Evaluation of learning abilities after role-playing method: Comparing outcomes of Active and Observer

Évaluation des capacités d'apprentissage après la méthode du jeu de rôle: Comparaison des résultats de l'activité active et de l'observation

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ABSTRACT

Introduction: During a role-play simulation session, despite supporting observer learning, educators disagree about whether the learning outcomes of observers are like those of active participants.

Aim: Evaluation of the degree of knowledge acquisition by these two types of learners during the same role-play session.

Methods: We carried out a quasi-experimental pre-post intervention study to identify the learning outcomes among learners serving in observer (group 1) and active (group 2) roles during a role-play simulation session.

Results: The role play involved 29 learners. In both groups, 65% of learners improved their overall score. The median post-test score was significantly higher in both groups (p=0.0001).

Likewise, learners in group 1 (p=0.023) and in group 2 (p=0.008) showed an improvement in the overall score in the within-group evaluation study. The between-group evaluation study showed no statistically significant difference in overall score improvement (p=0.58), number of learners improving (p=0.05) or percentage improvement (p=0.3).

Conclusion: Based on these findings, it is suggested that role-playing method is effective in achieving student-learning outcomes regardless of their status as active or observer.

Key words: Role-playing game, Learning, Evaluation

RÉSUMÉ

Introduction: Au cours d'une séance de simulation de jeu de rôle, bien qu'ils soutiennent l'apprentissage par les observateurs, les éducateurs ne sont pas d'accord sur la question de savoir si les résultats d'apprentissage des observateurs sont similaires à ceux des participants actifs.

Objectif: Évaluer le degré d'acquisition des connaissances par ces deux types d'apprenants au cours d'une même séance de jeu de rôle.

Méthode: Nous avons réalisé une étude quasi expérimentale pré-post intervention afin d'identifier les résultats d'apprentissage chez les apprenants occupant des rôles d'observateur (groupe 1) et d'actif (groupe 2) lors d'une séance de simulation de jeu de rôle.

Résultats: Le jeu de rôle a impliqué 29 apprenants. Dans les deux groupes, 65 % des apprenants ont amélioré leur score global. Le score médian au post-test était significativement plus élevé dans les deux groupes (p = 0,0001).

De même, les apprenants du groupe 1 (p = 0,023) et du groupe 2 (p = 0,008) ont montré une amélioration du score global dans l'étude d'évaluation intragroupe.

L'étude d'évaluation intergroupe n'a montré aucune différence statistiquement significative dans l'amélioration globale du score (p = 0,58), le nombre d'apprenants s'améliorant (p = 0,05) ou le pourcentage d'amélioration (p = 0,3).

Conclusion: Sur la base de ces résultats, il est suggéré que la méthode du jeu de rôle est efficace pour atteindre les résultats d'apprentissage des élèves, quel que soit leur statut d'actif ou d'observateur.

Mots clés: jeux de role, apprentissage, evaluation

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INTRODUCTION

Simulation-based learning is a particularly strategic learning method for any teacher who want to vary their teaching approaches, arouse the learner's interest, and engage him more fully in the process of competency-based learning process [1]. Role-playing is an active method of teaching by simulation in healthcare which places the learner at the centre of the learning process.

The learner is placed in a fictitious, simulated, and pre-prepared context with specific teaching objectives. During the session, they must demonstrate their technical and communicative skills to resolve a real medical situation to resolve a real medical situation written in a finely crafted scenario [1].

As part of the acquisition of know-how and interpersonal skills underpinned by knowledge, the situation may be a situation involving a help interview, teamwork, or the transmission of information.

In its classic form, the role-play scenario involves the learner in the role of a doctor facing a patient whose role may be played by another learner, by a teacher, or by a trained outsider (standardised patient), all under the eye of an observer. Subsequently, by analysing the behaviours used, the learner will be able to find out about his own attitudes and will be encouraged to reflect on how to act in similar care situations. In this context, the learner plays a determined role by improvising the dialogue in a plausible and partly unpredictable situation, in a specific fictional environment to which they will have to adapt.

In this way, a role-playing session is easy to plan and is an ideal way to teach at the level of the training ground. However, it has the disadvantage of representing a game scene where one or at most two learners are put into a simulation situation. The rest of the group, placed in an observation position, participate passively as observers. In this way, during the same session, the action, interaction, and involvement are not the same. therefore, there is no guarantee that the same skills will be acquired in a different position, as participant or observer [1,2].

Few studies have assessed the contribution of role-playing for active learners compared with passive learners. Our main objective is to evaluate the degree of knowledge acquired by the two types of learners during the same role-play simulation session [2].

METHODS

We conducted a quasi-experimental pre-post intervention, monocentric study conducted over a 6-month period, carried out in the emergency department of a tertiary hospital Mahmoud El Matri Hospital in Ariana, Tunisia. The intervention consisted of a role-playing educational session. A non-random sample of medical students were enrolled. Students were not randomly assigned to a simulation role and the choice of the group of active or observer was volunteer.

Inclusion criteria was medical students doing their training ground in the emergency department.

Exclusion criteria was non-consent to the learning session and video recording as part of a research study.

Primary endpoint was improvement in knowledge. Secondary endpoints were assessment of learners' emotions and satisfaction.

Course of the simulation session

The theme of the simulation scenario was "dyspnea in children".

Dyspnea is an unpleasant feeling of breathing difficulty, shortness of breath and inability to satisfy the hunger for air [3].

We choose this theme because it fits in with the learning objectives of medical students and it's one of the most frequent reasons for visiting emergency department in regional hospital.

The simulation session was announced one week ago so learners could revise their pediatrics course.

The procedures for a role-play simulation session were explained to the learners after obtaining their written consent.

The session took place in the classic way with three phases: an initial briefing phase, the simulated scenario, and then a debriefing.

Each role play involved a group of 03 learners: One playing the Doctor "active" and two playing the Observer "observer".

The learners voluntarily and freely chose to be in the position of "active" or "observer" learner. One teacher played the role of the infant's mother, and another teacher played the role of facilitator. The infant was represented by a doll.

Finally, the debriefing was conducted with a group of three learners: the one who had played the role-play and the other two observers.

The session took place in the emergency staff room, which was equipped like a consulting room: doctor's desk, emergency trolley, scope, pulse oximeter, paperwork, etc.

We conducted, nine simulation sessions with one active learner and two learner observers. Two groups of learners were identified:
- Group 1 (G1) = group of active learners
- Group 2 (G2) = group of learner observers

We first collected learners' demographic data: age, gender, and previous participation in a simulation session. Then, we assessed their prerequisites and knowledge acquired by using the same pre-test and post-test in the form of Multiple-Choice Questions (MCQs) (appendix 2). We evaluated their knowledge about epidemiology of bronchiolitis, physiopathology of bronchiolitis, clinic and red flag of bronchiolitis and pharmacologic management. Each item was marked from 0 to 2 points. The entire TEST was scored out of 10. We used the following scoring method:
- 2 points for the full score each time the answer was entirely correct
- 1 point or 1.5 points each time the answer was incomplete
- When a proposition ticked by the learner was wrong, we did not consider the whole question to be wrong.
We have assigned numbers to learners to maintain their

anonymity and so teacher who corrects the test cannot identify the active learner from the observer.

Finally, at the end of the session, we:

- assessed stress level and satisfaction level by using a simple numerical scale rated from 0 to 10 (0 No stress at all up to a maximum of 10).

- asked learner feedback about the benefit of this learning method and the change and improvement in their practices thanks to this learning tool.

Statistical analysis

Quantitative variables were presented using median and the interquartile rage [Q1-Q3]. Frequencies and percentages were used to describe qualitative variables. Intra-group comparison (Before and after the role-playing session):

We used statistical tests on paired series and non-parametric tests given that the sample size did not exceed 30 in each group. Quantitative variables and qualitative variables were compared using the Willcoxon test and the MacNemar test, respectively.

Inter-group comparison:

The Mann Whitney U test was used to compare the knowledge scores obtained by the G1 and G2 participants. All statistical analysis was done using the jamovi (jamovi is a new "3rd generation" statistical spreadsheet which is free and open. designed from the ground up to be easy to use, jamovi is a compelling alternative to costly statistical products such as SPSS and SAS).

Ethical consideration

Learners undergoing their internship were informed of their right not to participate in the study, and no pressure was exerted on them. Consent to participate in the learning session and for video recording as part of a research study was obtained by writing form. Anonymity of the learners and confidentiality of personal data were maintained, especially during pre-test and post-test evaluations. We declare no conflicts of interest.

RESULTS

We included 29 leaners: 11 (38%) in the group of active learners (G1) and 18 (62%) in the group of observers (G2) The average age of all learners was 23±1 years with no significant difference between groups (p=1) and their sex ratio (male/Female) was 0.31 (p=0.6)

None of the learners had taken part in any subsequent training in the management of a first episode of infant bronchiolitis. All groups confounded; 20 learners (69%) had already played a role-playing game previously. In group G1, 72% had already played a role-playing game at the hospital training ground Whereas in group G2, 66.7% have previously participated in a role-playing game.

In both groups, a significant improvement in the overall knowledge score was noted with a median score of 6 [5-7] in the pre-test, going up to 7 [6-8] in the post-test with p= 0.001. The knowledge score increased for 19 learners

(65.5%), decreased for 4 learners (13.8%) and remained unchanged for 6 learners (20.7%) (table 1).

The intra-group comparison before and after the session, showed that:

In group G1, a significant improvement in the median overall score was noted, which raised from 6 [5 - 7] in the pre-test to 7 [6 - 8] in the post-test with p=0.023. This improvement was observed in 8 learners; one learner among them improved his score by more than 50% in the post-test, one learner between 25% and 50% and 6 other learners less than 25%.

In group G2, the median overall score raised significantly from 6 [5- 6.25] in the pre-test to 7 [6 - 7.25] in the post-test, with p=0.008. An overall improvement was noted in 11 learners (61%), four of whom improved their score by more than 50%.

The intergroup evaluative study did not reveal any statistically significant difference in the improvement of the overall score (p=0.58) or in the number of learners who improved their score.

There was no significant difference between the two groups, regarding the pre-test score (p=0.38), the post test score (p=0.58) nor the difference between post and pretest scores (p=0.9). (See table 1).

Table 1. The results of the two groups of learners

	All groups	G1 (n=11)	G2 (n=18)	p
Pre-Test				0.38
Median [IQR]	6 [5-7]	6 [5-7]	6 [5-6.25]	
Minimum	4	5	4	
Maximum	8	8	8	
Post-Test				0.58
Median [IQR]	7 [6-8]	7 [6-8]	7 [6-7.25]	
Minimum	5	6	5	
Maximum	9	9	8	
Difference (Post – Pretest scores)				0.9
Median [IQR]	1 [0-2]	1 [0-2]	1 [0 -2.25]	
Minimum	-1	-1	-1	
Maximum	3	3	3	
Stress level after the session				0.16
Median [IQR]	4 [3-5]	5 [4-5]	3.75 [3-5]	
Minimum	0	2	0	
Maximum	8	8	7	
Satisfaction after the session				0.74
Median [IQR]	8 [7.25 -9.5]	8 [7-10]	8 [7.4 -9.3]	
Minimum	6	7	6	
Maximum	10	10	10	

IQR: Inter Quartile Range

Satisfaction expressed by all learners had a median of 8 [7.25 - 9.5]. The satisfaction score was not significantly different between the two groups (8 [7 - 10] in G1 versus 8 [7.37 - 9.25] in G2; (p=0.745)).

The feedback from the learners was positive. In fact, all the learners felt that this learning was beneficial to them and 65% of students were overall satisfied. In addition, 58% declared that this learning method would have a positive impact on their future daily practice.

The level of stress compared between the two groups in our study was not significant (p=0.161), The median

stress level after the session was 4.7 [2 - 8] in G1 and 3.7 [0-7] in G2.

DISCUSSION

The objective assessment of our learners in the pre-test, post-test, and during the debriefing revealed partial knowledge and incorrect assumptions in both the active and observer groups. However, there was an overall improvement in the knowledge of the majority of the knowledge, and in more specific areas such as definition, pathophysiology, signs of severity, and management, the improvement is unevenly distributed.

The management of bronchiolitis necessarily begins with a thorough and structed assessment of the child. This must consider the pathophysiological processes associated with the disease and must include a knowledge of the semiology with a rigorous history, as well as a careful clinical examination to look for any red flags.

According to Shinnick et al, a gain in knowledge always occurs with the simulated patient, and this reinforces the postulate of role-playing as an effective learning method [2].

Strengths

To the best of our knowledge, this is the first study to evaluate learner's abilities during a role-playing simulation session. Although we highlighted that the learner observers, are not actively playing a role-play learning session.

Limitations

Our study was conducted at a single center, with a relatively limited number of participants in each group. We carried out the pre- and post-test assessments using multiple-choice questions. This method has the advantage of being simple, easy to use, anonymous and reproducible. However, an assessment by direct observation of certain movements and assessment using a criterion-based grid, graded as the situation unfolded, would have been more appropriate.

There was no randomisation of the two groups, the students chose to be actors, which already defines their learning style and could influence the result.

We cannot generalize the results due to the small sample of students, but this experiment is worth considering and repeating on a larger scale in order to draw more conclusions and generalize it.

Nevertheless, conducting such an assessment would have required an additional session, necessitating availability of learners beyond the regular course schedule, along with availability of teachers and assessors.

Assessment of stress in learners

Managing a life-threatening emergency is one of the most critical medical activities. Practitioners are required to make and prioritise decisions that will have a crucial impact on patients' vital prognosis, under severe time pressure [4]. The stakes involved in these decisions, combined with the lack of experience of novice doctors, contribute to the fact that 33% of first-year interns present moderate or severe symptoms of depression and 37% a high level of anxiety [5]. Stress "is a non-specific response by the body to any demand made upon it". Its degree depends on both the stressful situation and individual personality traits. Negative stress is perceived when there is an imbalance between constraints and resources [6].

Although Wetzel et al [7] found that stress interferes with judgement, decision-making and communication, DeMaria et al [8] concluded that certain levels of stress do not interfere with learning. During the simulation session, scenarios are constructed to reproduce real-life critical situations and provoke certain emotions to improve learners' performance in managing stress and to take learners out of their comfort zone.

Roger et al recruited 28 residents who took part in the management of 32 emergency situations: 16 simulated and 16 real-life situations. The study revealed that the stress levels induced by both scenarios were similar, indicating that a simulation session replicates a psychological atmosphere akin to that of an actual scenario [9].

The level of stress compared in the two groups in our study was non-significant according to the Mann Whithney u-test (p=0.161), which probably reflects a sense of shared responsibility between the learners, combined with a pleasure in studying and learning on the part of these young learners with a view to improving their learning. Thus, learners who experience interest are more likely to show higher levels of learning and performance [10].

Assessment of learners' knowledge:

Using a role-play session will encourage the learner to distinguish between outpatient and inpatient situations, bearing in mind that only 2 to 3% of bronchiolitis cases are admitted to hospital each year [11].

When the scenario is played out in a simulation session, the actions carried out by the learners demonstrate reasoning or the application of known procedures. At the debriefing stage, the trainers gather useful information from the learners to help them understand the reasoning and knowledge behind the choices made during the simulation. On this stage partial knowledge and false certainties are revealed [12]. According to Kirkpatrick, when evaluating training, impact in terms of quality of care is the highest level of expected effect on a scale comprising four levels, the first three of which are satisfaction, knowledge acquisition and behavioural change [13].

The evaluation of our learners in the pre-test and during the debrief revealed partial knowledge and false certainties in both the active and observer groups, with an overall improvement in most areas in both groups. Hong BE et al provided simulation-based teaching to 24 anaesthesia and intensive care residents in a scenario involving the management of a Covid-positive patient in respiratory distress. The objectives were to

teach dressing and undressing, intubation, initiation of protective ventilation and interpersonal communication. Assessment of learners' knowledge using a ten-question questionnaire showed that the number of correct answers increased significantly between pre-simulation and post-simulation (from 5.1 to 9.0; p < 0.001) [14]. Similarly, the need to train paediatricians treating serious patients infected with SARS-CoV 2 in intubation led the Balikai team to set up a learning programme using repeated simulation sessions. Intubation performance improved between simulation sessions. In fact, during the first session, the teams performed an average of 7.3 of the 9 recommended procedures; this value rose to 8.4 during subsequent sessions (P = 0.024) [15].

Conclusion

Our work has thus shown that learners benefit overall from the simulation session, whether they are playing the role of doctor or that of observer, with a not particularly higher level of stress.

It is worth remembering here, that learning by simulation is based on the debriefing, which is the most important part, much more than on the role played by the learner during the simulation, and constructive feedback is one of the pillars of debriefing the role-playing game supports the beneficial link between fun and the development of authentic learning and long-term memory.

It involves participants who are intentionally engaged, on the one hand for the pleasure of playing and on the other hand to learn a task that they are not yet doing on a daily basis in the course of their weekly activity; the game's design , the clarity of the tasks and the constructive feedback established by the teacher striking a balance between the skills to be learned and the challenges to be met.

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