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Debriefing or Feedback: Exploring the Impact of Two Post-Scenario Discussion Methods in the Acquisition and Retention of Non-Technical Skills

Debriefing ou Feedback: Estudo Exploratório do Efeito de Dois Métodos de Discussão Pós-Cenário na Aquisição e Retenção de Competência Não-Técnicas

Carla SÁ-COUTO✉[1,2], Diana RODRIGUES[1,3], Marcos GOUVEIA[1,4,5]
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ABSTRACT

Introduction: There is a paucity of quantitative studies objectively comparing debriefing and feedback as methods for post-scenario discussion and its impact on healthcare teams' acquisition and retention of non-technical skills. The main purpose of this study is to provide some insight on this research question, using a sample of medical students. A secondary objective explores students' opinion and preference on the post-scenario discussion.

Material and Methods: Forty-five medical students were distributed among 15 teams, and randomly allocated to two groups. Each team participated in three different simulated scenarios, with similar levels of difficulty and opportunities to apply specific non-technical skills: leadership, communication, and task management. To assess the acquisition and retention of skills, scenarios occurred on days one (baseline), two (acquisition) and 20 (retention). Team performance was objectively evaluated by an observer, using scenario recordings. Students individually assessed different aspects of debriefing and feedback.

Results: Both debriefing and feedback groups showed similar overall increase in objective scores, with significant increase between days one and two (acquisition), and a smaller increase between days two and 20 (retention). Students indicated debriefing as the preferred discussion method.

Conclusion: Debriefing and feedback are effective post-scenario discussion methods, promoting acquisition and retention of non-technical skills, by undergraduate students. Allying debriefing reflexive practice with feedback directive style, and shifting appropriately between facilitation and instruction, can be a good compromise to achieve a timely and educationally meaningful discussion.

Keywords: Clinical Competence; Formative Feedback; Patient Care Team; Simulation Training; Students, Medical

RESUMO

Introdução: Há uma escassez de estudos quantitativos comparando objetivamente o *debriefing* e o *feedback* como métodos de discussão pós-cenário e o seu impacto na aquisição e retenção de competências não-técnicas pelas equipas de saúde. O objetivo principal deste estudo é explorar esta questão de investigação, usando uma amostra de estudantes de medicina. Adicionalmente, foi analisada a opinião e preferência dos estudantes sobre o método de discussão pós-cenário.

Material e Métodos: Quarenta e cinco estudantes de medicina foram distribuídos em 15 equipas e alocados aleatoriamente a dois grupos. Cada equipa participou em três cenários de simulação diferentes, com níveis de dificuldade semelhantes e as mesmas oportunidades para aplicar as seguintes competências não-técnicas específicas: liderança, comunicação e gestão de tarefas. Para avaliar a aquisição e retenção de competências, os cenários decorreram nos dias um (linha de base), dois (aquisição) e 20 (retenção). O desempenho de cada equipa foi avaliado objetivamente por um observador, através da análise das gravações dos cenários e de uma *checklist*. Os estudantes foram ainda convidados a avaliar individualmente a condução do *debriefing* e do *feedback*.

Resultados: Ambos os grupos (*debriefing* e *feedback*) demonstraram um incremento semelhante nas pontuações objetivas, com um aumento acentuado entre os dias um e dois (aquisição) e um aumento ligeiro entre os dias dois e 20 (retenção). Os estudantes indicaram o *debriefing* como método de discussão preferencial.

Conclusão: O *debriefing* e o *feedback* são métodos eficazes de discussão pós-cenário, promovendo a aquisição e retenção de competências não-técnicas por estudantes pré-graduados. A aliança da prática reflexiva do *debriefing* com o estilo diretivo de *feedback*, alternando apropriadamente entre facilitação e instrução, é um compromisso aceitável para alcançar uma discussão educacionalmente significativa num tempo limitado.

Palavras-chave: Competência Clínica; Equipas de Cuidados ao Doente; Estudantes de Medicina; Feedback Formativo; Simulação Realística

INTRODUCTION

Reports from the Institute of Medicine,[1,2] the National Health System,[3] and other more recent publications,[4-6] attribute 70% to 80% of the errors in patient care to poor non-technical skills (NTS), namely lack of communication, leadership, task management skills, among others. These reports and publications also have clear recommendations on the use of simulation to promote patient safety.

Simulation based medical education (SBME) can provide a supportive educational environment,[7,8] allowing users to practice and develop skills without any discomfort or risk to real patients.[9] It encourages the acquisition of technical and non-technical skills through experience, ideally in a realistic situation or environment, and can stimulate reflection on performance.[10] If correctly planned, scheduled, implemented and evaluated, it allows knowledge, skills and attitudes/behaviours to be acquired in a safe, educationally

1. Biomedical Simulation Center. Faculty of Medicine. University of Porto. Portugal.
2. CINTESIS@RISE. Community Medicine, Information and Decision Sciences Department. Faculty of Medicine. University of Porto. Portugal.
3. Serviço de Anestesiologia. Centro Hospitalar e Universitário de São João. Porto. Portugal.
4. Department of Surgery and Physiology. Faculty of Medicine. University of Porto. Portugal.
5. CUF Porto Hospital. Porto. Portugal.
✉ **Autor correspondente:** Carla Sá-Couto. csacouto@med.up.pt
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orientated and efficient manner.[11-13]

A typical simulation session includes three stages: briefing, scenario and debriefing/feedback[14]:

1. Briefing. Provides the ground for the simulated experience and promotes the engagement of the trainee(s). Briefing the room, equipment, and the simulation process (including debriefing/feedback) is essential for a valuable learning experience.
2. The scenario. Consists in the actual performance of a trainee or trainees in a specific simulated situation. It can range from basic settings for individual technical skills training to immersive environments for team training.
3. Debriefing or feedback. These remain fundamental and essential elements of simulation-based training or any learning process.[15] It allows the trainees to reflect on their performance, create new frames that will modulate new actions and improve future performance.[16,17]

Traditionally, there are considerable differences between debriefing and feedback, although an effort has been made by the community of medical educators to develop a common framework.[18,19] Yet these terms are still widely used, many times as synonyms, despite their different meanings and aimings.[20]

For the sake of clarity, in this paper we will consider feedback and debriefing defined as follows. Feedback is a type of formative assessment, based on direct observation of the learner in a specific learning environment. Feedback provides specific information on the comparison between a trainee observed performance and a standard, and conveys with the intent to improve/enhance the performance of trainees. Feedback can follow different structures,[21] being one of the most used the Pendleton model.[21-23] In this model, there is a structured dialogue between an instructor and trainee(s), initially pointing out the positive aspects and afterwards emphasizing the aspects to improve/modify. Although trainees contribute to the dialogue, this is viewed as a unidirectional flow of information to the trainee.[20] Typically, formative feedback takes between five to 20 minutes, and can be applied to technical and non-technical skills training.[21-24]

Debriefing is an assembly of participants and facilitator(s) in which a recent event can be recalled, analysed, and reflected upon in order to agree on future practice changes. There are several debriefing models, with most being built-on a three-phase structure: reaction/description, understanding/analysis, and application/summary.[25] This methodology provides the participants with the opportunity to explore and reflect on what happened in a previous event, reinforcing correct behaviours/attitudes, and identifying/exploring aspects that could have been done differently. The self-assessment promotes a deep reflection on the frames behind actions,[16] encouraging changes in future performance, and potentially transferability of new behaviours/attitudes to clinical practice.[17] This process is typically conducted by a facilitator, lasting 20 to 40 minutes,[26-28] and is mostly applied in NTS training.[13,17] Other formats of debriefing[20] (e.g. within-event; self-guided) are out of the scope of this paper and will not be considered.

In the context of team training in simulated emergency scenarios, debriefing is commonly used as a post-scenario discussion method. However, there is a paucity of quantitative studies objectively measuring its impact on the acquisition and retention of NTS, and its comparison with feedback. The main purpose of this study is to provide some insight on this research question, using quantitative data collected from a sample of undergraduate medical students. A secondary objective is to explore students' individual opinion and preference on the post-scenario discussion method.

MATERIAL AND METHODS

Participants

The target population of this study was undergraduate medical students of the Faculty of Medicine of the University of Porto, in Portugal. The recruitment was restricted to fifth year students, with no prior simulation experience. None of the students had prior professional or academic experience in healthcare. Students were invited to voluntarily register in the study, through announcements and posters from the student association. Only registered students comprised the sample of this study. Demographic information of the students was collected at registration.

Study design

This longitudinal double-blinded randomized control study was carried-out at the Biomedical Simulation Center of the Faculty of Medicine, University of Porto. The Ethics Committee of our institution approved the study and written informed consent was obtained from all participants before the study.

One-week prior to the study, the 60 registered participants received relevant support material on technical and non-technical skills required for an adequate resolution of a medical emergency.

Of the 60 registered students, 45 attended day zero. These 45 students received information and clarifications on the study and an informed consent form to read and sign. The objective of the study was blinded to participants, including the assessment of NTS and the comparison between feedback and debriefing. On this day, the 45 participants received a two-hour theoretical session on NTS and on the ABCDE approach to the critical patient, followed by a half-hour briefing of the simulation room, equipment, and

simulation process.

Students were arbitrarily allocated to 15 teams (three elements each) that were randomly assigned to one of the two groups: Group 1 (eight teams) and Group 2 (seven teams). Each team participated in three different emergency scenarios with similar difficulty and opportunities to apply the selected NTS.

To assess acquisition and retention of the skills, the scenarios occurred on day one (baseline), day two (acquisition) and day 20 (retention).

Group 1 received feedback after the first two scenarios and Group 2 received debriefing. After the third scenario the discussion method was swapped, so that all participants could experience both types of post-scenario discussion.

The detailed study protocol is graphically represented in Fig. 1.

NTS selection

Three NTS were selected to be assessed: collaborative leadership, effective communication, and task management. This selection was based on the relevance of these NTS, as pointed out in several publications,[4-6] and on its potential to easily be identified and objectively measured (counted) throughout the scenario. For each NTS, two to four specific behaviors/actions were defined, as specified on Table 1.

Scenario, debriefing, and feedback considerations

Each team participated in three distinct emergency scenarios with similar challenges and opportunities to apply the selected technical skills (ABCDE approach) and NTS (collaborative leadership, effective communication, and task management). The leadership role was experienced by all team members, through rotation of the three elements of each team, in the three scenarios. All scenarios were designed to have a duration of approximately 15 minutes.

Debriefing/feedback followed a standardized structure to avoid bias and to ensure that the approach to all teams was similar. Two teams, with two experienced facilitators each, conducted the scenario and provided debriefing or feedback to each group. The same team provided all debriefings or all feedbacks, avoiding bias due to personality or style of the facilitators. Each team of facilitators was encouraged to follow, during debriefing or feedback, an orientation grid with specific indications and suggestion of questions, to ensure a standard structure among all groups throughout all days [Appendix 1 - Tables S1 and S2 (Appendix 1: https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/16898/Appendix_01.pdf)]. Both debriefing and feedback focused on the NTS selected for this study, although other skills (technical and non-technical) could be discussed, depending on the teams' educational needs.

Assessment

Teams' objective evaluation

Scenarios were recorded and subsequently evaluated, considering team rather than individual performance. The evaluation was made by an experienced and independent observer, blinded to the study, who used the scenario recordings to assess the number of times each NTS was properly applied. For that, the observer used the previously defined behaviours/actions and counted the times each team exhibited them. The total score is the sum of all adequate behaviours/actions of a team in a scenario. Total scores were obtained for each study group (debriefing and feedback), and for each day of study (days one, two and 20).

It is important to bear in mind that exchanging the discussion method after scenario three has no influence in the assessment measures, as the recordings reflect team performance before post-scenario discussion (debriefing or feedback). As illustrated in Fig. 1, day one was considered the baseline, and days two and 20 represent the team performance after receiving the same discussion type twice (either feedback or debriefing).

Individual evaluation of the post-scenario discussion

On the last day of the study (day 20), after debriefing or feedback, all participants evaluated individually the post-discussion type, considering four specific aspects: 1) Felt involved in the discussion, 2) Clear and objective discussion, 3) Adequate duration, and 4) Good use of time, using a 5-point Likert scale. The preferred method was also questioned.

Statistical analysis

Statistical analysis was conducted using IBM SPSS Statistics® software, version 24.0. Both descriptive and inferential analyses were performed. Considering the reduced sample size, non-parametric tests were used, considering a significance level of 5%.

To evaluate the differences between the three days of the study, intra- and inter-groups comparisons were carried out. Wilcoxon signed rank test (unilateral) was used to compare intra-group mean rank increases between day one and day two (acquisition), and day two and day 20 (retention). Mann-Whitney U test was used to compare the mean rank differences between the two groups, for each day and study variable.

RESULTS

The study sample consisted of 45 medical students (fifth year), 11 male and 34 female, with mean age of 23 ± 5 years.

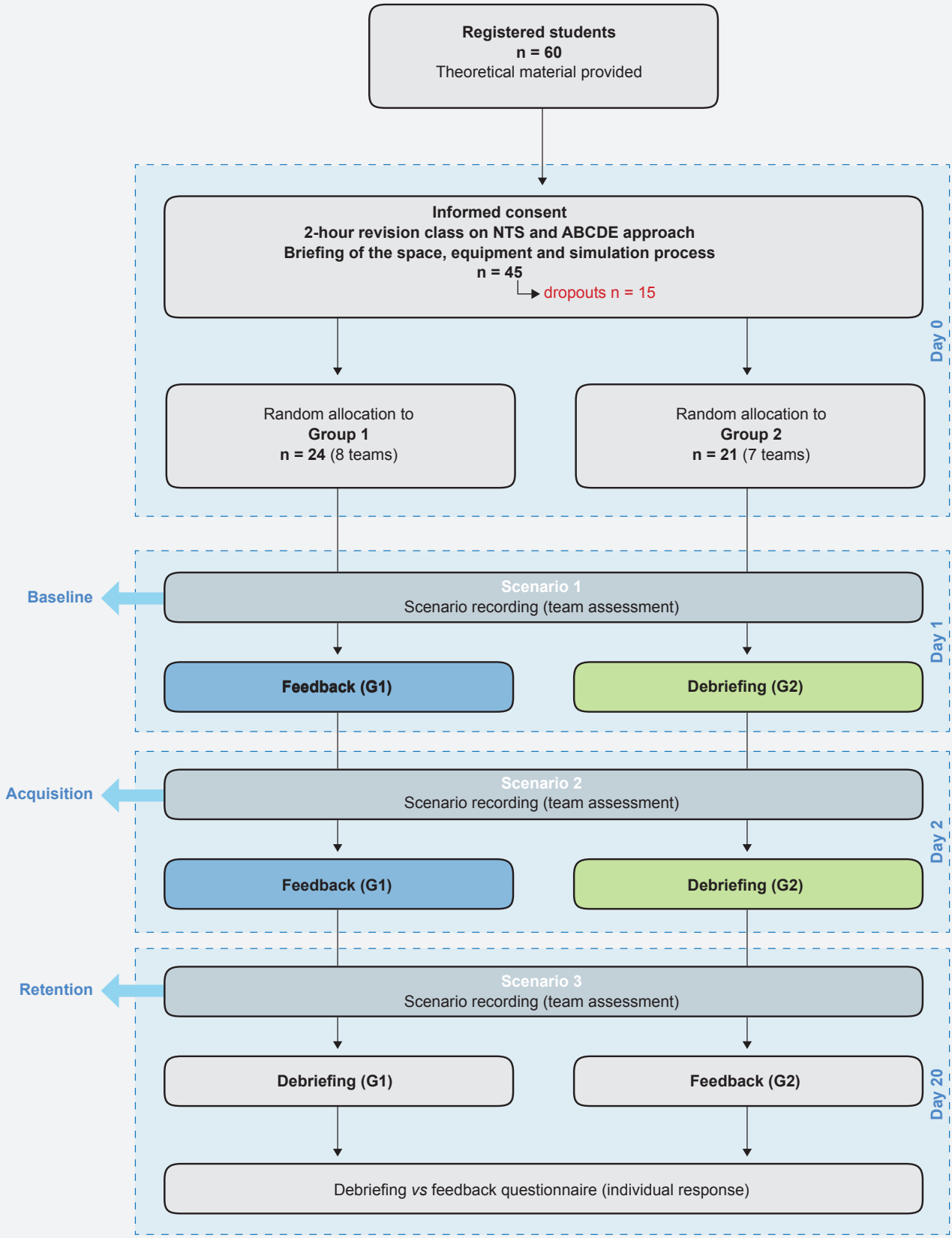

Figure 1 – Flow diagram of the study protocol

Table 1 – Selected non-technical skills (NTS) and specific behaviours/actions

NTS	Behaviour/action
Collaborative leadership	Feedback to team leader
	Offer and/or acknowledge help
Effective communication	Clear verbalization of the task/request
	Direct orders/tasks by using names or tactile/visual contact
	Close-loop communication
	Structured communication (iSBAR[a])
Task management	Use of all available resources[b]
	Adequately distributing tasks among team members (avoiding overload)

iSBAR[a]: identification, situation, background, assessment and recommendation/request;
[b]: For each scenario, specific resources were identified. Most resources were common to all scenarios (e.g. monitor, telephone, etc), although a few were specific (e.g. patient relative).

Teams' objective evaluation scores

The teams' objective evaluation scores increased remarkably between day one and day two, in both groups for all NTS (Table 2). Similarly, between day two and day 20, all scores increased, except for the leadership score, which decreased in both groups. Statistically significant differences were observed between days one and two, for all variables, and between days two and 20 for leadership (both groups), communication (debriefing group), and task management (debriefing group).

Overall objective scores showed a mean increase between days one and 20 of 88.3% and 82.6% for the debriefing and feedback group, respectively. For both groups (feedback and debriefing), a statistically significant overall increase was observed between days one and two (acquisition), with no significant differences between days two and 20 (retention) (Fig. 2).

No significant differences were observed in the intergroup scores (debriefing and feedback), on any variables or days of the study (Mann Whitney U test, $p > 0.05$).

Individual evaluation of the post-scenario discussion

Feedbacks had an average duration of 15 minutes (SD: 3 minutes) and debriefings of 25 minutes (SD: 4 minutes). The participants' assessment on specific aspects of post-scenario discussions was highly positive, for both types of discussion. Most participants agreed or completely agreed that they felt involved in the discussion (Debriefing - 98%, Feedback - 87%), that the discussion was clear and objective (Debriefing - 96%, Feedback - 100%), with adequate time (Debriefing - 87%, Feedback - 87%), and a good use of time (Debriefing - 98%, Feedback - 96%).

Thirty-one students (70%) selected debriefing as their preferential post-scenario discussion method.

DISCUSSION

This study explored the impact of debriefing and feedback, as post-scenario discussion methods, on the acquisition and retention of non-technical skills, using a sample of medical students. A secondary objective explored students' preferred discussion method.

Both debriefing and feedback showed to be equally beneficial in the acquisition and retention of NTS. The teams' objective scores showed, for both methods, a statistically significant increase in the number of adequate behaviours/actions from day one to day two (acquisition), and a

Table 2 – Teams' objective scores (Mean ± SD) for the selected NTS

NTS		Day 1	Day 1 to Day 2 variation	Day 2	Day 2 to Day 20 variation	Day 20
Leadership	G1 (Fe)	6.43 ± 2.31	+ 35.6%*	8.71 ± 1.79	- 27.0%*	6.86 ± 2.01
	G2 (De)	5.57 ± 1.33	+ 67.5%*	9.33 ± 2.70	- 25.6%*	7.43 ± 3.09
Communication	G1 (Fe)	11.42 ± 3.46	+ 81.3%*	20.71 ± 4.41	+ 17.7%	24.38 ± 8.45
	G2 (De)	11.43 ± 4.38	+ 80.8%*	20.67 ± 6.19	+ 15.4%*	23.86 ± 4.46
Task management	G1 (Fe)	3.57 ± 0.93	+ 128.0%*	8.14 ± 2.65	+ 6.0%	8.63 ± 1.24
	G2 (De)	3.71 ± 0.46	+ 97.6%*	7.33 ± 0.77	+ 5.2%*	7.71 ± 1.62
Overall	G1 (Fe)	21.43 ± 4.06	+ 75.3%*	37.57 ± 6.31	+ 4.2%	39.14 ± 10.95
	G2 (De)	20.71 ± 4.34	+ 80.3%*	37.33 ± 4.96	+ 4.5%	39.00 ± 6.84

*: $p < 0.05$, statistically significant for the unilateral Wilcoxon test
The scores represent the number of times correct behaviours/actions were observed. The percentage represents the relative increase/decrease between the study days. G1 (Fe): Group 1 (Feedback); G2 (De): Group 2 (Debriefing).

Figure 2 – Teams' overall objective scores, in the three days of the study. Vertical lines represent the standard deviation. Percentage represents the relative increase between the study days.

*: Significant differences [Wilcoxon test (unilateral), $\alpha = 0.05$]

sustained mild increase from day two to day 20 (retention). On day 20, a mean of 39 adequate behaviours/actions were observed per scenario, in both groups. Worth notice is the higher standard deviation of the feedback group (~11) when compared with the debriefing group (~7). Given that feedback is a more directive type of discussion, it may not engage and reach all participants in the same manner, thus potentiating the observed higher dispersion in the scores.

Leadership was the NTS with a less prominent increase from day one to day two, and the only NTS with a decrease from day two to day 20, in both types of discussion. This can be due to the bias from the rotation of the leadership role associated with the inexperience of our participants in this role. Medical students tend to have very limited opportunities to develop leadership skills[29] and are only given the opportunity to make decisions in a controlled learning environment. How and when these skills should be included and stimulated in medical pre-graduated training deserves future reflection.

Communication was the variable with the highest number of correct behaviours/actions, accounting for more than 60% of the total, for both debriefing and feedback. Since communication is a central skill[30] that encompasses and supports all other NTS, this result is not surprising and confirms its importance in effective teamwork.

Task management was the variable with the lowest mean absolute counting in day one and in day two, but with the highest relative change (double or more) between these days. A marginal increase was observed between day two and day 20. This shows considerable awareness and improvement of participants' task management skills, especially on the identification and correct use of all available resources, and adequate distribution of tasks amongst the team members.

For both debriefing and feedback, most participants felt involved in a clear and objective discussion, with adequate and good use of time, although 70% of the participants selected debriefing as their preferential post-scenario discussion.

There are similarities between debriefing and formative feedback since both methods follow a pre-defined structure that reinforces positive behaviours/actions and addresses performance gaps. Differences rely mostly on its instruction/facilitation style, and dedicated time.

However, do these differences translate into different educational effects and learning outcomes?

Debriefing may provide a safer learning environment, with participants deeply engaged and open to explore and reflect on their (individual and team) actions/behaviours. Learners are more receptive to change when insights emerge from their own discoveries. Feedback, being more directive in nature, may raise tension and discomfort, thus restricting the receptivity of the learner to reflect.[31]

On the other hand, the students' limited experience and clinical contact may be an obstacle for a deeper reflection, impairing the development of individual learning objectives and their implementation into clinical practice. Time wise, feedback offers a rapid turnover, which can be relevant for institutions with a high student-educator ratio.

Our findings concur with recent studies,[18,19] which found that allying debriefing reflexive practice with a feedback directive style, and shifting appropriately between facilitation and instruction, can be a good compromise in order to achieve a timely and educationally meaningful discussion, particularly for undergraduate students. Further investigation is needed to explore the application of these findings to more experienced audiences.

Limitations

An important limitation to this study was the reduced sample. Due to time constraints, student availability, and other logistic restrictions, the sample used was small and only included medical students, which may limit the conclusions of this work. A similar study with a larger sample constituted by interprofessional teams of healthcare staff may lead to different conclusions and a broader insight on the differences and potentials of these two post-scenario discussions to specific target groups.

CONCLUSION

The present study demonstrates that both debriefing and feedback are effective as post-scenario discussion methods, promoting acquisition and retention of non-technical skills, by teams of undergraduate medical students.

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AUTHOR CONTRIBUTIONS

CSC: Conception and design of the work, data acquisition and analysis, drafting of the manuscript.

DR: Design of the work, data acquisition and analysis, critical review of the manuscript.

MG: Data acquisition and critical review of the manuscript.

All authors have approved the manuscript version submitted.

PROTECTION OF HUMANS AND ANIMALS

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the Helsinki Declaration of the World Medical Association updated in 2013.

DATA CONFIDENTIALITY

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

COMPETING INTERESTS

The authors have declared that no competing interests exist.

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