



Modified Advanced Life Support in Obstetrics course: Feasibility, trainee satisfaction, and sustainability potential

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Abstract

Objective: The main objective of this initiative was to present evaluation results from an innovative adaptation of the Advanced Life Support in Obstetrics (ALSO) training course. We modified the traditional ALSO curriculum in our institution by adding hands-on training in laceration repairs and simulation scenarios on acute maternity care.

Methods: The modified ALSO provider course was designed to enhance cognitive and procedural skills of health care professionals in managing obstetric emergencies. Forty-nine participants attended this course and completed a posttraining survey. Descriptive statistics were used to describe the participant-reported assessment scores for the ALSO course on three domains (subject knowledge, organization and clarity, and teaching effectiveness) for each of 12 course topics.

Results: Evaluation of the results showed a high rate of trainee satisfaction as evidenced by the mean assessment scores across all topics ranging from 4.80 to 4.98 (out of 5.00). All trainees said they would refer others to the course. Our modified ALSO course effectively addressed the important needs of primary care physicians involved in maternity care, especially in underserved communities where specialized obstetric care is not readily available. Both simulation scenarios and workshops using simulated human tissue provide a better foundation before formal training.

Conclusion: Given the changing legal and regulatory climate, we expect that learning to treat complex obstetric situations on the job will become increasingly risky. With this in mind, both simulation scenarios and workshops using simulated human tissue will provide a better foundation before formal training.

Keywords: Advanced Life Support in Obstetrics (ALSO); training; hands-on laceration repair; simulated human tissue

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Introduction

The Advanced Life Support in Obstetrics (ALSO) provider course is an educational program designed to enhance cognitive and procedural skills of health care professionals in managing obstetric emergencies [1]. The internationally recognized interprofessional course was established to provide evidence-based training and scenario-based skills development

[2]. The ALSO course was first developed by the Department of Family Medicine at the University of Wisconsin, United States, and the original national ALSO Development Group of Family Physicians, Obstetricians, and Nurses formed in 1991 [3, 4]. Since that time the ALSO syllabus has undergone substantial developmental changes to optimize the curriculum and update it to concord with current



practice guidelines. Many obstetric cases and workshops have been added to enrich the syllabus [2, 3]. The most recent inclusion in the ALSO provider course is the introduction of the Obstetrics Emergency Simulation Series, which offers more intense hands-on training sessions that lead to acquisition and refinement of core obstetric emergency competencies [3, 5]. The series encapsulates simulation scenarios reflecting acute life-threatening situations encountered in maternity and newborn care. The content of the simulation modules includes conditions such as umbilical cord prolapse, placenta previa, postpartum hemorrhage, eclampsia, shoulder dystocia, and other conditions requiring maternal and neonatal resuscitation (e.g., shock, fetal asphyxia) [5]. At the end of the simulation scenarios, the instructor presents structured debriefing that provides immediate feedback to enhance the participants' medical skills, team-wide communications skills, and handling of system and logistical issues.

The ALSO course is also being offered in developing countries to decrease maternal and perinatal morbidity and mortality [6]. The ALSO provider and instructor courses are taught in 62 countries to augment the capacity of health care providers to effectively manage potential emergencies arising in the perinatal period. As a result of the ALSO program expansion internationally, the GLOBAL ALSO program was created with a curriculum modified to suit the contexts in which the course is taught [7].

Despite these positive developments, to our knowledge, the ALSO course still lacks skills transfer in the area of repair of perineal lacerations, which are the commonest intrapartum maternal complications that can lead to chronic morbidity such as perineal pain, dyspareunia, fecal urgency, leakage and incontinence, as well as psychological trauma. Hence, competency in suturing skills by maternity care providers has the potential to decrease maternal morbidity resulting from perineal lacerations. Accordingly, we modified the ALSO curriculum in our institution to fill this huge gap by offering hands-on intensive training in laceration repair. Another important modification to our ALSO curriculum is the incorporation of skills training on the common fundamental obstetrics procedures, such as amniotomy, intrauterine pressure catheter placement, fetal scalp electrode placement, and Cook balloon placement. In this article we present the results of this

transformed ALSO training course as well as its evaluation with respect to the effectiveness of teaching methods, trainee performance and satisfaction, and program logistics.

Methods

Forty-nine health professionals registered and participated in the ALSO provider course held at Baylor College of Medicine in Houston, Texas, in August 2015. The course was supported by infrastructure provided by the Department of Family and Community Medicine. Participants came from various institutions and health facilities in the United States. The participants attended lectures and skills demonstration and acquisition sessions offered in six spacious conference rooms and a large lecture theatre. The trainee-to-faculty ratio was low (4:1), which facilitated and enhanced knowledge and hands-on-training skills transfer.

The trainees comprised a midwife, a paramedic, 37 medical residents, and 10 family medicine physicians involved in maternity care. Four family medicine residency programs participated in the course, including Baylor College of Medicine, University of Texas Houston, Houston Methodist Family Medicine Residency Program, and the University of Texas Medical Branch, Galveston. A consortium of 16 faculty members from the four family medicine residency programs served as course instructors.

The ALSO course was completed in 2 days, from 8 am to 5 pm each day, and covered all ALSO core competencies (Table 1). In the first half of day 1 (morning session) we provided three lectures on safety in maternity care, first trimester complications, and late pregnancy bleeding. We also arranged three workshops on shoulder dystocia, assisted vaginal delivery, and obstetrics cases. In the second half of day 1 (afternoon session), one lecture was given on medical complications of pregnancy, and there were workshops on malpresentations and malpositions, intrapartum fetal surveillance, maternal resuscitation, and postpartum hemorrhage. On day 2 (morning session) we conducted two lectures: one on preterm labor and the other on perineal laceration repair supplemented by video presentations. Also, in the morning session, there were three workshops on perineal laceration repair using beef tongue to simulate perineal tissue, labor dystocia, and hands-on practice. In the second half of day 2 (afternoon session) we offered



Table 1. Core competencies of Advanced Life Support in Obstetrics (ALSO) course with corresponding goals and descriptions

Core competencies	Goals and descriptions
Repair of perineal lacerations	Discuss the classifications and complications of perineal lacerations; review techniques of perineal laceration repair
Management of first trimester pregnancy complications	Describe the diagnosis and management of miscarriage, ectopic pregnancy and gestational trophoblastic disease
Management of medical complications in pregnancy	Describe life-threatening medical complications of pregnancy; formulate a plan for diagnosis and treatment
Management of vaginal bleeding in late pregnancy	Identify the major causes of vaginal bleeding and their diagnosis and treatment
Management of preterm labor	Define preterm labor and PROM (premature rupture of membranes) and its management
Intrapartum fetal surveillance	Interpretation and management of the fetal heart rate tracings
Management of labor dystocia	Discuss diagnosis and management of labor dystocia
Malpresentations, malpositions, and multiple gestations	Delivery of malpresentations, malpositions and multiple gestations using maternal–fetal mannequins
Management of assisted vaginal delivery	Discuss indications and pre-requisites for vacuum and forceps delivery
Management of shoulder dystocia	Recognition and management of shoulder dystocia
Safety in maternity care	Understand the need for team-based approach in risk management issues in obstetrics
Maternal resuscitation and management of postpartum hemorrhage	Discuss the risk factors, prevention and management of postpartum hemorrhage

the written test, Mega Code, and evaluation survey. The written test comprised 50 multiple-choice questions on all the topics covered during the course. The evaluation survey was given to all participants to assess course metrics, including the organizational setup, location, effectiveness of teaching methods, and participant satisfaction. The Mega Code assessment session followed immediately after the evaluation survey, and course participants proceeded to the Mega Code stations, where the oral and practical examinations were conducted, followed by a one-on-one debriefing session moderated by the examining faculty. At the end of the course, an overall comprehensive debriefing session among all course instructors was held to elucidate pathways for improvement.

Statistical analysis

Statistical analysis descriptive statistics, including means and standard deviations, were used to describe the participant-reported assessment scores for the ALSO course on three domains (knowledge of the subject, organization and clarity, and effectiveness of teaching methods) for each of the 12

course topics. An overall course assessment score was calculated as the mean score across all assessment domains. We also grouped individual topics into one of three topic categories based on the overarching content of the module – (1) maternal topics (first trimester complications; labor dystocia; preterm labor and premature rupture of membranes; safety in maternity care; vaginal bleeding in late pregnancy; and assisted vaginal delivery), (2) fetal/infant topics (intrapartum fetal surveillance; malpresentations, malpositions, and multiple gestations; and shoulder dystocia), and (3) combined topics (medical complications; resuscitation/postpartum hemorrhage; and obstetric cases) – as well as reported assessment scores by topic category.

Since the empirical distribution of the assessment scores (on an original scale of 1–5) was significantly positively skewed, we also created dichotomous indicator variables representing whether a perfect score (5) was given for a particular topic and for each assessment domain. This decision was based on the assumption that, among our participant sample, any score less than the highest possible value might be indicative of the need for content revision, pedagogical adjustment, and



course improvement. We calculated the percentage of course participants who provided a perfect score; because of the relatively small sample size, confidence intervals (CIs) were calculated by the exact (Clopper-Pearson) method for binomial proportions. Non-overlapping CIs were used to determine statistically significant differences. Statistical analyses were performed with SAS, version 9.4 (SAS Institute, Cary, NC, USA), and we assumed a 5% type I error rate for estimation of CIs.

Results

Of the 49 participants finishing the modified ALSO course, 44 (90.0%) completed the course assessment survey. Table 2 provides the course survey results by topic and assessment domain. In general, the course received extremely high ratings on the knowledge of subject, organization and clarity, and effectiveness of teaching methods domains, as evidenced by the mean

assessment scores across all topics ranging from 4.80 to 4.98. The highest ratings in each assessment domain were observed for the obstetric cases topic (≥ 4.95 for each domain); the lowest scores were given for the medical complications module (≤ 4.84 for each domain). There were few differences in rating scores across the three assessment domains, and the degree of correlation in participant scores across the domains was high (the correlation coefficients ranged from 0.86 to 0.96). We also observed little differences in assessment scores when topics were categorized as maternal, fetal/infant, and combined; the scores ranged from 4.88 ± 0.28 to 4.94 ± 0.22 .

The proportion of participants who gave a perfect rating (5) was extremely high for all assessment domains and for all topics (Table 3). Of the 36 scores provided by each participant. (12 topic scores for each of the three assessment domains), 29 received a perfect rating from more than 90.0% of the

Table 2. Advanced Life Support in Obstetrics (ALSO) course survey results, by topic and assessment domain

	Knowledge of subject		Organization and clarity		Effectiveness of teaching methods		Overall assessment	
	n	Mean±SD	n	Mean±SD	n	Mean±SD	n	Mean±SD
Individual topic								
1: First trimester complications	44	4.89±0.32	40	4.90±0.30	40	4.90±0.30	40	4.91±0.28
2: Labor dystocia	42	4.90±0.30	37	4.89±0.31	38	4.92±0.27	38	4.91±0.28
3: Medical complications	43	4.84±0.37	40	4.80±0.41	40	4.80±0.41	40	4.81±0.38
4: Preterm labor and premature rupture of membranes	42	4.86±0.35	39	4.82±0.45	38	4.84±0.44	39	4.85±0.37
5: Safety in maternity care	43	4.86±0.64	41	4.85±0.65	41	4.85±0.65	41	4.85±0.65
6: Vaginal bleeding in late pregnancy	42	4.95±0.22	40	4.90±0.30	40	4.93±0.27	40	4.93±0.24
7: Assisted vaginal delivery	43	4.95±0.21	40	4.95±0.22	40	4.95±0.22	40	4.95±0.22
8: Intrapartum fetal surveillance	43	4.93±0.26	40	4.90±0.30	40	4.90±0.30	40	4.91±0.28
9: Malpresentations, malpositions, and multiple gestations	43	4.93±0.26	40	4.93±0.27	40	4.93±0.27	40	4.93±0.27
10: Maternal resuscitation/postpartum hemorrhage	43	4.95±0.21	40	4.93±0.27	40	4.95±0.22	40	4.94±0.23
11: Shoulder dystocia	43	4.95±0.21	40	4.95±0.22	40	4.95±0.22	40	4.95±0.22
12: Obstetrical cases	42	4.98±0.15	39	4.95±0.22	38	4.97±0.16	39	4.97±0.17
Topic groups*								
Maternal	43	4.90±0.24	39	4.88±0.28	39	4.90±0.28	39	4.90±0.27
Infant	43	4.94±0.22	40	4.92±0.23	40	4.92±0.23	40	4.93±0.23
Combined	43	4.92±0.20	40	4.89±0.23	40	4.91±0.21	40	4.91±0.21

*Maternal topics (1, 2, 4, 5, 6, 7); infant topics (8, 9, 11); combined topics (3, 10, 12).



Table 3. The proportion of Advanced Life Support in Obstetrics (ALSO) course participants who provided a perfect assessment score (5)*, by topic and assessment domain

Topic	Knowledge % (95% CI†)	Organization % (95% CI†)	Effectiveness % (95% CI†)
1: First trimester complications	88.6 (75.4, 96.2)	90.0 (76.3, 97.2)	90.0 (76.3, 97.2)
2: Labor dystocia	90.5 (77.4, 97.3)	89.2 (74.6, 97.0)	92.1 (78.6, 98.3)
3: Medical complications	83.7 (69.3, 93.2)	80.0 (64.4, 90.9)	80.0 (64.4, 90.9)
4: Preterm labor and premature rupture of membranes	85.7 (71.5, 94.6)	84.6 (69.5, 94.1)	86.8 (71.9, 95.6)
5: Safety in maternity care	93.0 (80.9, 98.5)	92.7 (80.1, 98.5)	92.7 (80.1, 98.5)
6: Vaginal bleeding in late pregnancy	95.2 (83.8, 99.4)	90.0 (76.3, 97.2)	92.5 (79.6, 98.4)
7: Assisted vaginal delivery	95.3 (84.2, 99.4)	95.0 (83.1, 99.4)	95.0 (83.1, 99.4)
8: Intrapartum fetal surveillance	93.0 (80.9, 98.5)	90.0 (76.3, 97.2)	90.0 (76.3, 97.2)
9: Malpresentations, malpositions, and multiple gestations	93.0 (80.9, 98.5)	92.5 (79.6, 98.4)	92.5 (79.6, 98.4)
10: Maternal resuscitation/postpartum hemorrhage	95.3 (84.2, 99.4)	92.5 (79.6, 98.4)	95.0 (83.1, 99.4)
11: Shoulder dystocia	95.3 (84.2, 99.4)	95.0 (83.1, 99.4)	95.0 (83.1, 99.4)
12: Obstetrical cases	97.6 (87.4, 99.9)	94.9 (82.7, 99.4)	97.4 (86.2, 99.9)

*For each assessment domain, for each topic, scores were given on a 1–5 scale. Values provided are the proportion of participants who scored the topic that provided the highest possible score of 5.

†Confidence intervals were calculated using the exact (Clopper–Pearson) method for binomial proportions.

participants. The lowest proportion of participants giving a rating of 5 was for the medical complications module (knowledge 83.7%, 95% CI 69.3%–93.2%; organization 80.0%, 95% CI 64.4%–90.9%; effectiveness 80.0%, 95% CI 64.4%–90.9%). Other areas in which less than 90.0% of participants gave the highest possible assessment score included preterm labor and premature rupture of membranes (effectiveness 86.8%), first trimester complications (knowledge 88.6%), and labor dystocia (organization 89.2%). When individual topics were grouped into maternal, fetal/infant, and combined categories, a perfect score was defined as a score of 5 on every topic within the category. On all three assessment domains, the infant category received the highest percentage of respondents giving perfect assessment scores; however, the differences were not statistically significant (Fig. 1).

Discussion

The ALSO course addresses important needs of primary care physicians involved in maternity care, especially in underserved communities where specialized obstetric care is not readily available [8]. Our study shows a high rate of trainee

satisfaction with respect to the logistics of course delivery (lectures, registration process, location, scheduling, rooms, and facilities). Because this is the premier course given by our team, it has the potential for expansion. Our results showed that all of the trainees would refer others to the course. This perfect score in terms of referral implies an excellent level of satisfaction. In addition, since the course is self-funded, paid for either by residency programs or by the participants themselves, it demonstrates that the course bears high potential for sustainability.

Toward the end of the course, we conducted a debriefing session and asked the participants to fill out evaluation forms. When asked what they liked about the course, some of the participants commented as follows:

“The workshop is very well-staffed and well-organized.”

“The instructors were very good and the lectures were not too long and not too short.”

“The tongue laceration repair work shop was fabulous.”

“The suturing course was excellent.”

“Kudos for hands-on laceration repair!”

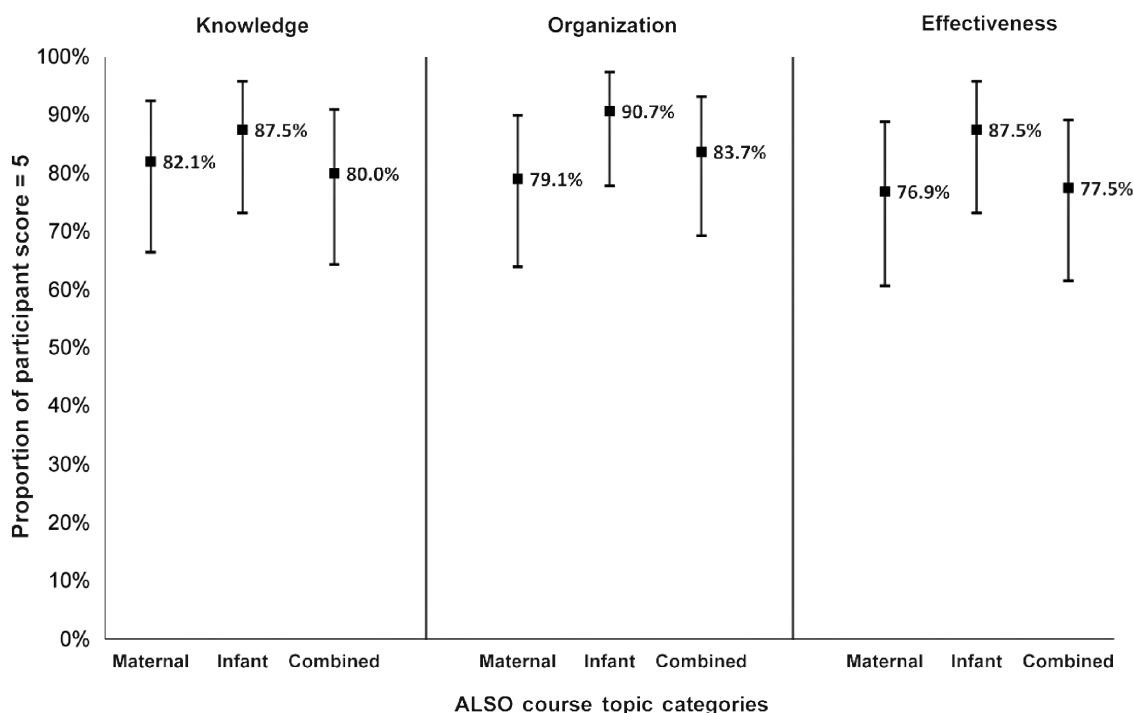


Fig. 1. The proportion of Advanced Life Support in Obstetrics (ALSO) course participants who provided a perfect assessment score (5)*, by topic groups and assessment domain.

*For each assessment domain, for each topic group, scores were given on a 1–5 scale. Values provided are the proportion of participants who scored the topic that provided the highest possible score of 5. Topic categories were defined as such: maternal topics (1, 2, 4–7); infant topics (8, 9, 11); combined topics (3, 10, 12). Note: Confidence intervals (error bars) were calculated using the exact (Clopper–Pearson) method for binomial proportions.

We also received a comment from a professor who shortly after the course observed an intern and a mid-level resident during a vaginal laceration repair. The professor noted that the intern, having participated in the laceration repair workshop as part of the ALSO course, actually performed better than the mid-level resident, who had also attended an ALSO course, but one that did not feature a laceration repair workshop.

When asked whether the course will change their clinical behavior, all trainees who provided a response answered “yes.” Their comments included the following: “I learned what I need to improve my clinical practice,” “I feel more prepared for my OB rotation,” and “I feel better equipped now to manage obstetric emergencies.”

Our findings should be considered in light of noteworthy limitations. First and most importantly, our results are based

on the design and implementation of a single modified ALSO course, and a small sample size (<50). Despite the extremely high levels of participant-reported satisfaction for all three assessment domains and for all topics, the results may not be generalizable to other groups of trainees, even for a similarly designed and administered course. Second, a source of positive bias in the response is that ALSO course trainees were familiar to a fraction of the instructors. However, this is unlikely to have impacted our results because the evaluation was completely anonymous. Informal discussion with the trainees revealed that the course price was quite reasonable with respect to the knowledge and skills acquired. Hence it had a high value for service. Another limitation is the lack of evaluative data concerning procedural topics such as amniotomy, intrauterine pressure catheter placement, fetal scalp electrode



placement, and Cook® Cervical Ripening Balloon placement as individual entities. Future training sessions should include a comprehensive evaluation platform for these procedures.

An area of strength is the incorporation of two innovative procedures into the ALSO provider program. These are the laceration repair workshop and simulation scenarios on acute maternity and newborn care, which included the following: umbilical cord prolapse, placenta previa, eclampsia, maternal resuscitation, postpartum hemorrhage, and shoulder dystocia. The two additions were well appreciated and valued by course participants, and have the potential to serve as a transformed model of the ALSO course. Another strength of our ALSO course is that it provides an avenue for interprofessional interaction. In addition to family medicine residents, midwives, paramedics, family medicine staff, and emergency medicine staff attended the course. This brought various perspectives that encouraged cross-pollination of ideas from various professional view points [9].

Given the changing legal and regulatory climate, we expect that learning to manage the previously described conditions on the job will become increasingly risky. With this in mind, both simulation scenarios and workshops using simulated human tissue will provide a better foundation before formal training.

Conflict of interest

The authors declare no conflict of interest.

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