Survey of ICU Teaching Rounds: Secrets to Improve Learner Satisfaction

Jingyuan Xu

Zhongda Hospital, School of Medicine, Southeast University

Hui Chen

Zhongda Hospital, School of Medicine, Southeast University

Bo Xie

Zhongda Hospital, School of Medicine, Southeast University

Zhihao Zhou

Zhongda Hospital, School of Medicine, Southeast University

Zhendan Peng

Zhongda Hospital, School of Medicine, Southeast University

Yi Yang (✉ 13851417209@163.com)

Zhongda Hospital, School of Medicine, Southeast University

Research Article

Keywords: teaching patters, rounds, learners satisfaction

Posted Date: February 18th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-197997/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Survey of ICU teaching rounds: secrets to improve learner satisfaction

Jingyuan Xu, Hui Chen, Bo Xie, Zhihao Zhou, Zhendan Peng, Yi Yang

- 1) Jingyuan Xu, M.D., Jiangsu Provincial Key Laboratory of Critical Care Medicine, Department of Critical Care Medicine, Zhongda Hospital, School of Medicine, Southeast University, Nanjing, 210009, P.R., China. xujingyuanmail@163.com
- 2) Hui Chen, M.D., Jiangsu Provincial Key Laboratory of Critical Care Medicine, Department of Critical Care Medicine, Zhongda Hospital, School of Medicine, Southeast University, Nanjing, 210009, P.R., China. 15905162429@163.com
- 3) Bo Xie, Scientific research and education Department, Zhongda Hospital, School of Medicine, Southeast University, Nanjing, 210009, P.R., China. boxxie80@163.com
- 4) Zhihao Zhou, M.D., Emergency department, Zhongda Hospital, School of Medicine, Southeast University, Nanjing, 210009, P.R., China. xgg751116@126.com
- 5) Zhendan Peng, M.D., Anesthesiology department, Zhongda Hospital, School of Medicine, Southeast University, Nanjing, 210009, P.R., China. qianliuwang@163.com
- 6) Yi Yang, Jiangsu Provincial Key Laboratory of Critical Care Medicine, Department of Critical Care Medicine, Zhongda Hospital, School of Medicine, Southeast University, Nanjing, 210009, P.R., China. yiyiyang2004@163.com

Correspondence to:

Yi Yang, M.D., Ph.D, Department of Critical Care Medicine, Zhongda Hospital,
School of Medicine, Southeast University, Nanjing 210009, Jiangsu, China. E-mail:
yiyiyang2004@163.com

Phone: 00862583262550

This work should be attributed to: Department of Critical Care Medicine, Zhongda
Hospital, School of Medicine, Southeast University, Nanjing, 210009, P.R., China.

Abstract

Background: Unique challenges of teaching in the ICU come from the complexity of critically ill patients. This study was designed to examine the different teaching patterns and learners' emotion load to achieve learners satisfaction on rounds.

Methods: The survey of learners was performed on their practices and perceptions of rounds using social media.

Results: A total of 82 learners with 195 responses were received. Pathophysiology-based analysis on worsened conditions, problem-based teaching and feedback, discussion about past experience were top three teaching behaviors on rounds, in addition, interesting and storytelling presentation, and evidence-based medicine were significantly correlated with learner satisfaction. However, the learners still have the expectations for further improvement of some teaching behaviors. During rounding, tense, calm, nervous, relaxed and excited were the most top learners' emotions, only excited was significantly correlated with learners satisfaction.

Conclusions: Pathophysiology-based analysis on worsened conditions, problem-based teaching and feedback, discussion about past experience are top three teaching behaviors during the rounding, however, learners might be dissatisfied barely with these teaching patterns. Teachers should focus on key skills on rounds to enhance satisfaction.

Key words: teaching patterns, rounds, learners satisfaction

Background

Unique challenges of teaching in the ICU come from the complexity of critically ill patients, the limited time pressure, the diverse levels and professions of learners [1], while the critical care requires the attention and understanding of interdisciplinary team members such as fellows, residents, nurse to integrate the opinions. To overcome these hurdles, a scheduled moment for teams to share information and make decisions are important to improve patient safety and therapy efficiency on rounds [2].

Few studies focused on the high-impact teaching strategies on rounds [3], let alone on ICU rounds. Although learners preferred attendings who enjoyed teaching and demonstrated enthusiasm, stimulate clinical reasoning and critical thinking, treated members respectfully, only certain practices were associated with the outcomes of rounds. Daily checklists, goal setting, and clinician prompting were used frequently, but not associated with in-hospital mortality [4], with potential explanations of questionable care processes to specified patients. Little opportunity to impart clinical knowledge, and to elicit clinical reasoning on disease pathophysiology on goal setting by decrease time spent on teaching [5] urging teaching features with maximal impact in minimal time to achieve learners satisfaction. Meanwhile, as emotions experienced during training are associated with cognitive load and learning outcomes, it is important to investigate learners' emotion load on rounds.

This study was designed to examine the different teaching patterns and learners' emotion load to achieve learners satisfaction on rounds.

Methods

Setting

The survey was conducted in the intensive care unit of a tertiary teaching hospital with 4 districts, 73 beds. Informed consent was given by each participants in the questionnaire (See Supplementary material). All methods were carried out in accordance with relevant guidelines and regulations. The study protocol was approved by the Ethics Committee of Zhongda Hospital, School of Medicine, Southeast University.

Data collection

Investigators get permission from the doctors who in charge of the rounds to allow survey. Immediately after rounds concluded, Wenjuanxing, an online crowdsourcing platform in mainland China, which provides functions equivalent to Amazon Mechanical Turk, recruited participants from the WeChat groups. The term “learner” was used to broadly encompass all the types of learners, including fellows, residents, visiting doctors, medical postgraduate students. Learners were asked to share the top three experiences and emotions during the rounding episode, as well as the expectations of further improvement, and responding to each item using a Likert scale of one (strongly disagree) through four (strongly agree).

Items focused on learners satisfaction and strategies to improve rounds were built based on literature search and expert opinion. The items included (I) pathophysiology-based analysis on worsened conditions, (II) problem-based teaching and feedback, (III) discussion about past experience, (IV) interesting and storytelling

presentation, (V) evidence-based medicine, (VI) protocolized therapy on specific disease.

To assess emotion during rounding, descriptors of emotion were recorded, which were dichotomized into positive or negative, tense/calm, nervous/relaxed, stressed/serene, upset/contented, sad/happy, depressed/elated, lethargic/excited, and bored/alert.

Data analysis

Learner satisfaction was measured and averaged across the learners by the Likertscale.

Continuous variable with normal distribution was presented as mean $\pm$ standard deviation (SD), while skewed distribution was presented with median (interquartile range, IQR). Pearson correlations were performed between the frequencies of each teaching activity and learner satisfaction scores. The data were computerized and analyzed by IBM SPSS Statistic Package. A 2-tailed threshold of 0.05 was considered as statistical significance.

Results

A total of 82 learners were enrolled in 20 rounding episodes. Among the learner, the median age was 32 (26 - 35), 34 (41%) were males, 28 (34%) were postgraduate students, 72 (88%) working in the ICU less than ten years. Median overall learner satisfaction with teaching (Likert scale of 1 - 4) was 3. Baseline respondent characteristics are shown in Table 1.

Table 1. Baseline characteristics of learners

Baseline characteristics	Total (n = 82)
Age, years	32 (26 - 35)
Gender n, (%)	34 male (41)
Education (%)	
Bachelor degree	26 (32)
Master degree	21 (26)
Doctor's Degree	7 (9)
Postgraduate student	28 (34)
Type n, (%)	
Postgraduate student	18 (22)
Resident	14 (17)
Fellows	13 (16)
Visiting doctors	37 (45)
Major n, (%)	
Intensivist	56 (68)

Non-intensivist	26 (32)
Working experience in ICU, years	
<1	35 (43)
2-10	37 (45)
>10	10 (12)
Overall learner satisfaction with teaching	3 (2 - 4)
(Likert scale of 1 - 4)	

ICU, intensive care unit

Nine attending doctors who in charge of the rounds were enrolled, the median age was 40 (39 - 45), 4 (44%) were males, all of them working in the ICU for more than ten years. Among patients, 42% of them were critically ill patients who need multi-disciplinary team discussions, the median Acute Physiology and Chronic Health Evaluation II score was 21 (17- 25).

A total of 195 responses were received. Top three experiences and expectations on the rounding episode are shown in Table 2.

Table 2. Correlation between teaching behaviors and learner satisfaction with teaching

Teaching behaviors on rounds (n= 195 responders)	Frequency	Correlation	<i>p</i> value	Degree (Likert scale of 1 - 4)	Correlation	<i>p</i> value
Pathophysiology-based analysis on worsened conditions	170 (87)	0.075	0.295	4 (3 - 4)	0.305	0.000
Problem-based teaching and feedback	120 (62)	0.210	0.003	3 (1 - 4)	0.332	0.000
Discussion about past experience	109 (56)	0.140	0.051	3 (1 - 4)	0.247	0.001
Interesting and storytelling presentation	43 (22)	0.185	0.010	1 (1 - 3)	0.178	0.013
Evidence-based medicine	30 (15)	0.166	0.020	1 (1 - 1)	0.210	0.003
Protocolized therapy on specific disease	25 (13)	0.099	0.167	1 (1 - 1)	0.134	0.062
Total behaviors in rounding	2 (2 - 3)	0.295	0.000	2 (1 - 3)	0.353	0.000
Behaviors need further improvement	Frequency			Degree		
Pathophysiology-based analysis on worsened conditions	53 (27)			4 (3 - 4)		
Problem-based teaching and feedback	73 (37)			3 (1 - 4)		
Discussion about past experience	69 (35)			3 (1 - 4)		
Interesting and storytelling presentation	53 (27)			1 (1 - 3)		
Evidence-based medicine	44 (23)			1 (1 - 1)		

Protocolized therapy on specific disease	37 (19)	1 (1 - 1)
--	---------	-----------

Pathophysiology-based analysis on worsened conditions, problem-based teaching and feedback, discussion about past experience are top three teaching behaviors during the rounding (Figure 1. A), however, problem-based teaching and feedback, interesting and storytelling presentation, and evidence-based medicine were significantly correlated with learner satisfaction. Moreover, the learners still have the expectations for further improvement of some teaching behaviors, eg. pathophysiology-based analysis on worsened conditions, problem-based teaching and feedback, discussion about past experience (Figure 1. B).

Figure 1. Experiences and expectations on teaching behaviors. A. Frequency and degree of teaching behaviors on rounds. B. Expectations for further improvement of teaching behaviors.

Item are as follows: (I) pathophysiology-based analysis on worsened conditions, (II) problem-based teaching and feedback, (III) discussion about past experience, (IV) interesting and storytelling presentation, (V) evidence-based medicine, (VI) protocolized therapy on specific disease.

Learners' emotion during rounding are shown in Table 3. Tense, calm, nervous, relaxed and excited were the most top learners' emotions during rounding. Only excited was significantly correlated with learners satisfaction.

Table 3. Learners' emotion during rounding

Learners' emotion on rounds (n= 195 responders)	Emotion, n (%)	Correlation	p value
Tense	144 (74)	0.030	0.678

Calm	78 (40)	-0.132	0.065
Nervous	67 (34)	0.019	0.794
Relaxed	65 (33)	-0.128	0.075
Excited	65 (33)	0.244	0.001
Stressed	61 (31)	0.019	0.796
Upset	22 (11)	-0.013	0.857
Depressed	4 (2)	0.002	0.983
Serene	0 (0)	-	-
Lethargic	0 (0)	-	-
Sad	0 (0)	-	-
Happy	0 (0)	-	-
Elated	0 (0)	-	-
Contented	0 (0)	-	-
Bored	0 (0)	-	-
Alert	0 (0)	-	-

Discussion

Critical care rounds are quite complex and baffling. Integrating a myriad of information, applying 'classroom' knowledge and rationalizing data to clinical situation, in order to reach a logical explanation and treatment plan are challenging for learners. Therefore, teaching in rounds are quite important, however, studies showed that more than half of the learners were dissatisfied with teaching [3], implying that ineffective teaching is common, and there would be substantial room to improve the teaching strategies during rounds.

Many papers summarize different tips to improve teaching during rounds [6-12], which offer strategies creating structured rounding system, or with clear delineation of expectations. However, previously described teaching models have been built based on expert opinion, surveys of excellent clinical teachers. Feelings between teachers and learners might vary widely. Although teachers try to actively engage learners, promoting bidirectional communication and getting positive feedback in Chinese is hard [13-15].

We aimed to hit what teaching behaviors and emotion load could correlate with high learner satisfaction, and found pathophysiology-based analysis on worsened conditions, problem-based teaching and feedback, discussion about past experience are top three teaching behaviors on rounds, in addition, interesting and storytelling presentation, and evidence-based medicine were significantly correlated with learner satisfaction. However, the learners still have the expectations for further improvement of some teaching behaviors.

Studies showed that emotions experienced during training are associated with cognitive load and learning outcomes [16-17], which are consistent with the psychology studies on the effects of emotion on task performance [18-20]. We investigated emotions during rounding, and found tense, calm, nervous, relaxed and excited were the most top learners' emotions, only excited was significantly correlated with learners satisfaction.

This study has some limitations. Firstly, this was a single-center study of one group of learners during short time, which limits the generalizability of the findings. Teaching patterns might vary based on the level of learners. Secondly, the learners were asked to assess satisfied teaching patterns and emotion load during rounds subjectively, and teaching behaviors were identified whether correlated with learner satisfaction, the actual learning effectiveness was not measured objectively.

Conclusion

Pathophysiology-based analysis on worsened conditions, problem-based teaching and feedback, discussion about past experience are top three teaching behaviors during the rounding, however, learners might be dissatisfied barely with these teaching patterns.

Teachers should focus on key skills on rounds to enhance satisfaction.

Declarations

Ethics approval and consent to participate

All methods were carried out in accordance with relevant guidelines and regulations. The study protocol was approved by the Ethics Committee of Zhongda Hospital, School of Medicine, Southeast University. Informed consent was given by each participants in the questionnaire.

Consent for publication

Not applicable

Availability of data and materials

All data generated or analysed during this study are included in this published article.

Competing interests

The authors declare that they have no competing interests.

Funding

This work is partially supported by grants from the National Natural Science Foundations of China (81501705, 81571874, 81930058, 81671892, 81971888), grants from the Scientific Research Foundation of Graduate School of Southeast University (YBPY1604), grants from the Jiangsu Provincial Medical Youth Talent (QNRC2016808). This work is partially supported by grants from the Jiangsu Provincial Special Program of Medical Science (BE2018743, BE2019749), grants from Ministry of Science and Technology of China (2020YFC0843700), grants from

Jiangsu Provincial Medical Priority Majors (ZDXKA2016025). This work was supported by Key Research and Development Plan of Jiangsu Province (BE2018743 and BE2019749), Natural Science Foundation of Jiangsu Province (BK20200367).

Authors' contributions

JYX carried out the analysis and interpretation of data and participated in drafting, editing and submitting the manuscript. HC and ZHZ carried out the analysis and interpretation of data and participated in drafting the manuscript. BX and ZDP carried out the analysis and interpretation of data, YY was responsible for conception and design, and revising the manuscript for important intellectual content. All authors read and approved the final manuscript.

Acknowledgements

Not applicable

Reference

1. Santhosh L, Brown W, Ferreira J, Niroula A, Carlos WG. Practical tips for ICU bedside teaching. *Chest* 2018;154(4):760-776.
2. Amaral ACKB, Vincent JL, Rose L, Mikkelsen ME, Webb S, Ramos GV, Pinto R, Salluh J. An international perspective on the frequency, perception of utility, and quality of interprofessional rounds practices in intensive care units. *J Crit Care*. 2020;55:28-34.
3. Frank W Merritt, Melissa N Noble, Allan V Prochazka, Eva M Aagaard, Chad R Stickrath. Attending rounds: What do the all-star teachers do? *Med Teach* 2017;39(1):100-104.
4. Writing Group for the CHECKLIST-ICU Investigators and the Brazilian Research in Intensive Care Network (BRICNet), Cavalcanti AB, Bozza FA, Machado FR, Salluh JI, Campagnucci VP, Vendramim P, Guimaraes HP, Normilio-Silva K, Damiani LP, Romano E, Carrara F, Lubarino Diniz de Souza J, Silva AR, Ramos GV, Teixeira C, Brandão da Silva N, Chang CC, Angus DC, Berwanger O. Effect of a quality improvement intervention with daily round checklists, goal setting, and clinician prompting on mortality of critically ill patients: a randomized clinical trial. *JAMA* 2016;315(14):1480-1490.
5. Carlos WG, Kritek PA, Clay AS, Luks AM, Thomson CC. Teaching at the bedside. Maximal impact in minimal time. *Ann Am Thorac Soc* 2016;13(4):545-548.

6. Hayes MM, Chatterjee S, Schwartzstein RM. Critical thinking in Critical Care: Five strategies to improve teaching and learning in the intensive care unit. *Ann Am Thorac Soc* 2017;14(4):569-575.
7. Kassutto S, Seam N, Carlos WG, Kelm D, Kaul V, Stewart NH, Hinkle L. Twelve tips for conducting successful interprofessional teaching rounds. *Med Teach*. 2020;42(1):24-29.
8. Paul A Bergl, Rose M Franco, Jayshil J Patel, Marium Khan, Kathlyn E Fletcher, Rahul S Nanchal. Impact of fellows-as-teachers workshops on teaching rounds: an observational study in an ICU. *Crit Care Explor* 2020;2(10):e0235.
9. Peter M Dodek, Janet Raboud. Explicit approach to rounds in an ICU improves communication and satisfaction of providers. *Intensive Care Med* 2003;29(9):1584-1588.
10. Siddiqui S. 'Think-aloud' protocol for ICU rounds: an assessment of information assimilation and rational thinking among trainees. *Med Educ Online*. 2014;19:25783
11. Segall N, Bennett-Guerrero E. ICU Rounds: "What we've got here is failure to communicate". *Crit Care Med* 2017;45(2):366-367.
12. Cao V, Tan LD, Horn F, Bland D, Giri P, Maken K, Cho N, Scott L, Dinh VA, Hidalgo D, Nguyen HB. Patient-centered structured interdisciplinary bedside rounds in the Medical ICU. *Crit Care Med* 2018;46(1):85-92.
13. Liu JL, Harkness S, Super CM. Chinese mothers' cultural models of children's shyness: ethnotheories and socialization strategies in the context of social change. *New Dir Child Adolesc Dev* 2020;2020(170):69-92.

14. Balkaya M, Cheah CSL, Yu J, Hart CH, Sun S. Maternal encouragement of modest behavior, temperamental shyness, and anxious withdrawal linkages to Chinese American children's social adjustment: a moderated mediation analysis. *Soc Dev* 2018;27(4):876-890.
15. Liu J, Bowker JC, Coplan RJ, Yang P, Li D, Chen X. Evaluating links among shyness, peer relations, and internalizing problems in Chinese young adolescents. *J Res Adolesc* 2019;29(3):696-709.
16. Fraser K, Ma I, Teteris E, Baxter H, Wright B, McLaughlin K. Emotion, cognitive load and learning outcomes during simulation training. *Med Educ* 2012;46(11):1055-1062.
17. Fraser K, Huffman J, Ma I, Sobczak M, McIlwrick J, Wright B, McLaughlin K. The emotional and cognitive impact of unexpected simulated patient death: a randomized controlled trial. *Chest* 2014;145(5):958-963.
18. Darke S. Effects of anxiety on inferential reasoning task performance. *J Pers Soc Psychol* 1988;55(3):499-505.
19. Sorg BA , Whitney P. The effect of trait anxiety and situational stress on working memory capacity. *J Res Pers* 1992; 26 (3): 235 - 241 .
20. Isen AM , Daubman KA , Nowicki GP. Positive affect facilitates creative problem solving. *J Pers Soc Psychol* 1987; 52 (6): 1122 - 1131.

Figures

Figure 1

Experiences and expectations on teaching behaviors. A. Frequency and degree of teaching behaviors on rounds. B. Expectations for further improvement of teaching behaviors.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Supplementarymaterial.pdf](#)