



Exploring the surgical residents' experience of teaching and learning process in the operating room: A grounded theory study

Leila Sadati¹, Shahram Yazdani², Peigham Heidarpour³

Abstract:

BACKGROUND: Despite the development of valuable teaching methods and assessment tools in the field of surgery education, yet unpreparedness for independence practice by surgical residents remains a problem in most of the countries.

AIMS: This study aims to explain the surgical residents' experience of the teaching and learning process in the operating rooms in Iran.

MATERIAL AND METHODS: This study is a qualitative research that was done from May 2019 to June 2020 in Tehran and eight other cities in Iran. The selected methodology was constructivist grounded theory. The study setting was 11 teaching hospitals. Data were collected through 36 in-depth interviews and 132 h of observation. Participants were selected initially by purposive sampling and then by theoretical sampling for covering gaps and completing categories.

RESULTS: Findings showed that the confused educational system was the main concern of the residents' experience of the teaching and learning process in the operating room. This concern is investigated by dividing into four subcategories: Education in the shadow of treatment, inefficient education, patient safety versus trusting residents for independent practice, and unstructured assessment.

CONCLUSION: Based on residents' experience about challenges such as inefficient education, the influence of patient safety versus trusting residents for independent practice, and unstructured assessment, the surgical residents' education in the operating rooms needs to revise.

Keywords:

Grounded theory, operating room, surgical education, unstructured education

Introduction

Unpreparedness for independence practice by surgical residency remains a problem despite changes in curricula from apprenticeship to competency-based designs in general surgery discipline. The surgery resident training usually takes place in the operating room as a unique environment, full of critical and stressful conditions. The residents should acquire fundamental surgical skills while facing complex

conditions and interact with others.^[1,2] Due to the complexities and characteristics of the educational environment in the operating room, the education managers need to pay more attention to the recognition of surgical residents' learning needs, designing a structural education program, and providing a supportive learning culture.^[3] Nevertheless, many surgery residents do not have sufficient competency in graduation despite passing the course and gaining scores in periodic assessments and specialized board exams.^[4] Hence,

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Sadati L, Yazdani S, Heidarpour P. Exploring the surgical residents' experience of teaching and learning process in the operating room: A grounded theory study. J Edu Health Promot 2021;10:176.

¹Phd Candidate in Medical Education, Virtual School of Medical Education and Management, Shahid Beheshti University of Medical Sciences, Tehran, Iran, ²Professor of Orthopedics, Department of Medical Education, Virtual School of Medical Education and Management, Shahid Beheshti University of Medical Sciences, Tehran, Iran, ³Assistant Professor, Department of Community-Based Health Education, Virtual School of Medical Education and Management, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Address for correspondence:

Dr. Peigham Heidarpour, Assistant Professor, Department of Community-Based Health Education, Virtual School of Medical Education and Management, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
E-mail: peigham.heidarpour@yahoo.com

Received: 10-08-2020

Accepted: 12-09-2020

Published: 31-05-2021

identifying the challenges and factors associated with the lack of professional competence in the field of surgery and preparing graduates for independent work would be very valuable. Inattention to clinical experiences and factors contributing to the learning of these experiences can waste a great deal of time and energy, impose heavy financial burden on educational systems.^[5]

Studies have mentioned various factors such as differences in professors' views on the concept of autonomy and their insufficient support for the residents' independence, financial pressures in medical centers, regulations on working hours and changes in society's views and expectations from the health system as reasons for the lack of independence performance and competency in residents.^[6] Hence, it is necessary to review the design and implementation of surgery training programs and changes in teaching and assessment practices in an interactive environment.^[7] Undoubtedly, understanding the basics of learning theories in the surgical workplace, such as the community of practice and situational learning, would help surgical instructors to improve the learning climate, provide better learning experiences for young learners,^[8] and enhances resident's knowledge and surgical skills.^[9] Paying attention to the setting of initial educational goals, having feedback and efficient assessment methods, and applying effective teaching methods are among the most efficient new approaches in medical education.^[10] The emergence of new teaching models such as Zwisch's model and briefing, intraoperative teaching, debriefing (BID), and assessment tools such as O-SCORE and OSATS are following the continuation of international efforts to develop effective teaching and assessment methods in the field of surgery.^[11-15] Despite the development of educational models and efficient assessment tools, surgical residents in Iran and many countries are still in a stressful and competitive educational environment of the operating rooms.

Due to the unique characteristics of the structure and relationships in the operating room compared to other fields of clinical education, the identification of the challenges and ongoing processes and discovering the relationships in this educational environment, is possible only by conducting qualitative studies and explaining the experiences of learners involved in this process. In a qualitative research in Australia in 2015, Kieu *et al.* specified the challenges in the teaching-learning process in the operating room as communication problems, lack of structured training, the requirement to use briefing and debriefing techniques.^[16]

Therefore, to identify the challenges in the process of teaching and learning and its related issues in the general surgery program in Iran, the present qualitative

study was designed and conducted through in-depth interviews with residents who had experienced this situation.

Materials and Methods

Research question

How does the teaching and learning process of surgical residents work in the operating rooms in Iran?

Study design

This study is a qualitative research that was designed based on the grounded theory with Charmaz's constructivist approach.^[17]

Research setting and participants

The research setting included the operating rooms of eleven teaching hospitals in Tehran and eight other cities in Iran. In the beginning, the study samples were selected through convenience sampling. Based on inclusion criteria, participants with the following properties entered to study: At least 6 months of experience in the operating room as assistants and were undergoing surgical assistantship under the supervision of surgical preceptors. They also verbally agreed to be interviewed. Using the Snowball method and the introduction of other residents by the first two residents, several other interviews were conducted. It should be noted that several surgeons and the operating room staff were added to the research participants in the process of analyzing based on theoretical sampling for covering identified gaps in completing categories.

Data collection method

Data were collected in the study through 36 semi-structured interviews (25 face-to-face and 11 online cases) and 132 h of observation in the operating room (32 surgical patients) and review of documents available in the field of a surgical training program such as general surgery curriculum. The interviews were conducted in-person in Tehran and Karaj and other cities with the help of WhatsApp social network. The interviews lasted 25–45 min. Three participants were interviewed for the second time after analyzing the first interviews. The data in the observation method were collected by recording the researcher's voice in surgery fields. Simultaneously with data collection and analysis, the use of field notes and memo played a valuable role in identifying the residents' problems with the teaching and learning process in the operating rooms.

Data analysis

Data analysis was performed according to Charmaz's constructivist approach. The analysis process began with the transcription of interviews and observations and entered the MAXQDA software to facilitate the analysis

process. Then interviews were read line by line, and the initial open codes were extracted from them. These initial open codes were written in a subcategory in terms of notion and meaning. Gradually, the number of codes recorded was increased, and more diverse subcategories were created by the addition of each interview and observation. Then in the focus coding stage, researchers were classified subcategories under main categories. Finally, using constant comparison methods in the last stage of data analysis, the main categories corresponding to the explanation of surgical resident's experience of the process of teaching and learning in the operating rooms.

Validity and reliability of the study

The researchers used Cuba and Lincoln's five criteria of credibility, transferability, dependability, authenticity conformability to strengthen the data.^[18] Long-term engagement in a subject is an appropriate validation method. Another way to ensure the validity of findings is member checking. Hence, the researcher almost sent the transcribed interviews to interviewees through E-mail or WhatsApp to ensure correct transcribing and a similar understanding of the concepts. The use of the triangulation method in data collection, including interviews, observations, memos, field notes, and available documents, increased the validity of the study. To achieve the greater validity of findings, the sampling with a maximum variability (age, sex, marital status, operating rooms of various universities, and level of residency) was used to make more extensive data. Undoubtedly, the author's background in teaching and research in the field of the operating room and medical education contributed to the theoretical sensitivity and increased the validity of the study and the collected data. In addition to the above issues, peer review in monthly reporting provided appropriate and significant roles in the validity of the study.

Ethical considerations

The present paper is based on a Ph.D. thesis approved by the ethics committee of Shahid Beheshti University of Medical Sciences with the code of ethics (IR.SBMU.SME.REC.1398.057). In order to observe the ethical principles in conducting the research, researchers received verbal consent from all participants and were ensured that the interviewees' identities would be kept confidential, and their voice files will be deleted after the study.

Results

Finding the study showed, there were 33 participants in interviews, 25 of whom were residents, five were surgeons, and three were operating room nurses. Five residents were in level 1, five in level 2, six in level 3, six in level 4, and three of them were chief residents in level 5. Eighteen residents were male, and seven were

female. The average age of male and female residents was 36 ± 3.2 and 32 ± 2.3 , respectively. Furthermore, 16 residents were married, and nine were single.

There were 132 h of observation during 32 surgical procedures included one case of colostomy, two cases of varicose veins, one case of intestinal anastomose, one case of laparoscopic sigmoidectomy, two cases of ovarian cystectomy, one case of AVF, four cases of Appendectomy, two cases of Sleeve Gastrectomy, two cases of Mammoplasty, two cases of Diabetic foot debridement, five cases of Laparoscopic Cholecystectomy, three cases of Inguinal herniorrhaphy, three cases of Pilonidal sinus, one case of umbilical herniorrhaphy, one case of Whipple procedure, and one case of perianal abscess.

Findings showed that the confused educational system was the main concern of the residents in the process of teaching and learning in operating rooms. This primary concern includes four subcategories of education in the shadow of treatment, inefficient education, patient safety versus trusting residents for independent practice, and unstructured assessment.

Education in the shadow of treatment

The education system of Iran is in the shadow of treatment due to its close association with the health and treatment system. The noneducational consideration of residents in hospitals is a concern of the surgical assistant education program.

"It does not pay attention to residents' need for learning. Here, there are some works that we must do, to make patients prepared for surgery, and help them to get out of bed quickly after the operation. In the operating room, we must work fast to finish the operation. They do not ask whether you have learned the surgery or need further learning, or go to another room and learn that operation. It should not be like that." (R28 L3F)

Since there is a debate about the priority of treatment and income generation in hospitals, there is no correlation between the diversity and number of patients admitted with residents to provide the right time for residents to learn.

"Unfortunately, there is a view of the hospital, under which there is no difference between public and private hospitals. The hospital head and even the ministry expect that the public hospital should make money, so there is a need for a great number of operations to generate income. This decreases the quality of operation and education. It is a big problem, and I don't think it will ever be fixed." (R15 L2M)

Inefficient education

The lack of effective teaching methods, use of residents in teaching, and neglect of the curriculum in the training

programs of the surgical assistant course were some problems that were repeatedly done by the residents.

"We attend an operation, but nobody teaches us. If I could operate, I will teach students during the operation. I will explain what to do step by step for residents, so they can find out what happens in operation." (R12 L2F)

The neglect of educational purposes in the training program curricula for residents was also mentioned in interviews and observations.

"When your plan is dependent on everyday life and number and variety of patients, who wants to see what is written in the curriculum. Here, force and favoritism decide who learns and what is learned, not the Ministry curriculum." (R5 L2M)

On the other hand, the assignment of surgical teaching and education to residents, who are not practical and scientifically qualified enough, and giving the responsibility of education to subordinate residents due to stress and fatigue are other causes of inadequate education.

"We did not learn how to teach, and just learned it as the upper-grade residents said, and we transfer it to the lower grade residents, so we behave the same as they behaved, and do what they did." (R3 L3M)

Patient safety versus trusting residents for independent practice

Due to the concerns about patients' complaints, the surgeons seldom allow residents to perform independently without the presence of a surgeon. Especially in young attending, trust and independence for residents happen too late.

"In the case of an accident for patients, I must go to court. The social culture is in a way that they blame us for everything, so I cannot take the risk and allow a resident who cannot ligate a vessel well. We, ourselves, learned in the same way." (R23 L4M)

Unstructured assessment

Subjective and unqualified assessments were other educational system problems from the residents' views.

"Those who are very clever, write the list of operations in logbooks from the first to the last year, write whether they were added first or fourth or write they were present in operations in which they were not actually present, and then they delivered their logbooks." (R14 L3M)

A chief resident said: *"We have no certain training program. It is not known who with what number of operations goes to the year later. In fact, all residents promote, but if someone is stubborn, they may pull the rug from under him, and he may*

not promote. There is a theoretical promotion test; they study and undergo the test. If they gain the minimum score, they will be accepted and go to the upper-year regardless of clinical competency." (R11 L5M)

Discussion

Findings showed that the confused educational system was the main concern of the residents in the process of teaching and learning in operating rooms, which is discussed in this section.

The first subcategory of the main concern is education in the shadow of treatment. The education course is almost spent without planning and merely as filling shifts and helping the surgeons in the shadow of treatment. When the primary goal of hospitals is to generate income, then residents are only used as employees, and as they say, to facilitate the hospital procedure. Focus on hospital income affects the process of training and working hours of residents.^[6] Residents spend a lot of time doing things like recording and reporting that can also be done by nonphysicians. Moreover, the presence of fellows deprives residents of experience opportunities.^[19,20]

Inefficient education is the second subcategory. Training by residents who do not know about teaching methods, communication, and assessment skills, leads to dissatisfaction of senior and junior residents. However, unfortunately, most medical schools do not provide the necessary training for their students about these skills, and the residents are not ready for playing roles as clinical teachers.^[21] It is recommended that residents' curricula should include programs to prepare and qualify residents to provide teaching for peers and other learners in the field of medical education.^[22] There are challenges such as interaction with other specialists, education process, professional issues, and payment system in the education system.^[23]

Moreover, based on the results of this study, the teaching techniques used by surgical professors in the operating room, in many cases, lack effectiveness and proper organization. In this regard, Mutabdzic believes that the traditional methods of continuing education in training surgeons do not work anymore and need a careful review, and paying attention to new training strategies in the real environment of education.^[24] In a clinical trial study, Bonrath compared the routine surgical training methods with the implementation of a comprehensive and purposeful training program based on feedback on educational outcomes. The latter showed a higher rate and better quality. Residents in the comprehensive training group performed surgical techniques with less error, higher accuracy, and more skill.^[25]

Patient safety versus trusting residents for independent practice is another subcategory. Based on the results of a study, the surgeon, as a preceptor, considers postoperative outcomes, and patients' expectations in comparison to residents' learning. The same reasons have been stated by some other studies as factors limiting the autonomy of residents in practice.^[26] Furthermore, Hashimoto *et al.* state that as patient satisfaction is one of the top priorities of hospitals, there is always a conflict between giving independence to residents, maintaining patient safety and generating income, and avoid potential financial damages by residents.^[6]

An unstructured assessment is the last extracted subcategory. In addition to poor teaching, unappreciated assessment is seen in the present surgical residency educational system too. Based on results, the residents considered the logbooks as superficial programs and believed that most residents are promoted to upper levels even without filling the logbooks. Mandel believes that residency programs still rely on informal and subjective assessments based on the supervisors' views.^[26] Other studies also show that most of the tools developed in assessing the professional competence of surgeons are used in simulated operating rooms, and yet most evaluations in real operating rooms rely on the subjective assessment and judgment of preceptors.^[27] A variety of assessment methods are used in the training process of surgeons.^[28] Jonathan *et al.* believe that the use of structured assessment methods such as feedback and self-assessment in novice residents in laparoscopic learning will improve their skills.^[29] Therefore, at the same time with considering the use of effective teaching methods, objective, competency-based, and structured assessment methods should be used.^[30]

Conclusion

The confused educational system in training the surgical residents signifies that it is essential to revise the curriculum of surgery and establish a structured educational system by considering training and assessment in an interactive academic atmosphere to train competence surgeons.

Acknowledgments

The authors are grateful to the research deputy of Shahid Beheshti University of Medical Sciences for their scientific and ethical support (IR.SBMU.SME.REC.1398.057) operating room officials, professors, residents, and staff who participated in interviews without hesitation and with patience and openness and made it possible for researchers to be present in the operating rooms.

Financial support and sponsorship

This study was funded and supported by Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Conflicts of interest

There are no conflicts of interest.

References

1. Duclos A, Peix JL, Colin C, Kraimps JL, Menegaux F, Pattou F, *et al.* Influence of experience on performance of individual surgeons in thyroid surgery: Prospective cross sectional multicentre study. *BMJ* 2012;344:d8041.
2. Diwadkar GB, Jelovsek JE. Measuring surgical trainee perceptions to assess the operating room educational environment. *J Surg Educ* 2010;67:210-6.
3. Cogbill TH, Shapiro SB. Transition from training to surgical practice. *Surg Clin North Am* 2016;96:25-33.
4. George BC, Bohnen JD, Williams RG, Meyerson SL, Schuller MC, Clark MJ, *et al.* Readiness of US general surgery residents for independent practice. *Ann Surg* 2017;266:582-94.
5. Baraz S, Memarian R, Vanaki Z. Learning challenges of nursing students in clinical environments: A qualitative study in Iran. *J Educ Health Promot* 2015;4:52.
6. Hashimoto DA, Bynum WE 4th, Lillemoe KD, Sachdeva AK. See more, do more, teach more: Surgical resident autonomy and the transition to independent practice. *Acad Med* 2016;91:757-60.
7. Chen XP, Sullivan AM, Alseidi A, Kwakye G, Smink DS. Assessing residents' readiness for OR autonomy: A qualitative descriptive study of expert surgical teachers' best practices. *J Surg Educ* 2017;74:e15-21.
8. Lave J, Wenger E. *Situated Learning: Legitimate Peripheral Participation. (Learning in Doing: Social, Cognitive and Computational Perspectives)* Cambridge University Press; 1991.
9. Gandamihardja T.A.K., Nestel D. (2019) Communities of Practice and Surgical Training. In: Nestel D., Dalrymple K., Paige J., Aggarwal R. (eds) *Advancing Surgical Education. Innovation and Change in Professional Education*, vol 17. Springer, Singapore. https://doi.org/10.1007/978-981-13-3128-2_9.
10. Sachdeva AK. Acquiring and maintaining lifelong expertise in surgery. *Surgery* 2020;167:787-92.
11. Lyon P. A model of teaching and learning in the operating theatre. *Med Educ* 2004;38:1278-87.
12. DaRosa DA, Zwischenberger JB, Meyerson SL, George BC, Teitelbaum EN, Soper NJ, *et al.* A theory-based model for teaching and assessing residents in the operating room. *J Surg Educ* 2013;70:24-30.
13. Roberts NK, Williams RG, Kim MJ, Dunnington GL. The briefing, intraoperative teaching, debriefing model for teaching in the operating room. *J Am Coll Surg* 2009;208:299-303.
14. Schon DA. Educating the reflective practitioner: Toward a new design for teaching and learning in the professions. *Aust J Adult Learn* 2010;50:448-51.
15. El Boghdady M, Alijani A. Feedback in surgical education. *Surgeon* 2017;15:98-103.
16. Kieu V, Stroud L, Huang P, Smith M, Spychal R, Hunter-Smith D, *et al.* The operating theatre as classroom: A qualitative study of learning and teaching surgical competencies. *Educ Health (Abingdon)* 2015;28:22-8.
17. Charmaz K. *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis.* SAGE Publications Ltd; 1st Edition; 2006.
18. Guba EG, Lincoln YS. Competing paradigms in qualitative research. *Handbook of Qualitative Research.* Thousand Oaks, CA: Sage; 1994. p. 105-117.
19. Domaney NM, Torous J, Greenberg WE. Exploring the association between electronic health record use and burnout among psychiatry residents and faculty: A pilot survey study. *Acad Psychiatry* 2018;42:648-52.
20. Horst PK, Choo K, Bharucha N, Vail TP. Graduates of orthopaedic

- residency training are increasingly subspecialized: A review of the American Board of Orthopaedic Surgery part ii database. *J Bone Joint Surg Am* 2015;97:869-75.
21. Messman A, Kryzaniak SM, Alden S, Pasirstein MJ, Chan TM. Recommendations for the development and implementation of a residents as teachers curriculum. *Cureus* 2018;10:e3053.
22. Snell L. The resident-as-teacher: It's more than just about student learning. *J Grad Med Educ* 2011;3:440-1.
23. Mutabdzic D, Mylopoulos M, Murnaghan ML, Patel P, Zilbert N, Seemann N, *et al.* Coaching surgeons: Is culture limiting our ability to improve? *Ann Surg* 2015;262:213-6.
24. Ravaghi H, Nasiri A, Takbiri A, Heidari S. Status, role, and performance of emergency medicine specialists in Iran: A qualitative study. *J Edu Health Promot* 2020;9:224.
25. Bonrath EM, Dedy NJ, Gordon LE, Grantcharov TP. Comprehensive surgical coaching enhances surgical skill in the operating room: A randomized controlled trial. *Ann Surg* 2015;262:205-12.
26. Mandel LP, Lentz GM, Goff BA. Teaching and evaluating surgical skills. *Obstet Gynecol* 2000;95:783-5.
27. Vedula SS, Ishii M, Hager GD. Objective assessment of surgical technical skill and competency in the operating room. *Annu Rev Biomed Eng* 2017;19:301-25.
28. Evgeniou E, Peter L, Tsironi M, Iyer S. Assessment methods in surgical training in the United Kingdom. *J Educ Eval Health Prof* 2013;10:2.
29. Halim J, Jelley J, Zhang N, Ornstein M, Patel B. The effect of verbal feedback, video feedback, and self-assessment on laparoscopic intracorporeal suturing skills in novices: a randomized trial. *Surg Endosc* (2020). <https://doi.org/10.1007/s00464-020-07871-3>.
30. Hiemstra E, Kolkman W, Wolterbeek R, Trimboos B, Jansen FW. Value of an objective assessment tool in the operating room. *Can J Surg* 2011;54:116-22.