

Comparison Study of ALSO[®] Trained and Traditionally Trained OB-GYN and Family Medicine Residents in Shoulder Dystocia

P. Tullar*, B. True, A. Stowe-Quain, R. Kauffman and K. Graves-Evenson

Texas Tech University Health Sciences Center at Amarillo 1400 S. Coulter, Department of Obstetrics & Gynecology Amarillo, TX 79106, USA

Abstract: *Introduction:* Obstetrics is a high risk specialty. The cephalic presentation vaginal delivery complicated by shoulder dystocia is a medical emergency commonly encountered. This study compares shoulder dystocia resolution educational and manual skills of Obstetrics and Gynecology (OB-GYN) and Family Medicine (FM) residents following completion of Advanced Life Support in Obstetrics (ALSO[®]) trained vs. a group of OB-GYN and FM residents untrained in ALSO but trained in traditional means in a traditional residency to manage shoulder dystocia.

Materials and Methods: Shoulder dystocia resolution skills taught in simulation using pelvic and fetal manikins were tested in Family Medicine and OB-GYN residencies who were ALSO[®] trained, and they were retested for the purpose of this study 6 months after their training. The same testing, using the same checklist, was done for traditionally trained OB-GYN and Family Medicine residents (who had not been exposed to the ALSO[®] training) by the same instructor, using the same checklist.

Results: The mean score of all (FM & OB-GYN) who had taken the course six months before testing was statistically higher than those in traditional OB-GYN and FM training who had not ($p < 0.0001$).

Discussion/Conclusions: Performance scores of simulation-trained Family Medicine and OB-GYN residents in resolving shoulder dystocia was higher 6 months after training compared to a group of OB-GYN and Family Medicine residents from traditional residencies not trained in shoulder dystocia resolution. This may have implications for patient safety.

Keywords: Shoulder Dystocia, Simulation, Resident Education, ALSO Course.

INTRODUCTION

Shoulder dystocia is an obstetrical emergency presenting with varying degrees of severity. Complication rates are proportional to the severity of the shoulder dystocia and the skills of the provider. They may be most severe for the neonate including temporary and permanent brachial plexus injury, bony fractures, hypoxic brain injury, and neonatal death [1]. Prevalence reports of shoulder dystocia account for 0.6% to 2.0% for vaginal deliveries of fetuses in the vertex presentation [1, 2]. In the 2005 Professional Insurance Association of America report, a private medical liability insurer report, shoulder dystocia was listed as the second most common cause for medical liability claims in obstetrics [3]. Improved practice patterns may diminish litigation by improving patient safety [4].

The American Academy of Family Practice has developed a didactic and simulation skills training course, Advanced Life Support in Obstetrics (ALSO[®]), which addresses many of the obstetric emergencies seen in the practice of maternity care, including labor dystocia, mechanically

-assisted vaginal delivery, shoulder dystocia, postpartum hemorrhage, malpresentations (including assisted delivery of the vaginal breech presentation). The complications of dystocia with mechanically assisted delivery of the cephalic presentation, shoulder dystocia of the cephalic presentation, postpartum hemorrhage, and malpresentations are taught with maternal pelvic and fetal manikins, with the goal of teaching and promoting better manual skills. ALSO[®] is presented in a standardized format with written tests and simulation lab tests with pelvic and fetal manikins [5]. The ALSO[®] course and testing are often accomplished over two 8-hour days. At least half of the teaching and testing personnel must have passed this course once, undergo training to teach this course, and maintain active involvement in maternity care. Over 14 years of study by the developers and owners of the ALSO[®] Course have demonstrated progress in enhancing obstetrical emergency skills, primarily in Family Medicine residents [6,7].

Research has been conducted to determine the ALSO[®] course effectiveness and success in conferring clinically usable skills and comfort level in managing obstetric emergencies [8]. Recently reported research has shown the effectiveness in conferring these management skills for postpartum hemorrhage to maternity care providers in Tanzania [9].

The null hypothesis of this study was knowledge and skills of the ALSO[®] trained residents in this study were no

*Address correspondence to this author at the Texas Tech University Health Sciences Center at Amarillo 1400 S. Coulter, Department of Obstetrics & Gynecology Amarillo, TX 79106 USA; Tel: (806) 346-4608; Fax: (806) 354-5516; E-mail: paul.tullar@ttuhsc.edu

different from the knowledge and skills of residents who received all their obstetrics training in the traditional residency format without ALSO® training. One might assume that traditional training in Obstetrics and Gynecology and in Family Medicine would transmit all the skills needed to practice these specialties, including the knowledge and skills necessary for resolution of shoulder dystocia, and that the addition of a mere two day course would not significantly convey any necessary skills not covered in a traditional four (or three) year residency. Also, one may additionally assume that while a two day course might demonstrate skills obtained by residents the day before, but if 6 months were to go by, these manual and knowledge based skills might well be forgotten and no longer demonstrable.

Some research has been done reporting on persistence of simulation-trained skills 1 and 6 months after such teaching, in OB residents, British midwives and OB faculty [8-10]. Shoulder dystocia resolution skills of those residents recently trained (with pelvic and fetal manikin beyond their traditional residency training), were demonstrably better than those with traditional residency training [11]. This study examined knowledge and testable skills immediately and 6 month interval, and compared them with FM and OB-GYN residents. This distinguishes it from other similar studies.

Simulation in training for obstetrical skills (separate from the ALSO Course) has been studied extensively, and shown to compare favorably with didactic training and has shown to improve neonatal outcome from shoulder dystocia with reduction of neonatal injury at birth by simulation-trained providers [12, 13].

To the author's knowledge comparisons of skills by 6 months retention of skills testing, has not been published in comparison to skills of traditionally trained Family Medicine and Obstetric residents. This study may be useful in adding light on maintenance of shoulder dystocia resolution skills, for patient safety in resident training programs. Such considerations underlie the requirements by many training programs for Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS) by all residents, especially first year residents.

MATERIALS AND METHODS

This study protocol was approved by the Institutional Review Boards (IRB) at Texas Tech University Health Science Center in Amarillo (IRB # A08-3469) and Methodist Hospital in Dallas, Texas (MHD IRB #2009.00.483.A). Though this study was exempted by the above IRBs as an educational study, written informed consent was obtained by each enrolled subject.

For the ALSO-Trained arm, Family Medicine and OB-GYN residents were recruited from those who attended a standard ALSO® course, conducted July 25 and 26, 2008. Manual skills were taught following a didactic presentation. This included resolving a simulated delivery emergency using a pelvic and fetal mannequin (Forceps OB Delivery Manikin, Armstrong Medical Industries, Lincolnshire IL, USA), with shoulder dystocia resolution, among other skills tested. Residents were tested by study personnel both immediately following the course, and approximately six months

after the didactic presentation. All passed the immediate post course skills exam at > 75% score, and these immediate post test scores were not used in this study. Only the 6 month post course skills test scores were used in comparison with those of traditionally trained Obstetric and Family Medicine residents.

For the traditionally trained arm, 2 residencies (Family Medicine and OB-GYN) in another city in the same state were chosen for their similarity in training, residency size and exposure to work together in a higher volume hospital where obstetrical care is given by both OB and Family Medicine residents. These programs were chosen as they had not offered either the ALSO Course to their residents, nor had they had similar simulator (maternal & fetal manikin) shoulder dystocia training for about 4 years. Residents were recruited from both programs, as approved by their IRB. Prior simulation training or testing was not done by testing personnel, in order to allow only the traditional training to supply the knowledge and skills to resolve the simulated shoulder dystocia.

The checklist driven test was adapted from the skills test at the end of the ALSO® course. During evaluation of resolution attempts by the examinee, 0 to 2 points were assigned for correct use of the following: call for additional medical support staff, evaluation of episiotomy to aid in intra-vaginal maneuvers, Mac Roberts' adduction of maternal legs, directed super-pubic pressure to abduct fetal impacted shoulder, Rubin's maneuver, Woods Screw maneuver, reverse Woods Screw maneuver to dislodge and deliver impacted fetal shoulder, and removal of posterior arm. Up to 12 additional points assigned for practical application of manual skills, A total of 30 points for performance were possible in this testing format.

Both groups (ALSO® trained n = 11; traditional residency trained, but ALSO® untrained n = 20) were tested in a simulated emergency labor/delivery using the same pelvic and fetal manikin and by the same ALSO® certified faculty advisor, using the same checklist driven knowledge and skills test. Objective scores were assigned based on their performance. The ALSO-trained FM and OB residents were tested 6 months after their training. The traditionally trained FM and OB residents were tested over 1 week, at the beginning of their educational year (in July).

The distribution of continuous data was assessed using the D'Agostino-Pearson test. Results are expressed as mean \pm standard deviation (SD). Test scores between the two study groups were compared using paired Welch's t-test. Statistical significance was assumed when $p < 0.05$. Medcalc 11.2 (Mariakerke, Belgium) was used for the statistical calculations.

RESULTS

Figs. (2-5) comprise all completed data. Each bar in the bar charts represents a successfully completed (resident) participant, with a complete data set. Incomplete data sets from participants who failed to show for a testing session were excluded. Of 19 recruited into the study in the ALSO trained group, 11 completed the 6 month posttest, and are included in the data below. Unfortunately, none of the most

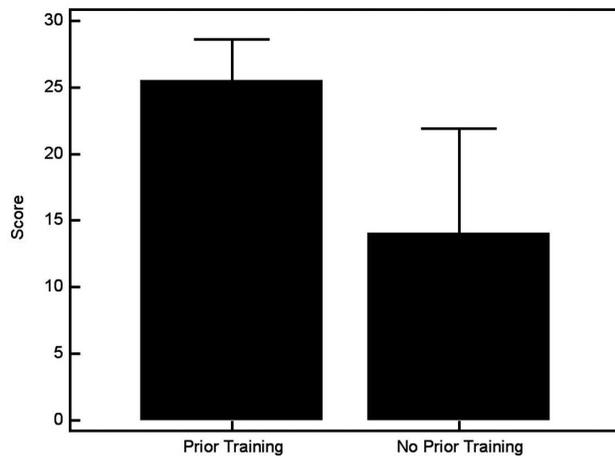


Fig. (1). All Family Medicine and OB-GYN Residents, in traditional (“no prior training”) residencies, vs. ALSO training (“prior training”), 6 months before shoulder dystocia resolution testing. These bars represent a combination of all FM and OB residents scores, averaged, in each arm “Score” is shoulder dystocia resolution score, of 30 points maximum.

senior ALSO trained OB or Family Medicine residents completed the 6 month post course testing. See Figs. (3 & 5). In the traditional training (non -ALSO trained) group, the OB & FM residents totaled 24, of which 20 were recruited, and all completed the skills testing.

Mean of the objective scores on skills testing of resolution of shoulder dystocia, using a checklist derived from the manual skills test in the ALSO® final exam, is shown in Fig. (1). Here, each of the 2 bars represents a (mean) combination of all the participants’ scores in one of the 2 groups: ALSO (simulation) trained residents vs. traditionally trained residents.

Mean scores from both FM and OB-GYN (n=20) who had no specific ALSO® training beyond that in a traditional OB-GYN or Family Medicine residency was 14 ± 7.9 . The mean score of all the Family Medicine and OB-GYN (n=11) residents who had taken the ALSO® course six months before testing was 25.4 ± 3.2 . The difference was statistically significant ($p < 0.0001$).

Though numbers were small, there was an increasing level of skills seen between the first year of the OB-GYN residents and those of later years in the traditional training program (Fig. 2), suggesting that this test demonstrated the acquisition of skills over the years of a multi-year residency, as expected. This would tend to validate this testing format. The ALSO testing format has elsewhere been validated.(6, 7) Six months after simulation training in manual skills ALSO© trained first year residents (both OB and FM) (n=6, Figs. 3 & 5) performed at the skills level of upper level 3rd & 4th year OB-GYN residents in the traditional training program. (Fig. 2). Though the numbers of subjects is small, the difference in shoulder dystocia resolution scores is even greater between ALSO trained Family Medicine residents (6 months before the testing) (Fig. 5) and those in a traditional Family Medicine training program (Fig. 4).

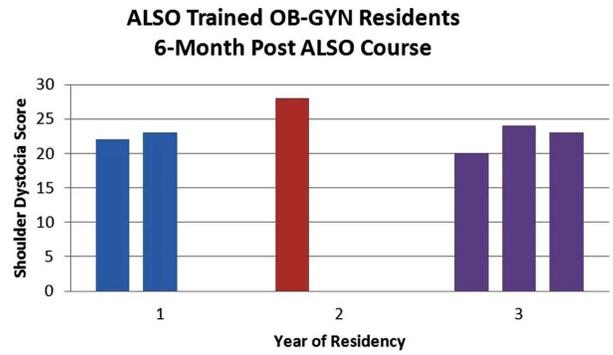


Fig. (2). Each bar represents a completed data set from a single participating resident.

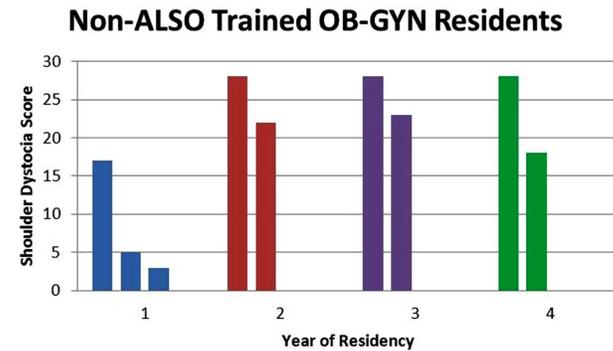


Fig. (3). Each bar represents a completed data set from a single participating resident.

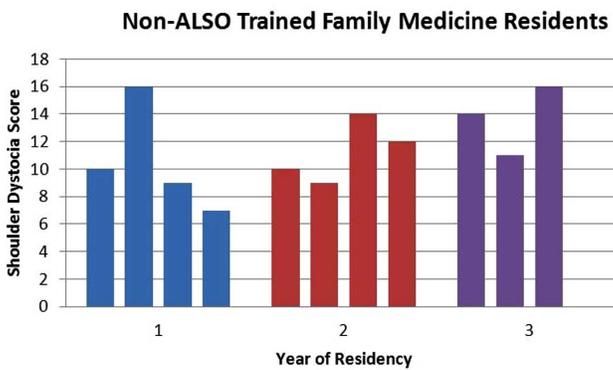


Fig. (4). Each bar represents a completed data set from a single participating resident.

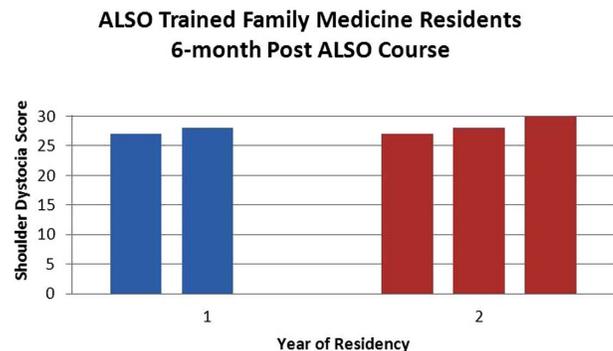


Fig. (5). Each bar represents a completed data set from a single participating resident.

DISCUSSION

Some difference of opinion exists, certainly within the OB-GYN resident education community, and even within the Family Medicine resident education community, about the necessity and utility of this Advanced Life Support in Obstetrics intensive, broad two-day course in the life support format (e.g. Basic Cardiac Life Support (BCLS), Advanced Cardiac Life Support (ACLS), Pediatric Advanced Life Support (PALS), etc) [14, 15]. The ALSO ® course teaches some measures of last resort not tested in the ALSO final exam (or in this study), such as maternal symphysiotomy and cephalic replacement with emergency cesarean delivery (Zavanelli maneuver). No training will necessarily allow successful delivery in all cases of shoulder dystocia with neither maternal nor neonatal injury. Standard skills, consistent and correct communication, and better teamwork for resolving the resolvable shoulder dystocia may produce fewer maternal and fewer neonatal injuries. Better demonstrable skills, both as individuals (as in this study) and as teams, assimilated by residents earlier in their training could hold implications for safety of patients [16-18].

This study's findings add to the body of knowledge that traditional OB-GYN residencies may well teach manual skills and knowledge by the 3rd and 4th years, necessary to resolve shoulder dystocia, and these skills are persistent across many months (perhaps because of the frequent use of these skills during the OB-GYN residency). This study's findings do not provide evidence for similar conclusions about traditional Family Medicine residencies (without the ALSO Course or simulation training). These findings do show that a single 2 day ALSO Course (with manikin simulation) can bring Family Medicine residents up to the testable performance level (in shoulder dystocia resolution) of 4th year OB residents, even 6 months after the Course. This study also suggests (despite small numbers) that the ALSO Course (with manikin simulation manual skills training) can bring even 1st year residents' (FM as well as OB) shoulder dystocia resolution skills up to that of 3rd and 4th year OB residents, even 6 months after the training. That could infer that there might be fewer shoulder dystocia-related injuries in babies delivered by 1st year (FM & OB) residents (if they had more demonstrable knowledge and skills, compared to those in a residency without such ALSO Course and simulation training).

Limitations of this study certainly include the small number of study subjects. Though the number of subjects in each arm is >10, and the differences between the arms is statistically very significant ($p < 0.0001$), the entire study is probably underpowered. The second limitation of this study is that it was done in simulation: one should interpret these results with some caution as the simulation testing environment may not perfectly reflect clinical practice habits. Both the JCAH in the U.S.A.(17) and English NHS Litigation Authority(16) seem to feel that simulation training in shoulder dystocia could increase safety.

Limitations of this study design include having the same educator and ALSO-certified Instructor travel to the second town at another time in the educational year to test the traditionally trained FM and OB residents. It could have been

more powerful if the testing were done at the same time in the educational year.

Strength of this study was that the same 'rater' (ALSO-certified instructor) administered the same test to both arms (the same as the weakness above), avoiding inter-rater reliability error introduced in the testing. With no inter-rater reliability issues, the numbers of the testing itself are more dependable.

CONCLUSIONS

The difference between performance scores of ALSO® course trained Family Medicine and OB-GYN residents six months after the course and those who had never participated in the ALSO® course, but received traditional training in resolving shoulder dystocia obstetrical emergency, in simulation, is significant. Implications for safety of newborns are implied, with more didactic and especially simulation training preparing those who deliver babies to better resolve the resolvable shoulder dystocia. Larger numbers of simulation-trained and traditionally trained residents will be needed to answer the questions about skills in each individual year of residency. Coordination of tested manual skills in simulation will be needed with outcomes data to prove the concept that simulation training improves patient outcomes.

SUPPORT AND CONFLICT OF INTEREST STATEMENTS

The authors gratefully acknowledge financial support of: Educational program grant from Office of the Regional Dean, Texas Tech University Health Science Center Amarillo, and educational grant from March of Dimes. (Both 2007). The authors report no conflicts of interest.

ACKNOWLEDGEMENTS

All statistical analysis was provided thanks to Dr. Robert Kauffman using MedCalc Statistical package (MedCalc, Mariankirke, Belgium).

Many thanks to Dr. Manuel Rivera-Alsina, Dr. Stephen Patrick, Dr. Brent Johnson, Drs. Laquita Sheppard, Dr. Sarah Holder, and Dr. BassemElsawy, Methodist Hospitals of Dallas, and their outstanding residents. Many thanks to both IRBs of Texas Tech and Methodist Hospitals of Dallas for review, consideration, help and expedited approval. Many thanks to Dr. Teresa Baker, Dr. Usha Sethi, Dr. Beverly Nixon-Lewis, Dr. Rodney Young, and Dr. Timothy Benton, and their outstanding residents at Texas Tech University Health Sciences Center at Amarillo.

REFERENCES

- [1] ACOG Practice Bulletins- Gynecology, the American College of Obstetricians & Gynecologists. ACOG practice bulletin clinical management guidelines for obstetricians & gynecologists. Number 40. November 2002. *Obstet Gynecol* 2002; 100: 1045-50.
- [2] Draycott TJ, Crofts JF, Ash JP, *et al*. Improving neonatal outcome through practical shoulder dystocia training. *Obstet Gynecol* 2008; 112: 14- 20.
- [3] Professional Insurance Association of America. Risk Management Data, 2005.

- [4] Clark SL, Belfort MA, Dildy GA, Myers JA. Reducing obstetric litigation through alterations in practice patterns. *Obstet Gynecol* 2008; 112: 1279-83.
- [5] ALSO: Advanced Life Support in Obstetrics provider courses syllabus. 5th ed. Leawood Kansas, USA: American Academy of Family Physicians, 2006.
- [6] Dauphin-McKenzie N, Celestin MJ, Brown D, González-Quintero VH. The advanced life support in obstetrics course as an orientation tool for obstetrics and gynecology residents. *Am J Obstet Gynecol* 2007; 196: e27-8.
- [7] Bower DJ, Wolkomir MS, Schubot DB. The effects of the ALSO course as an educational intervention for residents. *Advanced Life Support in Obstetrics. Fam Med* 1997; 29:187-93.
- [8] Taylor HA, Kiser WR. Reported comfort with obstetrical emergencies before and after participation in the advanced life support in obstetrics course. *Fam Med* 1998; 30:103-7.
- [9] Sorenson BL, Rasch V, Massawe S, Nyakina J, Elsass P, Nielsen BB. ALSO Training and PPH in Tanzania. *Acta Obstet Gynecol Scand* 2011; doi: 10.1111/j.1600-0412.2011.01115.x
- [10] Crofts JF, Bartlett C, Ellis D, Hunt LP, Fox R, Draycott TJ. Management of shoulder dystocia: skills retention 6 and 12 months after training. *Obstet Gynecol* 2007;110: 1069-74.
- [11] Daniels K, Arafeh J, Clark A, Waller S, Druzin M, Chueh J. Prospective randomized trial of simulation versus didactic teaching for obstetrical emergencies. *Simul Healthc* 2010; 5: 40- 5.
- [12] Deering S, Poggi S, Macedonia C, Gherman R, Satin AJ. Improving resident competency in management of shoulder dystocia with simulation training. *Obstet Gynecol* 2004; 103: 1224-8.
- [13] Goffman D, Heo H, Pardanani S, Merkatz IR, Bernstein PS. Improving shoulder dystocia management among resident and attending physicians using simulations. *Am J Obstet Gynecol* 2008; 199: 294e1-5.
- [14] Beasley JW, Damos JR, Roberts RG, Nesbitt TS. The advanced life support in obstetrics course. A national program to enhance obstetric emergency skills and to support maternity care practice. *Arch Fam Med* 1994; 3:1037-41.
- [15] Beasley JW, Dresang LT, Winslow DB, Damos JR. The Advanced Life Support in Obstetrics (ALSO) program: fourteen years of progress. *Prehosp Disaster Med* 2005 ; 20: 271-5.
- [16] NHS Litigation Authority. CNST maternity clinical risk management standards 2005.
- [17] Sentinel Event #30 in Joint Commission for Accreditation of Healthcare Organizations Sentinel Event Alert Issue 30, 2004.
- [18] Inglis SR, Feier N, Chetiyaar JB, et al. Effects of shoulder dystocia training on the incidence of brachial plexus injury. *Am J Obstet Gynecol* 2011; 204: 322.e1-6.

Received: February 25, 2012

Revised: April 17, 2012

Accepted: May 15, 2012

© Tullar et al.; Licensee *Bentham Open*

This is an open access article licensed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0/>) which permits unrestricted, non-commercial use, distribution and reproduction in any medium, provided the work is properly cited.