

ORIGINAL ARTICLE

Effect of combined individual–collective debriefing of participants in interprofessional simulation courses on crisis resource management: a randomized controlled multicenter trial

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Objective. Interprofessional simulation (IPS) training is an effective way to learn crisis resource management. The type of debriefing used in IPS training may affect participants' performance and their level of psychological safety. We aimed to assess and compare performance after standard collective debriefing versus a combination of individual and collective debriefing ("combined" approach).

Methods. Randomized, controlled multicenter trial. IPS sessions were randomized to have either standard or combined debriefing. Each team's performance in the IPS session was assessed with the Team Emergency Assessment Measure. The participants assessed the debriefing quality with the Debriefing Assessment for Simulation in Healthcare.

Results. Forty IPS sessions were randomized, and 30 were analyzed, 15 using standard collective debriefing and 15 the combined individual–collective method. Teams' performance improved with both types of debriefing, based on pre-post testing ($P < .01$), and there were no significant differences in overall performance scores between the 2 types of debriefing ($P = .64$). However, the combined approach was associated with higher scores for leadership skills ($P < .05$) and psychological safety, and the participants' learning experience was better ($P < .05$).

Conclusions. During IPS courses on crisis resource management, debriefing improves participants' performance, but similar overall results can be obtained with both debriefing methods. Combined debriefing might be more effective for improving participants' leadership skills and psychological safety and also provide a better learning experience.

Keywords: Crisis resource management. Training techniques, simulations. Competencies. Interpersonal professional relations.

Efecto de un debriefing (reunión informativa) combinado en los participantes en cursos de simulación interprofesional para la gestión de recursos de crisis: un estudio aleatorio, controlado y multicéntrico

Objetivo. La simulación interprofesional (SIP) es eficaz para aprender gestión de recursos de crisis. La modalidad de *debriefing* utilizada en la SIP puede influir en el rendimiento de los participantes y en su integridad psicológica. Se evalúa y compara el rendimiento de un *debriefing* estándar (DE) –colectivo– con un *debriefing* combinado (DC) –individual y colectivo– en cursos de SIP en escenarios que simulan pacientes con patología aguda y grave.

Método. Ensayo controlado, aleatorizado y multicéntrico. Se aleatorizó el tipo de *debriefing* realizado (DE o DC) en las sesiones de SIP. El rendimiento del *debriefing* se evaluó con la escala TEAM (Team Emergency Assessment Measure). La calidad de la SIP fue valorada por los participantes con la escala DASH (Debriefing Assessment for Simulation in Healthcare[®]).

Resultados. Se aleatorizaron 40 cursos de SIP de los que se analizaron 30. Quince realizaron DE y 15 DC. Ambos grupos mejoraron entre la pre y la posprueba ($p < 0,01$), pero no hubo diferencias en el rendimiento global entre ambas modalidades de *debriefing* ($p = 0,64$). El DC obtuvo mejores resultados que el DE en la capacidad de liderazgo ($p < 0,05$), en la percepción de seguridad psicológica y en la experiencia de aprendizaje eficaz ($p < 0,05$).

Conclusiones. Durante la SIP en situaciones de crisis, el *debriefing* mejora el rendimiento de los participantes, sin diferencias entre un DE y un DC. El DC podría ser más efectivo para mejorar la capacidad de liderazgo, la seguridad psicológica y la experiencia del aprendizaje.

Palabras clave: Gestión de recursos de crisis. Formación por simulación. Competencia profesional. Relaciones interprofesionales.

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Introduction

In emergency medicine, critical care, anesthesia and surgery, critical situations are at high risk of medical error. The principles of Crisis Resource Management (CRM) combine cognitive and interpersonal skills aiming at creating a more effective teamwork and a safer environment^{1,2}. Key CRM skills include problem solving, situational awareness, resource management, communication and leadership. Compared to other educational options, interprofessional simulation has been proven effective for learning CRM, leading to better safety and patient outcome and reducing mortality rates³⁻⁷. Debriefing is deemed to be an essential component of simulation-based education⁸. Structured, collective debriefing delivered after the procedure by an instructor is considered as the gold standard for interprofessional teams debriefing⁹. Psychological safety is a pre-requisite for collective reflection to ensure an effective debriefing that will guarantee learning. Indeed, all learners should have the opportunity to openly express their thoughts and perceptions during a debriefing¹⁰. Reeves et al. challenged the hypothesis that interprofessional simulation (IPS) creates an opportunity to practice in a sufficiently "safe" (neutral) environment to broach sociological problems that are nevertheless essential for perfecting interprofessional collaboration in clinical practice and improving the quality of care^{11,12}. This lack of psychological safety during standard team debriefing (SD) may explain part of the reluctance of healthcare professionals to participate in interprofessional simulation education. For this reason, we proposed a debriefing method combining an individual debriefing and a collective debriefing. Individual debriefing is a guided formative evaluation process that allows learners to express their feelings and perception of the situation without social pressures from peers. Informations obtained during individual debriefing will be used anonymously by the instructor during the collective debriefing to make the group aware of gaps in teamwork.

We hypothesized that the team performance could be better when performing combined debriefing (CD) compared to standard team debriefing (SD) by providing better psychological safety for participants. This study aimed to compare CD to SD on interprofessional team performance during a day course for crisis situation management training.

Method

This multicenter, prospective, randomized, single-blinded study was conducted in 4 simulation centers in France between February 2017 and October 2017. The trial was approved by an Institutional Review Board (Comité d'éthique en recherche, Federal University of Toulouse, 2016-019), and the French Data Protection Authority (Commission Nationale de l'Informatique et des Libertés; 1994066 v 0). Subject informed consent form were obtained prior to enrolment in the study.

The study took place in 3 university simulation centers (Toulouse, Limoges, Nimes - all in France, affiliated to hos-

pital) and a simulation center of a general hospital (Orange, France). The study has been approved by a French ethics committee «Comité d'éthique en recherche non interventionnelle» of Jean Jaures, Toulouse 3 University.

Subjects were recruited for all the simulation-based interprofessional team CRM learning sessions. Each session included 6 to 10 participants to compose 3 interprofessional teams. The inclusion criteria were as follows: all participants had to: (1) be healthcare professionals (physician, nurse, assistant nurse) (2) working in an emergency or anesthesia and intensive care department, (3) with a state-registered professional license (4). The three-team group was not included if one of their members had a hierarchical link with the instructor or had already participated in the study. Each session was developed in accordance with the French National Health Authority (Haute Autorité de Santé). The debriefers (n=16) were experienced instructors, with at least 2-year experience in CRM teaching, and had undergone a specific 2-hour training session on both types of debriefing (i.e. CD and SD). The overall purpose of these sessions was to learn and practice CRM with an interprofessional team. Participants were expected to learn (1) communication skills, (2) knowledge of respective roles (leadership/fellowship), (3) involvement in shared decision-making and (4) team coordination. During a four-hour session, each team was exposed to 3 scenarios: one as an actor and the others as observers. Each scenario was followed by a debriefing (Figure 1). The scenarios were standardized, and tailored to the specific environments of the subjects (ICU, emergency room, operating room, pre-hospital setting) to expose teams to various crisis situation such as cardiac arrest, difficult airway management, traumatic shock (Table 1). To ensure sociological fidelity in the scenarios, teams were trained in accordance with their usual working conditions (one physician, one or two nurses and/or a medical support worker) with each one playing their professional role. The scenarios lasted 10 to 15 minutes. After each scenario, the "actor" team and "observer" teams met for a debriefing led by two instructors (physician and nurse). The total duration of the debriefing was 30 minutes in both groups. In the CD group, combined debriefing consisted of two phases: an individual phase of 10 minutes followed by a 20-minute collective phase. Participants were interviewed

Table 1. Scenarios according to professional settings

Emergency department/ intensive care	Difficult airway management Severe trauma patient Hemorrhagic shock Status epilepticus Acute severe asthma Cardiac arrest
Operating theater	Tension pneumothorax Anaphylactic shock (Myorelaxant) Difficult airway management Malignant hyperthermia
Pediatric Intensive care	Hypovolemic Shock Septic shock (Purpura fulminans) Airway management
Neonatal care	Respiratory failure in new born

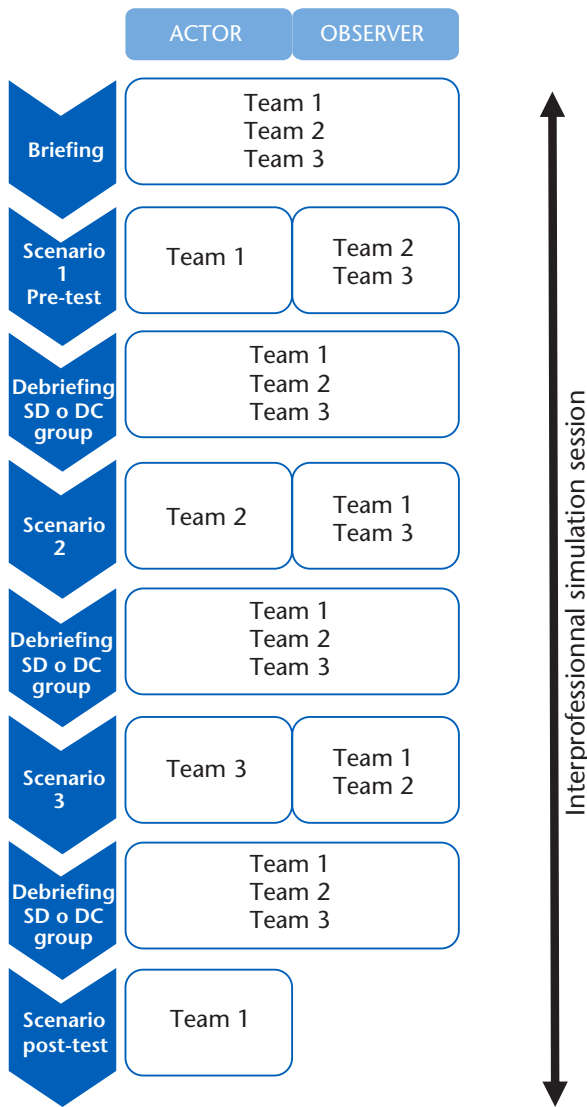


Figure 1. Design of interprofessional simulation session. SD: standar debriefing; DC: combined debriefing

face-to-face with an instructor. During this individual phase, the team member/instructor ratio was 1/1. This phase enabled participants to express their individual reactions, collect their emotions and to outline the positive and negative points that the participant wished to discuss in the collective debriefing without social pressure and without fear of judgement from peers. At the end of this phase, the instructors summarized the point to be highlighted, providing the basis for the collective phase. The collective phase consisted in an open-question session based on the summary of the individual interviews with time for free dialogue between participants and instructors. The summary (third phase) concluded the debriefing session, highlighting key messages identified during the 2nd phase and outlining post-training changes to clinical practices envisaged by participants. In the SD group, standard debriefing consisted of three phases according to the RUST

model (Reaction, Understanding, Summarize, Take home message)^{13,14}. The team was not separated and discussions were always collective. The first was the reaction phase during which participants had the opportunity to give their 15 impressions, describe and share their emotions. The second was the analytical phase in which they were instructed to embark on a constructive and targeted period of reflection to consider standard CRM practices. A summary phase was carried out using the same principles as those used in the CD.

The effectiveness of the type of debriefing was measured with the Team Emergency Assessment Measure (TEAM). It is a scale of team behavior markers which assesses the non-technical skills of healthcare professionals in crisis resource management¹⁶. This scale is the most validated and most reliable tool with a validated French version^{17,18}. Each item is described listing several potential behaviors which are scored on a scale of 0 (Never/Hardly ever) to 4 (Always/Nearly always). The 11 items may be separated in three categories: leadership (sum of items 1 and 2), teamwork (sum of items 3-9) and task management (sum of items 10 and 11). A global TEAM score of 0 to 44 is obtained by adding up the 11 items. The TEAM scale also includes a separate GRS of overall performance score which is assessed on a scale of 1 to 10.

The modalities of the session (3 scenarios with debriefing) did not allow to evaluate the 3 teams. The performance was measured on the first team, which performed the first (pre-test) and the fourth scenario (post-test) (Figure 1). Those scenarios were recorded on video and audio. Team performance was assessed by an independent pair of assessors (one physician and one nurse) blinded to the debriefing modalities assignment and not involved in the simulation sessions. The assessors had at least 3 years' experience in CRM course and had undergone TEAM training by assessing the videotaped performance of 3 simulated crisis management scenarios similar to those used in this study. Following their evaluations, the results of the evaluation was shared between assessors in order to find a consensus. At the end of the session, learners assessed the quality of the debriefing using a validated, global, descriptive scale (Debriefing Assessment for Simulation in Healthcare© - DASH©). The long student version of DASH is designed for learners to assess the quality of simulation training¹⁵. Students score instructors in six skills which are described in 23 behaviors with 18 being directly linked to the debriefing. Each behavior is scored from 1 (Extremely Ineffective/Detrimental) to 7 (Extremely Effective/Outstanding). The questionnaire is based on solid data and on theories of learning and change in experience contexts. DASH is designed to allow an evaluation of simulation debriefings in various training sessions, for a variable number of participants, with a wide range of pedagogical objectives and various environmental and time constraints. All of the questionnaires and video recordings were anonymized to maintain confidentiality. The protocol-defined primary outcome measure was the global TEAM score compared between the study groups (CD vs SD group) during the session of simulated crisis situation.

The secondary outcomes were, the interprofessional

team performance score of the three TEAM category levels (leadership, teamwork, task management) and the GRS of overall performance score by type of debriefing and test phase, the quality of the debriefing assessed by participants at the end of each session using the DASH® scale.

As commonly admitted in psychology and educational literature, a size effect greater than 1 standard deviation was considered acceptable for a given educational intervention¹⁹. With an alpha risk of 5%, and assuming an effect size of 1.0, a power of 0.8 and a ratio of 1:1, the sample of 15 sessions per group was required. Taking into account the possible difficulties in session recordings, 20 interprofessional simulation training sessions were required in each experimental situation (CD and SD), corresponding to a total of 40 training sessions. Sessions were randomized with a 1:1 allocation and stratified according to the simulation center by the Clinical Research Unit at Toulouse University Hospital, which was not involved in the training program. Four computer random lists were generated and equilibrated by a block of 4. Half of the groups were randomly assigned to the intervention group and the other half to the control group. For the eligible groups, the randomization process was initiated by a phone call from the instructor to the Toulouse simulation center which specified the group to which the participants were assigned.

Values are reported as median (range) with interquartile ranges (IQR) or mean with standard deviation and proportions with numbers and percentages. The effect of test phase and debriefing type on interprofessional team performance at the global TEAM score (primary outcome) and at the TEAM categories level (leadership, teamwork,

task management) and GRS of overall performance (secondary outcome) was analyzed using a 2-way, mixed-design analysis of variance (ANOVA). The TEAM score was treated as the dependent variable. The between-team variable was the debriefing type and the within-team measure was the test phase.

The quality of debriefing was analyzed using a Mann-Whitney test to compare the median scores of the 23 instructors' behaviors using the DASH scale. All statistical tests were 2-sided with a significance level of $p < 0.05$. Statistical analysis was performed using Stata (Statistical Software: Release 12.0. Stata Corporation, College Station, Texas, U.S.A).

Results

Out of 40 randomized sessions, 10 sessions were ruled out due to technical problems (n=9) and team changes between the pre- and post-test (n=1) (Figure 2). Two hundred and eleven participants divided over 30 sessions took part in the study. The participants' characteristics are described in Table 2. The number of sessions for the emergency care, neonatal resuscitation and anesthesiology-intensive care teams was 13, 9 and 8, respectively. The ANOVA detected a significant effect of test phase (pre- and post-test) on the global team score ($F=13.12, p<0.001$). No effect of the debriefing type was found on the performance ($F=0.22, p=0.64$). Thus, teams improved their global performance between pre- and post-test regardless of the debriefing strategy to which they were exposed (Table 3). The ANOVA detected a significant effect of test phase (pre- and

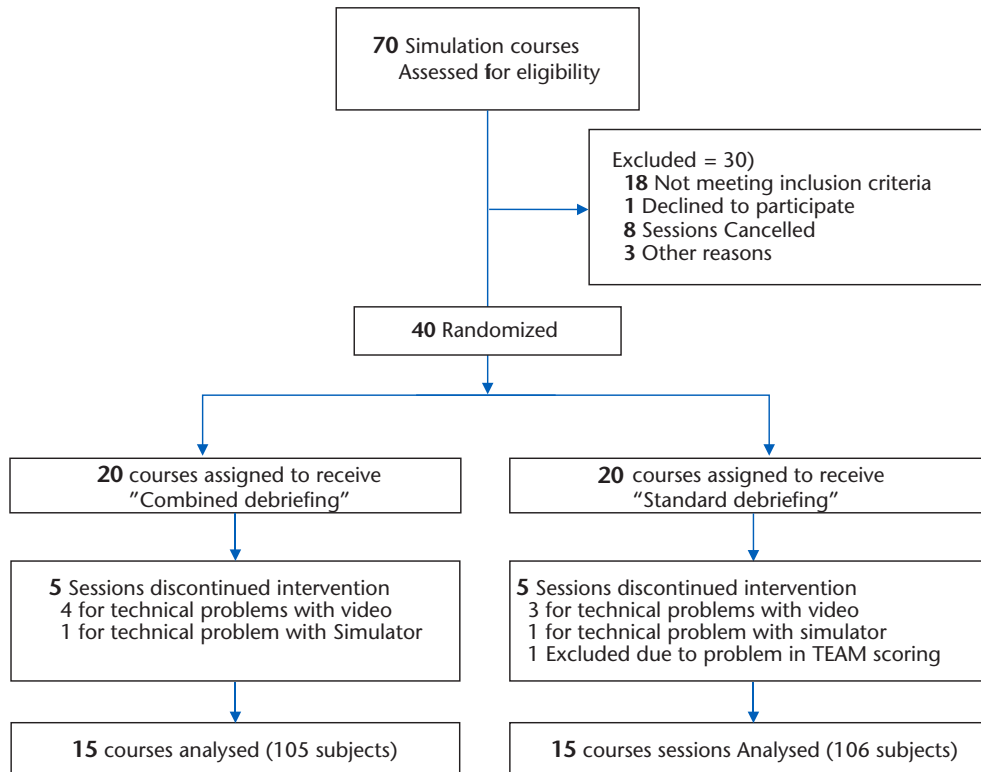


Figure 2. Flow chart of the simulation courses.

Table 2. Baseline Characteristics of the Participants (N = 211)

	Standard debriefing N = 106 n (%)	Combined debriefing N = 105 n (%)
Category, n (%)		
Physicians	47 (44)	35 (33)
Nurses	48 (45)	55 (52)
Assistant nurse	11 (11)	16 (15)
Age years, median [IQ]		
Physicians	32 (28-38)	30 (29-40)
Nurses	36 (28-43)	33 (26-45)
Assistant nurse	34 (31-39)	37 (31-43)
Female, n (%)	68 (54)	77 (73)
Physicians	22	19
Nurses	37	47
Assistant nurse	9	11
No. previous learning CRM, n (%)	60 (57)	54 (51)
Physicians	33	22
Nurses	24	24
Assistant nurse	3	8
No. previous experience of SBE, n (%)	44 (41)	43 (41)
Physicians	25	18
Nurses	17	17
Assistant nurse	2	10
No. previous simulation sessions, median [IQ]	2 (1-4)	2 (1-3)
Physicians	3 (1-4)	3 (2-6)
Nurses	2 (1-4)	2 (1-3)
Assistant nurse	2 (2-2)	1 (1-1)

Data are n (%) or median [interquartile range] CRM: Crisis resource Management, SBE: Simulation Based Education

post-test) for TEAM category levels of teamwork score ($F=17.16$, $p<0.01$), the leadership score ($F=10.52$, $p<0.01$), and GRS of Overall performance ($F=8.17$, $p<0.01$). For the teamwork and GRS of overall performance, the debriefing type showed no significant effect on performance (respectively, $F=0.46$, $p=0.5$; $F=0.01$, $p=0.99$). However, the ANOVA detected an effect of the debriefing type for the leadership ($F=3.9$, $p=0.05$). For the task management, The ANOVA detected no significant effect of the test phase ($F=0.78$, $p=0.38$) neither the debriefing modality ($F=1.53$, $p=0.22$). Therefore, teams improved both their leadership skills during the session, but significantly higher in the CD group compared to SD group. For the teamwork category and GRS of overall performance, teams improved between pre- and post-test irrespective of the debriefing type to which they were exposed. For the task management category, there was no significant improvement between pre- and post-test irrespective of the debriefing type.

Among the 23 DASH scale instructors' behaviors, 7 had a mean score significantly higher in the combined debriefing group than in the standard debriefing group. It shows that the combined debriefing improves the psychological safety of the participants (item 8, 9 and 13) and their learning experience (item 19, 20, 22, 23) (Table 4).

Discussion

This study shows that combined debriefing and standard team debriefing improve similarly team performance

Table 3. Score of the subcategories of the TEAM scale for both test phases and debriefing types

	Pre-test score	Post-test score	F	p
Global score				
Standard debriefing	26.2(5.6)	30.7 (5.0)	13.12	0.001
Combined debriefing	26(6.1)	32.3 (6.1)		
Team work				
Standard debriefing	17.3 (3.1)	19.9 (3.2)	17.16	0.001
Combined debriefing	15.6 (3.9)	20.4 (3.5)		
Leadership				
Standard debriefing	3.9 (1.9)	5.6 (1.4)	10.52	0.002
Combined debriefing	5.1 (1.7)	6.1 (1.5)		
Task management				
Standard debriefing	4.9 (1.2)	5.2 (1.3)	0.78	0.38
Combined debriefing	5.3 (1.3)	5.7 (1.7)		
Overall performance (1 a 10)				
Standard debriefing	6.3 (1.2)	7.2 (1.0)	8.17	0.006
Combined debriefing	6.3 (1.3)	7.3 (1.5)		

during simulation for crisis situations training. However, combined debriefing could be more effective at improving leadership skill, psychological safety and learning experience. The global team performance improved similarly with both debriefing modalities. We were not able to show any benefit of CD compared to SD on global team performance. This could be the result of a possible lack of power to show any difference between groups, and to the heterogeneity of the groups and scenarios, involving several acute care disciplines (emergency, anaesthesiology, intensive care and neonatal resuscitation). CD appears however to be more effective on specific teamwork skills such as leadership. The evaluation of the quality of the debriefing is in favor of the CD which allows a better perceived psychological safety and a better understanding of the situations during the debriefing session. Leadership is linked to an understanding of sociological factors that influence team performance, such as for instance, the understanding of individual roles, their responsibility, regulations stipulated by various bodies and the impact on decision-making^{11,12,20}. This understanding of sociological factors within a team may require each member to express himself/herself without fear of negative repercussions on his/her self-esteem, social status or professional development.

A wide range of debriefing methods are used in interprofessional simulation. Some instructors use co-debriefing and involve a member from each profession to conduct the debriefing, whilst others use only one instructor for the debriefing. One study showed that the presence of an expert instructor was not routinely required to measure CRM team learning in the simulation context, another study showed that a better outcome was achieved with instructor-led debriefing^{21,22}. In our study, instructors in individual debriefing scenarios are perceived by participants as event catalysts with the psychological safety of every individual and the social structure of the team remaining intact. According to the recommendation by Sharma et al., the instructor role should be to optimize team reflection whilst taking into account "sociological factors" that influence the performance and quality of care¹².

Table 4. Debriefing Assessment score for interprofessional simulation in acute care

	Standard debriefing N = 106 n (%)	Combined debriefing N = 105 n (%)	P
The instructor set the stage for an engaging learning experience	5.98 (0.65)	5.95 (0.70)	0.75
1 The instructor introduced him/herself, described the simulation environment, what would be expected during the activity, and introduced the learning objectives	6.30 (0.59)	6.32 (0.63)	0.76
2 The instructor explained the strengths and weaknesses of the simulation and what I could do to get the most out of simulated clinical experiences	6.14 (0.69)	6.11 (0.78)	0.79
3 The instructor attended to logistical details as necessary such as toilet location, food availability, and schedule	5.92 (1.01)	5.81 (1.13)	0.47
4 The instructor made me feel stimulated to share my thoughts and questions about the upcoming simulation and debriefing and reassured me that I wouldn't be shamed or humiliated in the process	6.47 (0.57)	6.48 (0.54)	0.95
The instructor maintained an engaging context for learning	6.06 (0.61)	6.15 (0.59)	0.28
5 The instructor clarified the purpose of the debriefing, what was expected of me, and the instructor's role in the debriefing	6.12 (0.74)	6.20 (0.69)	0.48
6 The instructor acknowledged concerns about realism and helped me learn even though the case(s) were simulated	6.15 (0.68)	6.28 (0.62)	0.15
7 I felt that the instructor respected participants	6.62 (0.54)	6.69 (0.50)	0.33
8 The focus was on learning and not on making people feel bad about making mistakes	6.53 (0.57)	6.69 (0.48)	0.03*
9 Participants could share thoughts and emotions without fear of being shamed or humiliated	6.39 (0.64)	6.61 (0.51)	< 0.01*
The instructor structured the debriefing in an organized way	5.97 (0.63)	6.15 (0.59)	0.14
10 The conversation progressed logically rather than jumping around from point to point	6.08 (0.72)	6.22 (0.66)	0.15
11 Near the beginning of the debriefing, I was encouraged to share my genuine reactions to the case(s) and the instructor seemed to take my remarks seriously.	6.30 (0.60)	6.40 (0.63)	0.23
12 In the middle, the instructor helped me analyze actions and thought processes as we reviewed the case(s).	6.14 (0.65)	6.27 (0.57)	0.12
13 At the end of the debriefing, there was a summary phase where the instructor helped tie observations together and relate the case(s) to ways I can improve my future clinical practice	6.22 (0.67)	6.41 (0.6)	0.03*
The instructor provoked in-depth discussions that led me to reflect on my performance	5.97 (0.63)	5.88 (0.76)	0.94
14 The instructor used concrete examples-not just abstract or generalized comments-to get me to think about my performance.	6.10 (0.70)	6.21 (0.69)	0.29
15 The instructor's point of view was clear; I didn't have to guess what the instructor was thinking	6.22 (0.71)	6.37 (0.64)	0.12
16 The instructor listened and made people feel heard by trying to include everyone, paraphrasing, and using non verbal actions like eye contact and nodding, etc	6.30 (0.64)	6.31 (0.76)	0.93
17 The instructor used video or recorded data to support analysis and learning	5.69 (1.40)	5.67 (1.51)	0.93
18 If someone got upset during the debriefing, the instructor was respectful and constructive in trying to help them deal with it	6.34 (0.68)	6.4 (0.67)	0.57
The instructor identified what I did well or poorly-and why	5.89 (0.78)	6.12 (0.67)	0.03*
19 I received concrete feedback on my performance or that of my team based on the instructor's honest and accurate view	6 (0.83)	6.4 (0.67)	0.01*
20 The instructor helped explore what I was thinking or trying to accomplish at key moments	5.95 (0.74)	6.17 (0.66)	0.02*
The instructor helped me see how to improve or how to sustain good performance	5.96 (0.79)	6.15 (0.69)	0.12
21 The instructor helped me learn how to improve weak areas or how to repeat good performance	5.94 (0.72)	6.08 (0.63)	0.07
22 The instructor was knowledgeable and used that knowledge to help me see how to perform well in the future	6.22 (0.71)	6.41 (0.64)	0.05*
23 The instructor made sure we covered important topics	6.22 (0.70)	6.41 (0.64)	0.04*

*p ≤ 0.05.

Learner evaluation of the quality of debriefing seems to confirm that combined debriefing enhances the psychological safety of participants who felt they were judged to less of an extent for their errors and who found it easier to express their thoughts and emotions without fear of being judged or humiliated. According to Boet et al., the challenge of interprofessional simulation is to strike a balance between professional diversity and fairness to ensure that debriefing does not show a preference for any profession²³. Individual followed by collective debriefing probably allows every professional to fairly express the problems they experienced. Our results show that participants in the CD group found that instructors were able to identify more accurately the areas for improvement from the simulated case scenario and to give guidance on how to improve future clinical practice. The "individual phase" of the CD gives instructors the opportunity to document the problems experienced by each participant and to consider the impact of social factors within the group in order

to allow for effective reflection at the collective debriefing. All team members were allocated the same period of time for individual interview. In the individual phase of the CD, the number of instructors was identical to the number of members in a team. Thus, the CD requires a higher number of instructors than SD. This could be a limiting factor in terms of cost-effectiveness and for the implementation of this debriefing modality. These findings are consistent with Boet et al., who consider that a higher number of interprofessional instructors may be required for interprofessional debriefing than for single-professional debriefing²³. The instructors summarized the individual interviews, providing the basis for the collective phase. An individual phase probably allows a better structuring of the collective debriefing by providing instructors with elements to establish a common debriefing strategy²⁴. Our results show that SIP has not improved team adherence to guidelines, regardless of the type of debriefing. This fact is also highlighted in the study conducted by Boet et

al. who also used the TEAM scale. In both studies, the scenarios portrayed during training and post-test reflect different clinical situations. Stocker et al. showed that repeated exposure to simulation is most beneficial to crisis resource management training and single, isolated exposure may fail to deliver a similar learning experience²⁵. The exposure of teams to multiple situations optimizes team experiential learning²⁶. However, as task management is strongly linked to the specificity of the clinical situation, our study is inconclusive with regard to the impact of interprofessional training on the development of this skill set. Further studies are therefore required to consolidate the impact of combined debriefing on task management by assessing the teams in identical clinical situations between pre- and post-test. SIP is challenging and needs robust studies to determine the most efficient type of debriefing in the continuing education context²⁷.

Our study allows a better understanding of interprofessional debriefing techniques but has several limitations. First, the impact of the debriefing modalities on outcome patient using the Kirkpatrick model, modified by Philips, was not measured²⁸. The choice of a multicenter method involving several (emergency, anaesthesiology and intensive care, neonatal resuscitation) rendered very difficult to investigate the impact of debriefing on outcome patient. Due to technical problems, the percentage of lost sessions was high (7 sessions lost over 40 session, corresponding to 17%). This could have induced a lack of power for the primary outcome analysis. The second limitation is that all instructors have implemented both debriefing strategies. It is difficult to assess whether or not one of the debriefing methodologies unwittingly influenced the instructors' approach, potentially leading to a contamination effect (cross-over bias). The number of instructors and groups included should limit this effect. The third limitation is that our study involved only one population from the same sociocultural health system. Thus, "societal" rules within teams may vary in other communities. The use of this debriefing model should be assessed with professionals from other socio-cultural models.

However, combining an individual debriefing with a collective debriefing appears to have a more beneficial effect on leadership, on perceived level of psychological safety and on learning experience. This study suggests the importance of considering sociological team factors during interprofessional debriefing.

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