



IRAQI  
Academic Scientific Journals



العراقية  
المجلات الأكاديمية العلمية

MJTU

ISSN:1813-1638

*The Medical Journal of Tikrit University*

Journal Homepage: <http://mjtu.tu.edu.iq>

## Healing Advantages of $\beta$ -Sitosterol Cream in Comparison with Lavender Essential Oil in Episiotomy Wounds

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### ABSTRACT

The pain intensity during the baseline visit among Lavender group were mild 3 (10%), moderate 16 (53.3%), and severe 11 (36.7%), in comparison to  $\beta$ -sitosterol 1(3.3%), 16 (53.3%), and 13(43.3%) respectively, among control group were 3(3.3%), 15(50%) and 14(46.7%) respectively. The pain intensity during day 7 visit among Lavender group were no pain 12(40%), mild 18(60%), and moderate 0(0%), in comparison to  $\beta$ -sitosterol 6 (20%), 19(63.3%), and 5(16.7%) respectively, among control group were 6(20%), 6(60%) and 18(60%) respectively. The pain intensity during day 14 visit among Lavender group were no pain 30(100%), and mild 0(0%), in comparison to  $\beta$ -sitosterol 26 (86.7%), and 4(13.3%), respectively. Regarding redness; was no redness among 16 (53.3%), 14(46.7%) mild redness, and moderate redness 0(0%) of the Lavender group in comparison to 10(33.3%), mild 18(60%), and moderate 2 (6.7%) among  $\beta$ -sitosterol group, and 2(6.7%), 20(66.7%) and 8(26.7%) among control group respectively, this relation were statically significant. Regarding edema; was no edema 21(70%), and mild edema 9(30%) among Lavender group in comparison to 12 (40%), mild 16(53.3%) among  $\beta$ -sitosterol group, and 6(20%), and 16(53.3%) among control group, this relation were statically significant. Discharge was none 10(33.3%), and 16(53.3%) among Lavender group in comparison to 4(13.3%), mild 24(80%) among  $\beta$ -sitosterol group, and 4(13.3%), and 12(40%) among control group. Approximation was (good) closed wound sites among 14(46.7%), and mild approximation among 13(43.3%) of Lavender group in comparison to good 6(20%), mild 22 (73.3%) among  $\beta$ -sitosterol group, and 6(20%), and 18(60%) among control group.

**Received:** 28/03/2024  
**Revising:** 06/05/2024  
**Proofreading:** 15/05/2024  
**Accepted:** 20/05/2024  
**Available:online:**30/06/2024

### KEY WORDS:

$\beta$ -sitosterol versus Lavender in Episiotomy,  $\beta$ -sitosterol in Episiotomy.

DOI: <http://doi.org/10.25130/mjtu.30.1.1>



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## INTRODUCTION

The primary episiotomy complaining is perineal pain, and it's stressful and challenging for primiparous women and has multiple adverse impacts,[1] such as a detrimental effect on the first experience of being a mom, mothers' being unable to provide adequate care for the baby, and so on. [2] Difficulty in mother-infant interaction, weariness, insomnia, bewilderment, worry, and disregarding maternal-infant health education [3, 4]. - sitosterol provides optimal moisture for wound reconstruction, promoting keratinocyte motion and collaboration with growth factors.

Several investigations have proven the quick, infection-free, and pain-free healing of  $\beta$ -sitosterol, whether in chronic or acute wounds. Through experimentation and medically, augmentation of wound healing with  $\beta$ -sitosterol has been reported. [5,6]. It was documented that beta sitosterol induce rapid epithelialization of the perineal and sacral region ulcers in diabetic elderly [7]. Lavender oil is antioxidant that wide-spectrum antimicrobial, antifungal, and anti-inflammatory properties. The antimicrobial effect was tested to reduce the risk of burn infection by *Staphylococcus aureus*, and it is capable of controlling and reducing the inflammatory response caused in human foreskin fibroblasts by lipopolysaccharides.[8] Topical use of lavender oil reduced the size of foot-and-mouth ulcerations, also wound closure

progressed more rapidly as compared to classic treatment.[9].

The Lavender oil and Beta sitosterol use was studied in wound healing other than episiotomy, therefore this study is important to find their role in episiotomy healing. The aim of this study, is to find healing advantages of lavender essential oil in comparison with beta sitosterol cream in episiotomy wounds, regarding the healing time, infection sign, and pain intensity.

## MATERIAL

A clinical trial study was undertaken at department of Obstetrics and Gynecology -Salah Adeen teaching Hospital/ from October 1, 2022 to February 1, 2023. A convenient sample of 90 pregnant women who attended the Gynecology and Obstetrics department and have episiotomy Women age between 20-36 years of age and, 1st episiotomy, and mediolateral type of episiotomy only included. The patient with assisted delivery, post-partum bleeding, injuries to the perineum, previous episiotomy, and retained placenta, were excluded. Patient with history of DM, or obese, and which had history of infection also excluded.

## Data Collection Tools

1-Questionnaire: containing information regarding medical history, and sociodemographic characteristics, and body mass index (BMI) of participants were taken.

2- Visual Analogue Scale (VAS) [10]:.” It is a 10 cm line with fix statements on

the left side (no pain) and right (extreme pain). It was scored as No pain = 0, Mild = 1-3, Moderate = 4-6, Severe = 7-9, and Extreme = 10”.

3- The REEDA:’ scale is used to evaluate perineal heal (11). It covers five factors relating to the healing process: (Redness, Edema, Ecchymosis, Discharge, Approximation - REEDA), with a score ranging from 0 to 3 for each item, with a higher score indicating more pain. Good (0 - 4), Moderate (5 - 8), Mild (9 -12), and Poor (13-15) are the healing scores”. Then, using the second and third tools, assess the pain and healing wound over the course of four distinct measurements on the first (baseline), seventh, and fourteenth days postpartum during follow up at the previously indicated setting. Field work: The participants were then randomized and blindly divided into three groups of 30 women each. Women were questioned for 30 minutes following birth in order to collect medical and demographic background information. clarify to every member of the groups how to do episiotomy care.

$\beta$ -sitosterol Group (30 patients) Beta Sitosterol was given for the topical therapy of the raw region. Apply beta sitosterol three to four times each day. When possible, application began soon after surgery and was continued for 14 days After washing the wound with solution of povidone, -sitosterol was placed as a fairly thick layer (approximately 3 mm) on the wound.

Lavender Group (30 patients) received Lavender Essential Oil. Patients were

treated with 2% lavender essential oil.

Control Group 3 (30 patients) received only management with saline wash and cleaning.

Then, using the second and third instruments, assess the healing wound and pain over the course of three examinations done at day 1, 7, 14 at follow up of episiotomy wound. The patient was observed and compared with pain scale pictures and give the score that related to it. Regarding the healing process also the episiotomy wound examined and healing score given according to each item and given the score related to the healing item.

Statistical analysis conducted using SPSS software ( version 16.0, SPSS Inc, Chicago, Ill, USA) and descriptive statistics (crosstabs:Chi-square) were employed for data analyses. A P-value less than 0.05 was regarded as significant.

## RESULTS

Most of the patients in the Lavender group was 20-24.9 years 28 (93.3%), in comparison to  $\beta$ -sitosterol group 22(73.3%) and control group 24(80%), as demonstrated, this relationship was statistically insignificant in figure 1. The mothers in Lavender group was commonly of primary education 18 (60%) followed by read and write 8(26.7%), in comparison to  $\beta$ -sitosterol group secondary education was the highest 11(36.7%), followed by read and write 10(33.3%), and control group was by read and write

12(40%), followed by secondary education group 10 (33.3%). The commonest occupation was Housewife 16(53.3%), 15 (50%), and 14 (46.7%) for the groups Lavender,  $\beta$ -sitosterol, and Control groups respectively, this relation was statistically not significant P

value > 0.05. Most of the study groups from urban areas 18 (60%), 15 (50%) and 22 (73.3%) for the Lavender,  $\beta$ -sitosterol and control groups respectively, this relation was statistically not significant as shown in table 1.

Table 1. The general characteristics of study groups

	Lavender group		$\beta$ -sitosterol group		Control group		P value
	No.	%	No.	%	No.	%	
<b>Mother educational level</b>							
Read and write	8	26.7%	10	33.3%	12	40.0%	> 0.05 NS
Primary	18	60.0%	7	23.3%	8	26.7%	
Intermediate	0	0.0%	2	6.7%	0	0.0%	
Secondary	4	13.3%	11	36.7%	10	33.3%	
<b>Occupation</b>							
Student	4	13.3%	8	26.7%	4	13.3%	> 0.05 NS
Housewife	16	53.3%	15	50.0%	14	46.7%	
Employer	10	33.3%	7	23.3%	12	40.0%	
<b>Residence</b>							
Urban	18	60.0%	15	50.0%	22	73.3%	> 0.05 NS
Rural	12	40.0%	15	50.0%	8	26.7%	
Total	30	100.0%	30	100.0%	30	100.0%	

The mean age were  $20.73 \pm 3.03$ ,  $21.5 \pm 4.36$ ,  $21.46 \pm 4.84$  among Lavender group,  $\beta$ -sitosterol group and Control group, respectively, this relation was statistically not significant (P value > 0.05). The mean BMI were  $23.42 \pm 1.92$ ,  $25.61 \pm 10.92$ ,  $24.96 \pm 2.24$  among Lavender group,  $\beta$ -sitosterol group and Control group, respectively, this relation was statistically not significant (P value > 0.05), as shown in table 2. The primigravida was 22(73.3%), among the lavender group, 23(76.7%) among  $\beta$ -sitosterol group and 28(93.3%) among control group, this relation was statistically not significant (P value > 0.05). The multipara was 8(26.7%), among the lavender group, 7(23.3%) among  $\beta$ -sitosterol group and 2(6.7%) among control group, this relation was statistically not significant (P value > 0.05). type of current episiotomy was Medio-lateral in all groups. Causes of episiotomy among lavender group were primiparity 14 (46.7%), large baby 9(30 %), prolonged 2nd stage 6(20%), Shoulder dystocia 1(3.3%), in comparison to  $\beta$ -sitosterol group 11(36.7%), 12(40%), 7(23.3%), 0(0%) respectively, and among control group was 20(66.7%), 8(26.7%), 2(6.7%), and 0(0%) respectively this difference were statistically not significant, as shown in table 3.

Table 2. The mean age and BMI of the patient according to the study groups

	Lavender Group		β-sitosterol Group		Control Group		ANOVA P value
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	
Age	20.73	3.03	21.5	4.36	21.46	4.84	> 0.05 NS
BMI	23.42	1.92	25.61	10.92	24.96	2.24	> 0.05 NS

NS: non-significant

Table 3. The obstetrical and medical history of study groups

	Lavender Group		β-sitosterol Group		Control Group		P value
	No.	%	No.	%	No.	%	
Gravidity							
Primigravida	22	73.3%	23	76.7%	28	93.3%	>0.05*
>1 gravidity	8	26.7%	7	23.3%	2	6.7%	
Parity							
primipara	22	73.3%	23	76.7%	28	93.3%	>0.05*
multipara	8	26.7%	7	23.3%	2	6.7%	
Type of Current Episiotomy							
Medio-lateral	30	100%	30	100%	30	100%	
Causes of episiotomy:							
Prim parity	14	46.7%	11	36.7%	20	66.7%	>0.05*
Large baby	9	30.0%	12	40.0%	8	26.7%	
Prolonged 2nd stage	6	20.0%	7	23.3%	2	6.7%	
Shoulder dystocia	1	3.3%	0	0.0%	0	0.0%	
History hypertension and preeclampsia							
No	30	100.0%	30	100.0%	30	100.0%	
Total	30	100.0%	30	100.0%	30	100.0%	

The pain intensity during the baseline visit among Lavender group were mild 3(10%) , moderate 16(53.3%), and sever 11(36.7%), in comparison to β-sitosterol 1(3.3%), 16(53.3%), and 13(43.3%) respectively, among control group were 3(3.3%), 15(50 %) and 14(46.7%) respectively, this difference was statistically non-significant (P value > 0.05 ) as shown in table 4.

The pain intensity during day 7 visit among Lavender group were no pain 12(40%), mild 18(60%), and moderate 0(0%), in comparison to β-sitosterol 6 (20%), 19(63.3%), and 5(16.7%) respectively, among control group were 6(20%), 6(60%) and 18(60%) respectively, this difference was statistically significant (P value < 0.05), as shown in Figure 2. The pain intensity during day 14 visit among Lavender group were no pain 30(100%),

and mild 0(0%), in comparison to  $\beta$ -sitosterol 26 (86.7%), and 4(13.3%), respectively, among control group were 10(33.3%), and 20(66.7%) respectively, this difference was statistically significant (P value < 0.05), as shown in Table 5.

Redness was none 16(53.3%), and 14(46.7%) among Lavender group in comparison to 10(33.3%), mild 18(60%) among  $\beta$ -sitosterol group, and 2(6.7%), and 20(66.7%) among control group, this relation were statically significant P value < 0.05. Edema was none 21(70%), and 9(30%) among Lavender group in comparison to 12 (40%), mild 16(53.3%) among  $\beta$ -sitosterol group, and 6(20%), and

16(53.3%) among control group, this relation were statically significant P value < 0.05. Discharge was none 10(33.3%), and 16(53.3%) among Lavender group in comparison to 4(13.3%), mild 24(80%) among  $\beta$ -sitosterol group, and 4(13.3%), and 12(40%) among control group, this relation were statically significant P value < 0.05. Approximation was none/closed 14(46.7%), and 13(43.3%) among Lavender group in comparison to 6(20%), mild 22(73.3%) among  $\beta$ -sitosterol group, and 6(20%), and 18(60%) among control group, this relation were statically significant P value < 0.05, as shown in table 6.

Table 4. The pain intensity in baseline measure

Pain baseline	Lavender group		$\beta$ -sitosterol group		Control group		P value
	No.	%	No.	%	No.	%	
Mild	3	10.0%	1	3.3%	1	3.30%	> 0.05 NS*
Moderate	16	53.3%	16	53.3%	15	50.00%	
Severe	11	36.7%	13	43.3%	14	46.70%	
Total	30	100.0%	30	100.0%	30	100.0%	

\*NS: non-significant

Table 5. The pain intensity in day 14 measure

Pain intensity day 14	Lavender group		$\beta$ -sitosterol group		Control group		P value
	No.	%	No.	%	No.	%	
No pain	30	100.0%	26	86.7%	10	33.3%	<0.05 S
Mild	0	0.0%	4	13.3%	20	66.7%	
Total	30	100.0%	30	100.0%	30	100.0%	

Table 6. The distribution of the study groups based on episiotomy healing as measured by the REEDA scale on the seventh day.

	Lavender group		β-sitosterol group		Control group		P value
	No.	%	No.	%	No.	%	
Redness							
None	16	53.3%	10	33.3%	2	6.7%	<0.05*
Mild	14	46.7%	18	60.0%	20	66.7%	
Moderate	0	0.0%	2	6.7%	8	26.7%	
Edema							
None	21	70.0%	12	40.0%	6	20.0%	<0.05*
Mild	9	30.0%	16	53.3%	16	53.3%	
Moderate	0	0.0%	2	6.7%	8	26.7%	
Ecchymosis							
None	28	93.3%	30	100.0%	30	100.0%	>0.05
Mild	2	6.7%	0	0.0%	0	0.0%	
Discharge							
None	10	33.3%	4	13.3%	4	13.3%	<0.05*
Mild	16	53.3%	24	80.0%	12	40.0%	
Moderate	4	13.3%	2	6.7%	14	46.7%	
Approximation							
Closed/ no separation	14	46.7%	6	20.0%	6	20.0%	<0.05*
Mild separation	13	43.3%	22	73.3%	18	60.0%	
Moderate separation	3	10.0%	2	6.7%	6	20.0%	
Total	30	100.0%	30	100.0%	30	100.0%	

\*significant

The mean REEDA score at baseline among lavender group was  $9.03 \pm 1.88$ , β-sitosterol group  $8.6 \pm 1.96$ , and control group was  $9.37 \pm 1.61$ , this relation was statistically non-significant. The mean REEDA score at day 7 among lavender group was  $2.67 \pm 1.6$ , β-sitosterol group  $3.53 \pm 1.78$ , and control group was  $5.47 \pm 2.65$ , this relation was statistically. The mean REEDA score at day 14 among lavender group was  $1.67 \pm 1.6$ , β-sitosterol group  $2.03 \pm 1.78$ ,

and control group was  $4.11 \pm 2.03$ , this relation was statistically significant, as shown in table 7.

The change in mean REEDA score from baseline of the Lavender group at day 7 was  $-6.4 \pm 2.76$ , and  $-7.4 \pm 2.7$  at day 14, in a statistically significant relation. The change in mean REEDA score from baseline of the β-sitosterol group at day 7 was  $-5.1 \pm 2.5$ , and  $-6.6 \pm 2.8$  at day 14, in a statistically significant relation. The change in mean

REEDA score from baseline of the control group at day 7 was  $-3.9 \pm 2.1$ , and  $-5.3 \pm 1.6$  at day 14, in a statistically significant relation as shown in Figure 3.

The reported Complication was infection among 1(3.3%) of the Lavender

group, 1(3.3%) among  $\beta$ -sitosterol group and 3 (10%) among control group. Skin irritation reported among 2(6.7%) of the Lavender group, 3(10%) among  $\beta$ -sitosterol group and non (0%) among control group, as shown in table 8.

Table 7. The mean total score of REEDA scale among study groups

Time Of Examination	Lavender group		$\beta$ -sitosterol group		Control group		ANOVA P value
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	
Baseline	9.03	1.88	8.60	1.96	9.37	1.61	>0.05 NS
Day 7	2.67	1.60	3.53	1.78	5.47	2.65	<0.05 S
Day 14	1.67	1.60	2.03	1.78	4.11	2.03	<0.05 S
P value	<0.05 S		<0.05 S		<0.05 S		

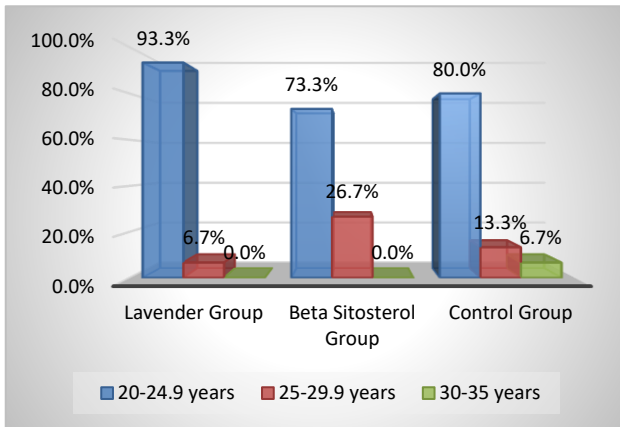


Figure 1. The age distribution of the study groups

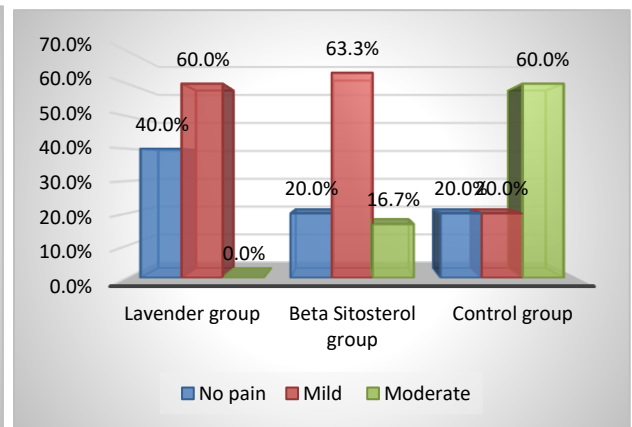


Figure 2. The pain intensity among study groups at day 7 (P value <0.05 Significant)

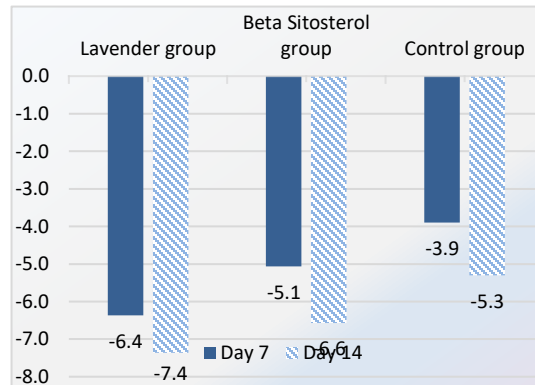


Figure 3. The difference in REEDA score from baseline reading according to stud



## DISCUSSION

Pain intensity over the baseline, 7 days, 14 days better reduced by Lavender, followed Beta Sitosterol than the control group. This agree with Abedian S, et al, in 2020 in a systemic review of 11 full-text articles, concluded that the use of Lavender (in any form Lavender-thymol, or lavender oil using sitz path or direct application) in postpartum has a significant effect on pain relief and healing of episiotomy wound [10]. This is agree with Maryam Moradi et al 2020 They discovered that lavender essential oil possesses antifungal, antibacterial, and soothing characteristics, as well as antimicrobial capabilities that can help with infection prevention and early wound healing. [11] The essential oil hastens the healing process by stimulating olfactory bulb receptors and enhancing cutaneous blood circulation at the location of lesion. [12,13]

Behmanesh et al. (2011) discovered a significant difference in the pain score measured by the Visual Analogue Scale (VAS) and healing of wounds depending on the Swelling, red, Ecchymosis, Discharge, Approximation (REEDA) scale in the group of lavender oil group. [14].

The result in this study revealed that the redness, edema, discharge, approximation scores are significantly less among Lavender group in comparison Beta Sitosterol group, and the mean REEDA scores were significantly reduced at day 7, and 14 in comparison with baseline among

lavender group, Beta Sitosterol group and control group. This results agree with Reda M. Hable in 2021 revealed taht (52%) of the lavender group possessed beneficial healing, incomparision to (37.5%) of the control group had moderate benifit in healing [15].

These findings are supported by Sari, Hamranani, and Sawitri in (2020), which found that lavender sitzbath treatment significantly help in episiotomy healing in primiparous women.[16]

Also, the findings are consistent with a study published in 2016 by Mori, Kawanami, et al found that wound healing and granulation tissue formation accelerated by lavender oil via stimulation of TGF. [17]. At the same time, Kaur and Kaur (2016) discovered that its helpful in episiotomy wound reconstruction in the experimental group at day 5 than the povidine-iodine application. [18]

Furthermore, a study by Kapoor (2018) discovered that essential oil sitz bath had similar effect on episiotomy healing as medicated sitz bath. [19] However, the study by Behmanesh et al., 2011, found no significant difference between the lavender oil and olive oil groups in episiotomy healing. [20]

The current study revealed that the redness, edema, discharge, approximation scores are significantly less among Beta Sitosterol group in comparison control group. The current study revealed that the mean REEDA scores regarding healing process were significantly reduced at day 14, 7 in

comparison with baseline among Beta Sitosterol group in comparison to the control group. This agree with studies of Ang ES [21] in 2000, Iovanovich J [22] in 2000, and Ang ES [23] in 2001 found that Beta Sitosterol stimulates epithelial repair, has analgesic effects, decreases the loss of water from burned skin, and provides the best physiological conditions for healing and formation of scars. [21-23]

Ang ES in 2001 found that Beta Sitosterol improved the management of face and neck burns, allowed the early implementation of occupational therapy in hand burns, and lowered hospital expenses by 8% in the first five days of therapy.[23] The lavender oil was preferred by the women because of the cheaper cost and good odor.

#### Conclusions:

Lavender is an effective remedy for maternal episiotomy wound care. There are no reported negative effects among the individuals. -sitosterol is also effective in the treatment of postpartum episiotomy wounds, but it has a lower effect than Lavender, which is more expensive.

#### Recommendations

Further research to test the lavender oil and Beta Sitosterol effect with higher study sample, and to test their effect on cesarean scare healing. Lavender can be used as a suitable therapy for postpartum episiotomy wound care, as it had no side effect, and Women prefer the lavender because of its low coast and nice odor. Beta Sitosterol is also good in the treatment of the postpartum episiotomy

wound but had lower effect than Lavender with higher price.

#### Study limitations:

the current study has some limitations, including the failure to perform a meta-analysis due to scarcity of related studies, differences in the used doses of essential oil, small sample size, differences in the method of using lavender essential oil, differences in the timing of intervention to obtain definitive conclusions regarding the effect of lavender essential oil in episiotomy wound healing and pain relief.

#### CONCLUSION

Lavender can be used as a suitable therapy for postpartum episiotomy wound care. There is no side effect found among the patients.  $\beta$ -sitosterol is also good in the treatment of the postpartum episiotomy wound but had lower effect than Lavender with higher price.

#### CONFLICT OF INTEREST

No any conflict of interest exists.

#### ACKNOWLEDGEMENTS

I would like to present my great gratitude to the head of department of obstetrics and gynecology Professor Dr. Israa Hashim Abid Al-Karim for her encouragement, support, concern and precious advice throughout the course of this thesis, and I wish to express my deep gratitude and sincere thanks for Professor Dr. Wisam Suhail Najim dean

of college of medicine, and all teaching staff members of the Obstetrics and Gynecology Committee, for their effort during my training period. I am particularly grateful to the health care workers, and patient who participated in this study for their willingness to assist by giving me their time and information. I would like also to thank my colleagues, especially those who helped me to accomplish my work.

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