

Effectiveness of Structured Training for Retention of Procedural Skill in Anesthesiology Resident

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Abstract

Purpose: Inadequate skills for procedures during residency can cause complications and needless interventions. Usually, there is lack of structured training for it. The aims were to improve and check for retention of procedural skill using structured training. **Methods:** Anesthesiology residents who had done less than 5 procedures underwent structured training followed by evaluation for retention of skill after intervening gap of two months. They were evaluated for 15 steps with each step given 1 point for step done and 0 for step not done. Overall score of 12/15 was considered as competent while score of less than 9/15 would imply need for improvement. Analysis of number of steps done by residents, number of attempts taken, duration taken, number of complications, number of procedures done in intervening period, number of times video, power point watched was done. Feedback from the residents was taken after every procedure. **Results:** 10 residents underwent training and came for retention testing. Number of attempts and duration of procedure reduced during retention phase for all. The skill improved during retention phase. Fewer residents felt they needed improvement. More residents were competent and confident, while fewer would need supervision and practice. Structured module was accepted and found good but wanted improvement of video with detailed labeling, more anatomy lecture and demonstrations. **Conclusion:** Structured training improved skill and can be effective for testing retention of skill.

Keywords: Structured training; Retention of skill; Clinical competence; Internship and Residency/Methods; Education; Models

Introduction

Inadequate skills for procedures during training in residents can cause complications and needless interventions. Usually, structured training that includes demonstration, assisting and then independent performance is not given before procedures are done by residents. Structured training can help in improvement and retention of skill and faster performance of procedure by residents. It can also lead to reduced morbidity and hence reduced interventions; hospital stays and costs thereby overall improvement in healthcare. After receiving structured training, skills may be retained thereby minimizing complications and enhancing confidence in them.^[1,2] It may lead to lifelong practice in anesthesia procedures like internal jugular vein (IJV) cannulation. Replication of structured training to other procedures can then be done. Studies stating retention of skills after structured training that may lead to lifelong practice are few. Structured training would improve procedural skills.^[3]

Aims and Objectives

Primary objective

To improve procedural (Internal jugular vein catheterization) skill amongst residents by giving structured training.

Secondary objective

To check for retention of procedural (internal jugular vein catheterization) skill and duration of procedure and number of attempts.

Methods

After Institutional Ethics Committee II of Seth G. S. Medical College and KEM Hospital, Parel, Mumbai 400012. Address: Department of Pharmacology and Therapeutics, 1st floor, college Building, Seth G. S. Medical College and KEM Hospital, Parel, Mumbai 400012 (Chairperson: Dr. Sangeeta Desai on 16 August 2016 (Ethical Committee EC/OA-102/2016).

Approval and consent, anesthesiology residents who had done less than 5 procedures (internal jugular vein catheterization), were enrolled in the non-randomized interventional study. Pregnant and pediatric patients undergoing non-elective gastroenterology surgery and needing internal jugular vein catheterization were excluded from the study. The study was done in a teaching hospital.

Sample size was complete enumeration method which meant that all residents in the period getting posting and gave consent were included.

10 residents underwent the structured training followed by

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How to Cite this Article: Shah PN, et al. Effectiveness of Structured Training for Retention of Procedural Skill in Anesthesiology Resident. *Ann Med Health Sci Res.* 2018; 8: 45-47

evaluation for retention of skill after a gap of two months. Evaluation and taking feedback from them was done after each procedure.

Structured training was divided as described. The skill check list, feedback, power point and video were evaluated and content validated by 5 faculty of the department. In the first week, baseline knowledge test with respect to anatomy and steps using skill check list was done. Using power point and video, the procedure was demonstrated and 2 procedures assisted to each resident. Power point and video of the steps of the procedure was shared with the residents. During weeks 2–4, the residents by rotation performed at least 2 procedures independently. The duration taken, attempts and complications like arterial puncture, hematoma formation, pneumothorax etc. were noted. If the resident was unable to do the procedure in 2 attempts, it was taken over by the faculty as routinely done.

During the intervening phase, in subsequent 2 months, resident noted down how many procedures were performed by them and how many times they had watched the power point and video. Evaluation was done by another faculty in that period for the procedures done by the resident.

They were evaluated as per the skill check list for 15 steps divided into 3 parts of the procedure viz professional, knowledge and technical ability of 5 points. Each step was given 1 point for step done and 0 for step not done. The total score was calculated for each procedure done by the resident. Score of 4/5 was satisfactory while less than 3/5 would imply need for improvement. Overall score of 12/15 was considered as competent while score of less than 9/15 would imply need for improvement.

For evaluation of retention of skill, the same residents, who had done less than three procedures during the intervening two months, were evaluated for at least two internal jugular vein catheterizations. Feedback from the residents was taken after every procedure assisted or performed by the resident.

Outcomes

Analysis of number of steps done by residents, number of attempts taken, duration taken, number of complications, number of procedures done in intervening period, number of times video, power point watched was done in training, intervening and retention phase of the study. Feedback from residents was evaluated from the comments regarding performance of procedure. Assessment for improvement from training phase to intervening and retention phase was done.

Statistics

Paired t-test was used to do the analysis. A p-value of <0.05 was considered statistically significant.

Results

As seen in Table 1, there was comparable gender distribution. 10 residents were there in training and came for retention

testing. Table 2 reveals about skill check list, wherein number of attempts and duration of procedure reduced during retention phase for all. The evaluation score improved during retention phase in all three parts of procedure via professional, knowledge and technical ability as seen in Table 3. Table 4 depicts about feedback with lesser residents felt they needed improvement after retention. Table 5 reveals ability of skill. More number of residents was found to be competent and confident after retention phase while fewer residents would need supervision and practice. Table 6 shows comments on structured module. Structured module was accepted and found good but wanted improvement of video with detailed labeling, more anatomy lecture and demonstrations.

Discussion

Structured training is usually not given to residents for procedures. They observe, assist and do procedure. The evaluation score improved during retention phase. In the feedback, lesser residents felt they needed improvement after retention. More number of residents was found to be competent

Table 1: Demographics.

Gender	Training	Retention	Total
Male	7	5	12
Female	8	8	16
Total	15	13	

Table 2: Skills.

Skill	Training	Retention	Diff	%
Attempts (Number)	1.39	1.16	0.23	16
Duration (minutes)	15	11.67	3.33	22

Table 3: Evaluation score.

Evaluation Score	Training	Retention	Diff	P value
Professional	4.49	4.77	0.28	0.42
Knowledge	4.17	4.57	0.4	0.27
Technical ability	3.94	4.57	0.63	0.09

Table 4: Feedback.

Feedback	Number	Training	Retention
Professional	Satisfactory	13	12
	Need Improvement	2	1
Knowledge	Satisfactory	13	13
	Need Improvement	2	0
Technical ability	Satisfactory	11	13
	Need Improvement	4	0

Table 5: Ability.

Ability	Training	Retention
Competent	1	3
Need Supervision	4	2
Need Practice	9	6
Confident	5	6

Table 6: Comments on structured module.

Comments on Structured Module	Training	Retention
Good	9	5
Video improvement	6	2
Demo more	1	0
Anatomy lecture	1	0
Technical ability improved	0	13

and confident after retention phase while fewer residents would need supervision and practice. Structured module was accepted and found good but improvement of video with detailed labeling, more anatomy lecture and demonstrations was desired. Although statistical significance was not seen in this study, clinical improvement was seen.^[4,5]

In a study done by Supe et al, laparoscopic skill retention was seen after short training program. Retention skill improved in 4/5 tasks. Skill sustains over time. Ongoing practice is advisable.^[2] Structured training on box trainers leads to better skills and improved confidence of residents with significant retention of skills. Incorporation of structured training with box trainers for laparoscopic skills into surgical training programs can be done.^[3] Knowledge and skills of in-service and pre-service nurses in pediatric CPR improved with training. However, the in-service nurses seemed to retain knowledge better with time than skills.^[6]

Factors affecting include retention interval, quality of original training and trainees' individual differences. Skill loss can occur with no practice and nonuse. Structured training may be applied for other procedures. It helps in improvement and retention of skill with faster performance of procedure. There is reduction in morbidity, interventions, hospital stays and costs with ultimately overall improvement in healthcare.

Limitations

The limitation of the study was small sample size and shorter intervention period. Further studies on this aspect would help to find gaps which can be bridged.

Conclusion

Internal jugular vein catheterization skill amongst residents improved and was retained by giving structured training. There was reduction in duration of procedure and number of attempts. Structured training improved skill can be effective for testing retention of skill and may be used for other procedures.

Conflict of Interest

All authors disclose that there was no conflict of interest.

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