Spinal Analgesia Physiologic Effects: Principles of Anesthesiology. Philadelphia, Lea and Febiger; 1993. P. 1498-1520.
12. Esener Z. Local / regional anesthesia. Clinical Anesthesia, Istanbul, Logos Publishing; 1991. P. 363-428.

13. Stone PA, Thorburn J, Lamb KSR. Complications of spinal anaesthesia following extradural blok for caesarean section. Br J Anaesth. 1989; 62: 335-337.

14. Güngel H. Postoperative care and complications. In: Kalaycı G, editor. *General Surgery*. Istanbul, Nobel Medical Bookstores; 2002. P. 25-37.

15. Akyolcu N. Postoperative nursing care. In: Aksoy G, Kanan N, Akyolcu N editors. *Surgical Nursing I*. Istanbul, Nobel Medical Bookstores; 2012. p. 357-358.

16. Smeltzer S.C, Bare B.G, Hinkle J.L, Cheever K.H. Editors. Management of patients with renal diseases. *Brunner & Suddarth's textbook of medical-surgical nursing* (11th ed.). Philadelphia: Lippincott Williams & Wilkins; 2008. p. 1514–1568.

17. International Council of Nurses (2012). Closing the Gap: From Evidence to Action - IND Kit 2012. Available at: http://www.icn.ch/ publications/2012-closing-the-gap-from-evidence-to-action/Erişim: 03/11/2013.

18. Taşdemir N, Çelik SŞ. Patients' experience towards postoperative abdominal distention. Ege University School of Nursing Journal 2010; 26(3): 23-31.

19. Macmillan L.M, Kammerer-Doak D, Rogers R.G, Parker M.K. Early Feeding and the Incidence of Gastrointestinal Symptoms After Major Gynecologic Surgery. Obstetrics & Gynecology 2000; 96(4):604-608. http://dx.doi.org/10.1016/S0029-7844(00)00957-1.

20. Kovavisarach E, Atthakorn M. Early versus delayed oral feeding after cesarean delivery. International Journal of Gynecology and Obstetrics 2005; 90: 31-34. http://dx.doi.org/10.1016/j.ijgo.2005.03.017.

21. Harma M, Barut A, Arıkan İ, Harma M. Gum-chewing speeds return of first bowel sounds but not first defecation after cesarean section. Anatol J Obstet Gynecol 2009; 1(1): 1-3.

22. Abd-El-Maeboud KHI, Ibrahim MI, Shalaby DAA, Fikry MF. Gum Chewing Stimulates Early Return of Bowel Motility After Caesarean Section. BJOG 2009;116:1334-1339. http://dx.doi.org/10.1111/j.1471-0528.2009.02225.x

23. Asao T, Kuwano H, Nakamura J, Morinaga N, Hirayama I, Ide M. Gum Chewing Enhances Early Recovery from Postoperative Ileus after Laparoscopic Colectomy. J Am Coll Surg 2002; 195:30–32. http://dx.doi.org/ 10.4103/1319-3767.93812

24. Satij B, Cohen SA. Evaluation of gum chewing on the return of bowel function in cesarean-delivery patients. *Obstet Gynecol* 2006*; 107(***4***):*10s. http://dx.doi.org/ 10.1097/00006250-200604001-00023.

25. Noble EJ, Harris R, Hosie K B., Thomas S, Lewis S J. Gum chewing reduces postoperative ileus? A systematic review and meta-analysis. International Journal of Surgery 2009; 7: 100-105. Accession: 12009104768

26. Çevik S. Effect of bed exercises and gum chewing on abdominal sounds, flatulence and early discharge in the early period after cesarean section.Unpublished doctoral dissertation, Kayseri: Erciyes University, Institute of Health Sciences; 2014. P. 1-45.

27. Malhotra N, Khanna S, Pasrija S, Jain M, Agarwala B.R. Early oral hydration and its impact on bowel activity after elective caesarean section-our experience. European Journal of Obstetrics & Gynecology and Reproductive Biology 2005; 120(1): 53-56. http://dx.doi.org/10.1016/j.ejogrb.2004.08.009

28. Marwah S, Singla S, Tinna P. Role of gum chewing on the duration of postoperative ileus following ileostomy closure done for typhoid ileal perforation: A prospective randomized trial. Saudi J Gastroenterol [serial online] 2012 [cited 2015 Jun 17];18:111-7.Available from: http://www.saudijgastro.com/text.asp?2012/18/2/111/93812

29. Ledari F. M. , Barat S., Delavar M. A. Chewing gums has stimulatory effects on bowel function in patients undergoing cesarean section: A randomized controlled trial. Bosn J Basic Med Sciv.12(4); 2012 Nov; 265-268.

30. Shang H, Yang Y, Tong X, Zhang L, Fang A, Hong L. Gum chewing slightly enhances early recovery from postoperative ileus after cesarean section: results of a prospective, randomized, controlled trial. Am J Perinatol 2010; 27:387–391. http://dx.doi.org/ 10.1055/s-0029-1243313.

31. Dehcheshmeh S.F. The Effect of Chewing Sugar Free Gum after Elective Cesarean-Delivery on Return of Bowel Function in Primiparous Women: Qom University of Medical Sciences Journal 2011[cited 2015 Jun 17];4(4). Available from:http//en.journals.sid.ir/journalListPaper.aspx?ID=81403WINTER2011

32. Jakkaew B, Charoenkwan K. Effects of gum chewing on recovery of bowel function following cesarean section: a randomized controlled trial. Arch Gynecol Obstet. 2013, P: 3-6. http://dx.doi.org/ 10.1007/s00404-013-2727-x.

33. Garshasbi A, Behboudi S. The effect of Gum chewing on postoperative ileus after cesarean section. Society for obstetric anesthesia and perinatology 43rd annual meeting 2011,13-17 april Loews Lake Las Vegas Resort Henderson, Nevada P148.

34. Terzioglu F, Şimsek S, Karaca K, Sarı ince N, Altunsoy P, Salman M. Multimodal interventions (chewing gum, early oral hydration and early mobilisation) on the intestinal motility following abdominal gynaecologic surgery. Journal of Clinical Nursing 2013; 22: 1917–1925. http://dx.doi.org/ 10.1111/jocn.12172.