



Structured Workshop for Repair of High-Grade Perineal Lacerations Among Obstetrics and Gynecology Residents, The Need for Repetition and Retraining

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Abstract

Objective The objective of this study was to evaluate the effectiveness of structured workshops in improving the knowledge and skills of obstetrics and gynecology residents for repairing high-grade perineal lacerations.

Materials and methods This quasi-experimental multicenter study evaluated the baseline knowledge of obstetrics and gynecology residents using an online patient-management problem (PMP) tool. After the initial evaluation, a workshop was conducted using sponge models to teach the practical technique for repairing high-grade perineal lacerations, including external and internal anal sphincter repair. The residents' knowledge was reassessed by PMP exams at 3 and 6 months after the workshop, and the scores were compared to the baseline statistics.

Result Eighty residents participated in the study, including 26, 22, and 32 at the first, second, and third-year levels of residency, respectively. The total PMP scores significantly improved after three months of the workshop, with an increasing total score from 15.5 (baseline) to 31.3 ($p=0.027$) (range of total score from -63 to $+52$). The senior residents performed better before and after three months of the intervention. However, in the six-month follow-up, the total PMP score of all residents decreased to 12.3 with no significant difference with pre-education scores at all levels. Similar significant results were also reported for each PMP question at all levels of residency.

Conclusion The study found that obstetrics and gynecology residents had substandard knowledge in repairing perineal lacerations. Although the training workshop significantly increased residents' knowledge, its effectiveness diminished over time, indicating a need for continuous or periodic training.

Keywords Residency · Obstetric anal sphincter injuries · Vaginal delivery · Education

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Introduction

Obstetric anal sphincter injuries (OASIS) comprise third and fourth-degree lacerations that are associated with vaginal delivery (VD). It is estimated that up to 79% of all women experience different degrees of perineal laceration during vaginal delivery. Although the laceration can have an uneven effect on the anatomy and function of the pelvic floor, it has also been proven that high-grade lacerations have more association with pelvic dysfunctions such as bladder and bowel incontinence [1–6].

Primary repair of the perineal lacerations can substantially reduce long-term complications and even salvage nerve supply and prevent fecal incontinence. Although delayed sphincter repair can reverse adverse outcomes to some degree, primary diagnosis and repair can help prevent secondary complications and the need for further surgery [5, 7–11].

With professional training in pelvic floor structure and the risk factors for injury, the residents would be more likely to adopt appropriate methods to prevent and if needed, manage the injuries. Therefore, providing practical solutions to improve the educational level of residents and increase their skills seems necessary. This study aimed to assess the basic knowledge for repairing high-grade perineal lacerations among residents at different levels and to evaluate the effectiveness of the workshop on their knowledge at 3 and 6 months intervals.

Materials and Methods

Study Setting

This study was carried out from October 2021 to January 2022 in four academic centers affiliated with the IR.TUMS.MEDICINE.REC.1400.707. The participants included obstetrics and gynecology residents in 3 levels.

Evaluation

The evaluation was conducted using an online patient-management problem (PMP) tool, which was designed by the authors and contained 10 questions (Table 1). The validity of the questionnaire was evaluated by presenting it to ten experts in the field of medical education, gynecology, and obstetrics. They were asked to rate the relevance and appropriateness of the questionnaire on a 4-point scale, where 1 = inappropriate, 2 = slightly appropriate, 3 = appropriate,

and 4 = very appropriate. The experts were also asked to provide corrective comments on the questionnaire, and their opinions were analyzed to determine the validity of the questionnaire.

All participants were required to fill out a questionnaire that included their hospital name, educational level, history of perineal rupture training, history of repairing sphincter injuries, and information on the presence of a specific protocol in each hospital at baseline. The basic knowledge of the residents was then evaluated using ten online PMP questions, which covered the risk factors for perineal injury during childbirth, injury diagnosis methods, injury prevention methods, diagnosis of the degree of rupture, methods of repairing the lacerations, and post-discharge and post-delivery recommendations. The total maximum and minimum scores of the PMP questions were +52 and –63, respectively.

The residents were reevaluated using the same method at 3 and 6 months after the workshop.

Structured Workshop

All participants attended a four-hour workshop that included two hours of theoretical evidence-based repair techniques, followed by practical training to repair perineal lacerations (external and internal anal sphincter) on a sponge model. The sponge model consisted of two pieces of felt attached to the bottom of a sponge, which was cut to simulate sphincter laceration (Fig. 1). The trainers checked the performance of each resident during the practical training.

Statistical Analysis

We used IBM's SPSS software version 26 for statistical analysis. Pearson's chi-square test was used to assess the significance of differences. The odds ratio (OR) was calculated with 95% confidence intervals. We also used t-tests and ANOVA tests to analyze the significance of differences between means and variances. *p*-values < 0.05 were considered significant.

Ethical Considerations

This study was conducted according to the Helsinki declaration. The ethical committee approved our study at the Tehran University of Medical Sciences. (IR.TUMS.IKHC.REC.1398.295). All participants signed informed consent forms to share data for scientific purposes.

Table 1 The PMP questionnaire and the scoring system

Case presentation

A 34-year-old pregnant woman G3L2 at the 37th week of pregnancy was a candidate for termination of pregnancy by oxytocin due to cholestasis. The 2nd stage of labor lasted for almost 90 minutes. Mediolateral episiotomy and vacuum extraction delivery were performed. After the delivery, a sphincter injury is suspected. Please choose the best answer/answers

Questions		Scores	
1. What are the risk factors of sphincter injury in this case?	1. The induction of labor	+1	
	2. Maternal age	-1	
	3. Body Mass Index	0	
	4. Mediolateral episiotomy	-3	
	5. Multiparity	0	
	6. Cholestasis	0	
	7. The length of 2nd stage of labor	+1	
	8. Vacuum-assisted delivery	+1	
	2. The sphincter injury is diagnosed by:	1. Inspection of the injury with adequate lighting	+2
		2. Routine digital rectal examination	-3
		3. Rectal examination if 2nd-degree laceration or more severe is suspected	-2
		4. Endoanal sonography	-1
5. Wait until the patient defecates		-2	
6. Manometry		-1	
3. Which methods may prevent perineal damage?	7. Pill rolling motion	2	
	1. Routine episiotomy	-2	
	2. Episiotomy incision angle (60–90 degrees)	-1	
	3. Continuous and persistent Perineal message	-2	
	4. Manual perineal support	+2	
	5. Pushing during crowning	-3	
	6. Stop pushing	+1	
	7. Maternal lithotomy position	-1	
	8. Maternal lateral position	+1	
	9. Application of perineal warm packs in 2nd stage	+2	
	10. Application of perineal warm packs during the entire labor	0	
	11. Applying ice packs on the perineum	-1	
12. Ritgens maneuver	1		
4. In this picture, what is the severity of the injury?	1. 2nd degree	-1	
	2. 3a	-1	
	3. 3b	1	
	4. 3c	-1	
	5. 4th degree	-1	

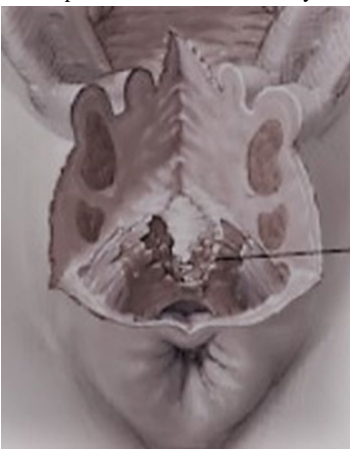


Table 1 (continued)

Questions		Scores
5. The best things to do after a sphincter injury?	1. Surgical repair as soon as possible	+1
	2. Digital rectal examination pre and post-repair	+2
	3. Delayed repair up to 48 h	-2
	4. Repair by the resident	-1
	5. In the absence of an expert, delay repair up to 12 h	+2
	6. Enema or bowel prep	-2
	7. Use of antibiotics prior to repair	+1
	8. Use of antibiotics post-repair	0
	9. Surgery consultation	-1
	10. Irrigation with normal saline	+1
	11. Broad-spectrum antibiotics prior to repair	-1
	12. Repair at the bedside	-3
	13. Repair under optimal lighting and analgesia	+2
6. First repair method of the external sphincter in the above mentioned patient	1. Overlap technique	+2
	2. End to End technique	+2
	3. Repair with the figure of 8 sutures	-3
	4. polyglactin (Vicryl) 3-0	+1
	5. Chrome 2-0	-2
	6. polydioxanone suture (PDS) 2-0	+1
	7. Distinct sutures and nylon 3-0	-3
7. How to repair internal sphincter	1. Distinct sutures and absorbable 0-3 monofilament	+2
	2. Mattress sutures and PDS 0-3	+2
	3. Overlap technique	-2
	4. End to End technique	+2
	5. Continuous sutures and absorbable monofilament 0	-2
	6. Continuous suture and PDS 0	-2
	7. Chrome 0-2	-2
8. Post operation orders	1. No need for Antibiotics	+1
	2. Oral antibiotics up to 7 days	+1
	3. IV antibiotics for 7 days	-2
	4. Local antibiotic ointments	-1
9. Recommendations after discharge	1. Mild laxatives	+1
	2. Use of bulking agent	-3
	3. Applying a warm pack	0
	4. Applying ice pack	+1
	5. Local Lidocaine	+1
	6. Painkillers	+1
	7. Sitz bath	+1
	8. Glycerin suppository	-3
	9. Physiotherapy and pelvic floor exercises	+2
	10. Foley Catheter	-2
10. Recommendations for subsequent deliveries	1. Cesarean section	-2
	2. If fecal incontinence is present, C/S is recommended	+2
	3. If the patient asks for it, C/S is recommended	2
	4. Prophylactic episiotomy in the subsequent delivery	-3

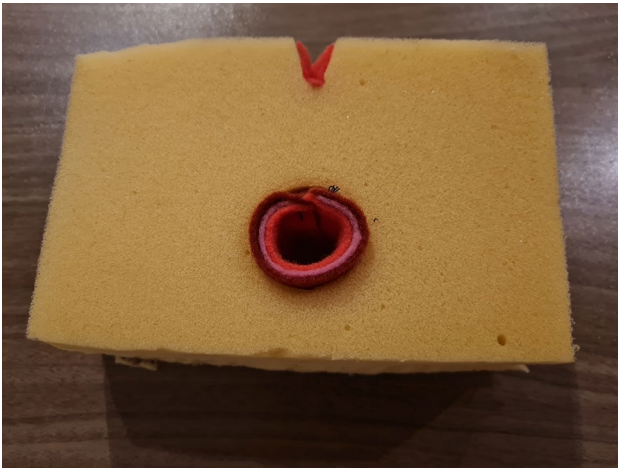


Fig. 1 The sponge training model of the internal and external anal sphincter

Table 2 General information and basic knowledge of the participants

Characteristics	n (%)
Level	
1	26 (32.5)
2	22 (27.5)
3	32 (40.0)
History of perineal rupture training	
Yes	43 (53.8)
No	37 (46.3)
History of repairing sphincter injuries	
Yes	12 (15)
No	68 (85)
Presence of a specific protocol	
Yes	38 (47.5)
No	42 (52.5)

Table 3 Comparison of total PMP scores of each level of the residents before and after the workshop

Level	Total PMP* score before intervention mean (SD)	Total PMP Score 3 months after intervention mean (SD)	Total PMP score 6 months after intervention mean (SD)
1	13.26 (10.14)	30.07 (7.66)	14.37 (12.53)
2	13.76 (9.21)	29.18 (7.38)	11.21 (12.83)
3	18.57 (6.13)	33.75 (4.84)	12.65 (12.13)
<i>p</i> -value**	0.034 (insignificant post-hoc)	0.027 (post-hoc: <i>p</i> -value for first and third: 0.043)	0.688

*The range of PMP score is from -100 to 100

***p*-values are the result of a one-way ANOVA-test and Bonferroni posthoc test

Results

A total of 80 residents were enrolled in the program, with 26, 22, and 32 at the first, second, and third levels of residency, respectively. The general information regarding the basic knowledge is summarized in Table 2. Senior residents had better performance before and three months after the intervention, although no significant difference was observed after six months between residency levels.

The total PMP scores significantly improved three months after the workshop, with means increasing from 15.5 (mean score of baselines) to 31.3 (mean score, min: -63, max: +52). Surprisingly, after the six-month follow-up, the total score decreased to +12.3, with no significant difference between pre-education and follow-up scores (Table 3). The total PMP score indicates that, contrary to the findings that the baseline and follow-up (after three months) scores were significantly different, this difference was not observed after six months of follow-up. The *p*-values are provided in Table 4.

Similar significant results were also reported for each PMP question in each level of residents. The data is provided in supplementary 1, 2, and 3.

Discussion

This study demonstrated that workshop training for obstetrics and gynecology residents in the management of perineal lacerations significantly improved their knowledge in a short period. However, their knowledge markedly decreased over time, and the scores, albeit insignificantly, fell to the levels before education. These findings can be explained by the fact that systematic, constant training during residency is lacking.

Table 4 The results of Bonferroni post hoc p-values for evaluation of differences between each phase of the test

Exam	PMP pre (p-value)	PMP 3 months post (p-value)	PMP 6 months post (p-value)
PMP Pre	–	$p < 0.001$	$p = 0.204$
PMP 3 months follow up	$p < 0.001$	–	$p < 0.001$
PMP 6 months follow up	$p = 0.204$	$p < 0.001$	–

Third and fourth-degree perineal lacerations significantly increase the risk of fecal and urinary incontinence. Current trends show that the incidence rate has been increasing, which might be due to improvements in diagnosis. It is estimated that 28 to 35% of primipara and up to 44.5% of multipara women suffer from occult tears, which can only be diagnosed by experienced gynecologists. Hence, healthcare providers have to be effectively trained [3, 5, 7, 9, 12].

The first, second, and third PMP questions assess the knowledge of the residents regarding the risk factors of sphincter injury and how to diagnose and prevent sphincter injury, respectively. A hands-on workshop improves detection rates and repair routines in a one-year follow-up by investigating medical records. In this study, we witnessed an enhancement in information about the risk factor, diagnosis, and prevention techniques regarding sphincter injuries by using a questionnaire [13].

Previous studies have also proposed that obstetrics and gynecology residents do not receive enough education regarding perineal laceration, including anal sphincter repair. A study conducted in Spain on third- and fourth-year residents showed that 98% of residents needed more training in this area, and less than 70% of residents had experience repairing high-grade tears [5]. This is in line with our study that the residents need more education.

A survey that evaluated the impact of education by repeated simulation on high-grade perineal laceration in residents demonstrated that inadequate and inappropriate repair techniques could lead to long-term consequences that can be prevented by providing adequate training [6]. We had similar results that the residents need repeated and continuous training. Seddighi et al. developed an assessment tool to compare the identity and repair skills of residents before and after a workshop. They found a significant improvement in the technical skills of PGY-1 to PGY-4 residents (14).

The PMP questions 4–8 assess the knowledge of the residents about the steps of the management of perineal laceration, including the extent of injury, knowledge of the procedure, repair techniques, choice of suture and instrument, the necessity of antibiotics, etc. PMP questions 9 and 10 evaluate the awareness of the residents about the required care after surgery and the indication of cesarean in the following deliveries.

This study had some limitations. We did not evaluate the practical skills of the residents pre- and post-education. We

gathered our data based on the questionnaire, and there may be small differences in the number of vaginal deliveries in the four centers that were not considered in this study.

Conclusion

In conclusion, obstetrics and gynecology residents demonstrated substandard knowledge in repairing perineal lacerations. Although the training workshop significantly increased residents' knowledge, its effectiveness decreases over time, and there is a need for continuous or periodic training.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s13224-023-01792-6>.

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Availability of data and materials The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Conflict of interest The authors declare that they have no conflicts of interest.

Ethical approval Ethical approval was obtained from the Ethics Committee of Tehran University of Medical Sciences.

Ethical standards This study is designed and performed according to the Helsinki declaration.

Consent for publication All participants signed the electronic consent forms and their privacy was respected. All the data and identity of the participants are secret and will not reveal to anyone.

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