Research Article

Study in a Simulated Scenario of the Influence of Training and Personality in the Resolution of Critical Situations in Anaesthesiology Residents

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A R T I C L E I N F O

A B S T R A C T

Introduction: Empowerment of simulations in emergent situations by resident medical interns has positively demonstrated the acquisition of clinical skills [1]. Even so, it remains unclear what psychological factors influence when assuming leadership in carrying out these simulations or in a real situation. This study aims to analyse, by simulating critical situations in the operating room, the influence of training and personality among anaesthesiology residents on the predisposition to assume such leadership.

Materials and Methods: A study was carried out on 22 residents both trained (11) and untrained in simulation, assessing their personality and degree of stress using the Typi and Stay Trait. By observation it was determined that he was the leader, when entering a simulated model of ventricular fibrillation in pairs. Resolution capacity was not valued, but rather the characteristics that define the personality of the resident who assumed leadership.

Results: Regarding personality, measured with the TIPI test, the leaders turned out to score high in agreeableness but low in extraversion compared to the helpers. This suggests that they are altruistic, compassionate, trusting, frank, empathic and sensitive to others and on the other hand reserved, socially distant except with close friends. In the trained group, the Stai Trait test revealed a slightly lower mean in helpers compared to the total mean, in addition to a significantly higher SD in leaders (4.57) than in helpers (2.87), obtaining a $p > 0.02$. In Stai Estado, the opposite occurred in terms of the averages, lower in the group of leaders with respect to the global average. And a very similar SD was obtained in both groups (4.91 and 4.21). In the TIPI test, the leading group stands out with a low score in extraversion, compared to the total mean and compared to assistants, justified data with a $p > 0.02$.

Conclusion: The residents of the trained group turned out to have lower anxiety in the stressful situation of the simulation compared to the other group. In addition, the women who turned out to be leaders in the trained group demonstrated control of the situation with lower HRs than the leaders in the untrained group, thus demonstrating the influence of training in resolving critical situations.

Introduction

Empowerment of simulations in emergent situations by resident medical interns has positively demonstrated the acquisition of clinical skills [1]. Even so, it remains unclear what psychological factors influence when assuming leadership in carrying out these simulations or in a real situation. This study aims to analyse, by simulating critical situations in the operating room, the influence of training and personality among anaesthesiology residents on the predisposition to assume such leadership.

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Materials and Methods

I Study Design

Prospective experimental study.

II Scenery

The study was conducted in the skills classroom of the Hospital Universitario Arnau de Vilanova de Lleida. Spain (HUAV) teaching unit.

III Selection of Participants

The participants included in the study were 11 anaesthesiology residents from HUAV and 10 anaesthesiology residents from outside HUAV.

IV Simulation Development

One day the residents outside the HUAV were summoned to carry out the simulations with them and another day the residents of the HUAV were summoned.

Just before starting the simulation and going to the skills room, the participants met and the specific case was explained. Once the presentation was over, 3 of the participants were taken to a room to change their clothes and be ready to proceed to the start of the simulation. At the same time, before starting the simulation, their baseline constants (HR, BP, SpO2) were measured and recorded in a table (Annex 1). They were also asked to fill out two psychological tests: Tipi (Annex 2), to detect personality type, and Stai Trait (Annex 3), to determine the latent anxiety of each participant.

Upon entering the room, a critical situation lasting 18 minutes developed, in which the participants made their resolution, without any external influence. There, it was determined who was the leader, by means of observation, and their HR and SpO2 were also taken during the resolution of the case. At the end of the simulation, the baseline constants (HR, BP, SpO2) were determined again, as well as the Stai State test (Annex 4).

As differentiating characteristics between the two groups of residents, it must be taken into account that those of the HUAV had training in the same classroom in other critical situations. On the other hand, the residents outside the HUAV had never faced this type of situation, more than the theoretical knowledge that each of them might have.

V Descriptive Analysis

i Trained Group

Of the 11 residents in the trained group, 6 were women and 5 men. These 11 residents were grouped in pairs (boy-girl) plus an R2 who joined one of them. In this group, the baseline constants could not be recorded since the teaching unit remained closed due to the Covid-19 pandemic. Therefore, these tables could not be made either. In the TIPI test, male and female residents clearly differed in neuroticism, with $p > 0.02$. Men scored higher on this personality with M=4. Women had a very low standard deviation in consciousness and men in neuroticism. In the Stai Trait and Stai State tests, it is evident that the majority of women (4 of the 6) are in the 50-75 percentile, which is equivalent to a level of "medium anxiety". In the group of men, the distribution is more heterogeneous, with 3 men in this percentile 50-75 and 2 in other different percentiles.

Table 1: Synopsis.

TIPI: The Ten-Item Personality Inventory (TIPI), developed by Gosling, Rentfrow and Swan, was used. It is a 10-item scale developed to assess personality according to the Big-Five model. There are no breakpoints. Try to find out which dimension predominates in each person (which one scores more).
Each factor is evaluated by a pair of items: E 1/6, A 2/7, C 3/8, N 4/9 and O 5/10.

Table 2: Synopsis.

STAI TRAIT AND STAI STATUS: The values obtained with the test are corrected as a percentile.
• P77-99: would correspond to high anxiety.
• p50-75: reflects average anxiety.
• p1-45: anxiety is barely perceptible.
Each score obtained corresponds to a percentile depending on whether it is a woman or a man.

ii Untrained Group

Of the 10 residents in the untrained group, 6 were women and 4 men. Of these 10 residents, 3 were leaders. Of the 3 leaders, 2 turned out to be women and 1 was a man. Table 3 shows the data on the baseline constants of the residents. Regarding HR: HR pre (M=83 and SD=18.398), HR intra (M=93 and SD=16.997), HR post (M=79 and SD= 15.342). The TAS pre (M=130 and SD=18.699), the TAS post (M=137 and SD 17.859). The pre DAT (M=78 and SD=9.700), the post DAT (M=83.5 and SD= 8.708). Finally, the SpO2 results were: SpO2 pre (M=98.8 and SD=1.229), SpO2 intra (M= 96.5 and SD= 1.715) and

SpO2 post (M= 97.9 and SD=1.197). In (Table 5), in the TIPI test, the following results were obtained in terms of the 5 spheres it covers ("the big five"): extraversion (M=4.15 and SD=1.354), agreeableness (M= 5 and SD = 1.247), responsibility (M= 4.85 and SD= 1.292). Neuroticism (M= 4.7 and SD= 1.183) and openness to experience (M=5.25 and SD= 0.857). In the psychological analysis of anxiety, the mean score was 28.9 with a SD of 3.14 in Stai Trait (Table 6), 3 participants turned out to have a "high" level of anxiety and the remaining 7 had a "medium" level of anxiety. In the State Stai (Table 7) the mean score was 25 and SD 3.055. the 10 participants were found to have a "medium" level of anxiety.

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Table 3: Baseline constants in the untrained group.

Nº	Gender	Leader	FC pre	FC intra	FC post	TAS pre	TAD pre	TAS post	TAD post	SpO2 pre	SpO2 intra	SpO2 post
1	F		89	110	87	118	68	141	89	100	93	99
2	F		68	81	62	132	78	138	79	98	98	96
3	M	L	93	103	101	162	78	156	82	99	97	98
4	M		78	77	77	134	81	141	88	100	95	98
5	F		126	101	88	126	78	123	78	99	95	97
6	M		60	61	57	125	88	133	85	100	98	100
7	F	L	86	112	95	123	74	148	86	99	98	99
8	M		82	83	86	162	99	164	102	96	98	97
9	F		68	93	60	111	68	113	75	99	96	98
10	F	L	76	109	72	108	69	108	71	98	97	97
M			82,6	93	78,5	130,1	78,1	136,5	83,5	98,8	96,5	97,9
DE			18,398 06753	16,977 10877	15,342 38863	18,699 079	9,7005 1545	17,859 01577	8,7082 33652	1,2292 72594	1,7159 38357	1,1972 19

Table: 4: Baseline constants female vs. Men.

Nº	Gender	Leader	FC pre	FC intra	FC post	TAS pre	TAD pre	TAS post	TAD post	SpO2 pre	SpO2 intra	SpO2 post
1	F		89	110	87	118	68	141	89	100	93	99
2	F		68	81	62	132	78	138	79	98	98	96
5	F		126	101	88	126	78	123	78	99	95	97
7	F	L	86	112	95	123	74	148	86	99	98	99
9	F		68	93	60	111	68	113	75	99	96	98
10	F	L	76	109	72	108	69	108	71	98	97	97
M			85,5	101	77,333333 33	119,66666 67	72,5	128,5	79,666666 67	98,833333 33	96,166666 67	97,666666 67
DE			21,704838 17	12,083045 97	14,719601 44	9,1360093 4	4,8062459 36	16,232683 08	6,7428974 98	0,7527726 53	1,9407902 17	1,2110601 42

Nº	Gender	Leader	FC pre	FC intra	FC post	TAS pre	TAD pre	TAS post	TAD post	SpO2 pre	SpO2 intra	SpO2 post
3	M	L	93	103	101	162	78	156	82	99	97	98
4	M		78	77	77	134	81	141	88	100	95	98
6	M		60	61	57	125	88	133	85	100	98	100
8	M		82	83	86	162	99	164	102	96	98	97
M.			78,25	81	80,25	145,75	86,5	148,5	89,25	98,75	97	98,25
D. S			13,720422 73	17,358955 42	18,391574 16	19,120233 61	9,3273790 53	14,059397 81	8,8459030 06	1,8929694 49	1,4142135 62	1,2583057 39

Table 5: TIPI untrained group.

	extraversion	Amiability	Responsibility	Neuroticism	Openness to experience	Leader
1	6	5	6	5,5	6	
2	2,5	6,5	5	4,5	6	
3	4	6	4	5,5	5	L
4	4	3,5	4	6	5,5	
5	5,5	5	6	3	6,5	
6	5,5	5	4,5	5	5	
7	4	5	2	4,5	5	L
8	5	2,5	5	2,5	5,5	

9	2	5	6	6	4,5	
10	3	6,5	6	4,5	3,5	L
M	4,15	5	4,85	4,7	5,25	
DS	1,355031775	1,247219129	1,29206983	1,183215957	0,857969178	

Table 6: STAI TRAIT untrained group.

QUESTION NUMBER	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	TOTAL	GÉNDER	CORRECTION	anxiety
1	2	1	0	1	1	2	2	1	1	3	1	1	2	1	0	2	1	1	3	1	27	F	p50-75	half
2	3	2	1	1	0	1	1	1	1	2	3	2	1	2	1	2	2	2	1	1	30	F	p50-75	half
3	3	2	0	1	0	1	3	1	0	3	0	1	1	2	0	2	1	0	3	1	25	M	p50-75	half
4	3	1	1	0	0	1	3	1	2	2	2	1	2	2	0	2	1	1	3	1	29	M	p77-99	high
5	3	1	1	2	1	2	1	1	1	3	2	1	1	1	0	2	1	1	2	2	29	F	p50-75	half
6	3	1	1	1	2	2	2	1	2	2	2	2	2	2	2	2	2	1	2	2	36	M	p77-99	high
7	2	0	1	1	0	2	2	1	1	2	1	1	1	1	1	3	1	1	2	1	25	F	p50-75	half
8	3	2	0	1	1	2	1	1	2	3	2	1	1	2	2	2	1	0	2	1	30	M	p77-99	high
9	2	3	1	1	2	1	3	0	1	2	1	2	1	0	1	2	1	0	3	1	28	F	p50-75	half
10	3	1	1	1	1	1	2	1	1	3	2	2	1	1	0	2	1	1	3	2	30	F	p50-75	half

M	28,9
DS	3,142893218

Table 7: STAI STATUS untrained group.

QUESTION NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL	GÉNDER	Corretión	anxiety level
1	1	2	2	1	1	1	0	3	0	2	1	2	0	0	1	1	0	1	2	1	22	F	p50-75	half
2	0	1	2	1	2	2	1	3	2	1	1	3	2	0	1	2	2	1	2	2	31	F	p50-75	half
3	2	1	1	1	2	1	2	2	1	2	2	1	0	0	2	1	1	1	3	2	28	M	p50-75	half
4	1	2	2	1	1	1	1	2	0	1	2	2	0	0	1	1	0	0	2	2	22	M	p50-75	half
5	1	0	2	2	0	3	3	0	2	0	0	2	1	1	0	0	2	2	0	1	22	F	p50-75	half
6	1	0	2	2	1	2	2	0	2	1	1	2	1	0	0	1	2	2	1	1	24	M	p50-75	half
7	1	0	2	1	1	2	3	1	1	2	1	2	1	1	1	0	1	1	1	1	24	F	p50-75	half

8	0	0	3	0	2	1	2	1	1	2	1	1	2	1	1	1	2	1	1	1	24	M	p50- 75	half
9	1	1	2	3	1	1	1	1	2	1	1	1	2	0	1	1	2	1	1	25	F	p50- 75	half
10	0	0	3	2	0	3	3	1	2	1	1	3	2	1	1	0	2	2	0	1	28	F	p50-75	half

M	25
	3,0550
DS	50463

VI Comparative Analysis

First, the different parameters were compared between women and men: (Table 4) compares the physiological parameters in the different sexes. It can be seen that the HR both at the initial, middle and final moments is higher in women than in men. The opposite occurs in TAS and TAD, which is higher in men.

Second, leaders and helpers were compared. Both in the untrained group and in the trained group, the leadership was mostly by women. It was also observed that the leaders obtained higher HR at all times of the study. The final HR was also higher than the first in the leaders, unlike in the helpers, which was lower all the time.

Discussion

In the untrained group, in the Stai tests that perceive the degree of anxiety, the leaders and the assistants had the same level of anxiety in the Stai State. In the Stai Rasgo there were 3 of the helpers who obtained a higher level of anxiety than the leaders. Regarding personality, measured with the TIPI test, the leaders turned out to score high in agreeableness but low in extraversion compared to the helpers. This suggests that they are altruistic, compassionate, trusting, frank, empathic and sensitive to others and on the other hand reserved, socially distant except with close friends. In the trained group, the Stai Trait test revealed a slightly lower mean in helpers compared to the total mean, in addition to a significantly higher SD in leaders (4.57) than in helpers (2.87), obtaining a p> 0.02. In Stai Estado, the opposite occurred in terms of the averages, lower in the group of leaders with respect to the global average. And a very similar SD was obtained in both groups (4.91 and 4.21). In the TIPI test, the leading group stands out with a low score in extraversion, compared to the total mean and compared to assistants, justified data with a p>0.02. Helpers scored higher on friendliness, conscientiousness, and openness to experience.

Conclusion

The residents of the trained group turned out to have lower anxiety in the stressful situation of the simulation compared to the other group. In addition, the women who turned out to be leaders in the trained group demonstrated control of the situation with lower HRs than the leaders in the untrained group, thus demonstrating the influence of training in resolving critical situations.

In personality tests, the leaders turned out to be the least extroverted. On the other hand, men stood out in neuroticism, thus reflecting more emotional instability, both in one and in the other group. Therefore, we conclude that continuous training can promote greater self-control and mastery when facing real critical situations.

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