Original Research

GESDAV

Role play – an effective tool to teach clinical medicine

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ABSTRACT

Objective: This study was undertaken as an experimental effort to introduce role-play as a learning tool in teaching of clinical medicine, access its efficacy in understanding clinical scenarios and honing linguistic and examination skills through expression in medical students. The basic hypothesis was that, role-plays can guide the medical students in a better way by gaining knowledge and attitude to deal with real-life situations through simulation acts, so that they can apply this knowledge and skill gained through these simulations in practical examinations, as well as self-application in clinical practice. **Methods:** This experimental study with a single group pre- and post-test design was carried out in Datta Meghe Institute of Medical Sciences University (NAAC-A) and Jawaharlal Nehru Medical College, Wardha. Twenty-four final year MBBS students were selected for the study. All were subjected to a pre sensitization test in short case format covering affective, cognitive and psychomotor domains from cardiovascular, respiratory, and gastrointestinal system and marks were recorded. Later, the students were sensitized with role-plays of common clinical scenarios and all the role-plays were enacted. Finally, post sensitization test in the same short case format was conducted. Statistical method: student's paired t-test. **Results:** The post-sensitization scores in each domain were significantly better than the pre-sensitization scores, cognitive domain (95% confidence interval [CI]: -5.14 to -4.60; $P < 0.001$), affective domain (95% CI -3.26 to -2.65; $P < 0.001$), and psychomotor domain (955 CI -5.56 to -4.62; $P < 0.001$), respectively. **Conclusion:** Role-plays can be used as an extremely effective tool for teaching of clinical medicine.

KEY WORDS: Affective, cognitive, domain, psychomotor, role-play

INTRODUCTION

Van Ments (1989) defined role-play as: One particular type of simulation that focuses attention on the interaction of people with one another. It emphasises the functions performed by different people under various circumstances. Role-play is widely used as an educational method for learning about communication in medical education [1,2]. It is used as a training method to acquire knowledge, attitudes and skills in a range of disciplines and with learners of different ages (e.g., acquisition of language skills, [3] cross-cultural training, [4] medical science, business and human resources [5]. Although its use is widespread and educational theory provides a sound rationale for using this form of simulation, there is little published evidence for its effectiveness. As far as role-plays

in medical teaching are concerned, a lot of studies have been published dealing with the effectiveness of role-plays in the field of communication and behavioural skills of medical students with the patients. However, there are no published reports or studies about its effectiveness in the other domains in the medical specialities. This study will explore students experiences with benefits gained through role-play as an innovative learning methodology. This study will not only embark upon the utility of role-play as a learning tool in enhancing the communication and behavioural skill (affective domain) of the medical students with the patients, it will also analyse its effectiveness in other important domains like the capacity of the students to enhance and reinforce their knowledge of medicine and its application in various real-life situations (cognitive domain) and their examination skills (psychomotor domain).

MATERIALS AND METHODS

This experimental study with a single group pre- and post-test design was carried out in Datta Meghe Institute of Medical Sciences (DIMMS) University (NAAC-A) and Jawaharlal Nehru (JN) Medical College, Wardha. Twenty-four students of final year (MBBS final part 2) formed a study group. A pre-sensitization test was first carried out in a short case format. The total marks assigned for a short case clinical examination was 50 and the time allotted to each students was 20 min. The students were asked to take a brief history, think differential possibilities from the information gathered and do a relevant clinical examination on the patient/simulator. All these activities were observed by the examiner. The total marks were subdivided into various skill wise distributions, affective domain 10 marks, cognitive domain 20 marks and psychomotor domain 20 marks respectively. Two lecturers were assigned for conduction of the examinations. They were also briefed as how to access the students and give marks according to the performances in each domain.

The course for the examinations was medical conditions from a cardiovascular system, respiratory system and abdomen systems, which were already covered in traditional clinical teaching and theory lectures. The principal investigator acted as an observer through the examinations. Marks obtained were recorded. Then, all the 24 students were sensitized to role-plays over the next 2 months.

The 24 students were divided into three groups consisting of eight students each. Each subgroup was again divided into two small groups of four each. Each subgroup was assigned to prepare two scripts of case scenarios from one system. Each of the script was verified, necessary corrections were made and the students were asked to rehearse the act. Before the final presentation, the role-plays were first seen, and necessary corrections were made by the principal investigator and feed-back about performances and technical aspects of the acts and examination was given. Then, serially all the role-plays were seen. The case scenarios were again interchanged between the groups, so that all the groups were exposed to all the systems respectively. The basic structure and objectives of the role-plays were, to deal with common but important case scenarios, basic behaviour with the patients, rapport building, cognitive skills in the form of taking a brief history and discussing differential diagnosis and demonstration of clinical examination skills in the correct way.

After all the role-plays were done. Post-sensitization examination in the same format was taken by the same set of examiners who were blinded about the sensitization process, that is, the examiners were unknown about the process of role-plays to which the students were exposed before appearing for the post-sensitisation test. Marks obtained were recorded, and analysis of data was done.

Statistical analysis of data was performed using Student's paired *t*-test.

RESULTS

This study was conducted in JN Medical College, DMIMS University. The results of this study showed that there was a statistically significant improvement in each of the cognitive, affective and psychomotor domain of the students after they were sensitized with the role-plays conducted in different clinical scenarios. They are depicted in the tables vide infra.

Table 1 shows the marks obtained in all the three domains pre and post-sensitization. Tables 2-4 depicts the statistical significance of the same in all the respective domains.

Suggesting that there is a significant improvement in the performance of the students in the cognitive domain (remembering and recollecting the scientific facts) after being sensitised to role plays ($P < 0.001$).

Suggesting that there is a significant improvement in the performance of the students in the psychomotor domain (clinical examination skills) after being sensitised to role-plays ($P < 0.001$).

Suggesting that there is a significant improvement in the performance of the students in the affective domain (behaviour with the patients and showing communication skills) after being sensitised to role-plays ($P < 0.001$).

DISCUSSION

This study was conducted in DMIMSU, JN Medical College. Twenty four students from final year were selected for the study. First they went through a pre-sensitization clinical test, the

Table 1: Comparisons in all the three domains before (pre-test) and after sensitization (post-test) to role-plays

Cognitive domain		Psychomotor domain		Affective domain	
Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
6	12	7	11	3	6
10	15	8	13	5	8
7	13	8	14	5	8
12	17	13	16	4	6
7	12	10	15	3	6
10	15	8	13	4	6
11	16	10	15	5	7
12	17	12	16	3	5
10	15	10	15	4	8
8	11	11	16	5	7
7	12	12	16	3	7
8	12	7	15	4	8
11	16	12	17	6	8
12	17	7	14	3	6
10	15	12	18	5	8
7	11	10	15	5	8
11	16	8	13	3	6
10	15	11	15	4	7
7	11	8	12	5	8
11	16	7	13	5	8
8	13	11	16	3	6
10	15	10	15	4	8
11	16	8	14	4	8
7	11	10	15	4	8

Table 2: Statistical pre- and post-sensitization comparison for cognitive domain

Group variables	Group 1 pre-sensitization	Group 2 post-sensitization
Mean	9.29	14.26
SD	1.94	2.09
SEM	0.40	0.44
N	24	23

P<0.001 (extremely significant). The mean of group one minus group two equals −4.87. 95% confidence interval of this difference: From −5.14 to −4.60. Intermediate values used in calculations: *t*=37.3333, df=22, standard error of difference=0.130, SD: Standard deviation, SEM: Standard error of the mean

Table 3: Statistical pre- and post-sensitization comparison for psychomotor domain

Group variables	Group 1 pre-sensitization	Group 2 post-sensitization
Mean	9.58	14.65
SD	1.91	1.64
SEM	0.39	0.34
N	24	23

P<0.001 (extremely significant). CI: The mean of group one minus group two equals −5.09. 95% CI of this difference: From −5.56 to −4.62. Intermediate values used in calculations: *t*=22.5167, df=22, standard error of difference=0.226, SD: Standard deviation, SEM: Standard error of the mean, CI: Confidence interval

Table 4: Statistical pre- and post-sensitization comparison for affective domain

Group variables	Group 1 pre-sensitization	Group 2 post-sensitization
Mean	4.13	7.09
SD	0.90	1.00
SEM	0.18	0.21
N	24	23

P<0.001 (extremely significant). CI: The mean of group one minus group two equals −2.96. 95% CI of this difference: From −3.26 to −2.65. Intermediate values used in calculations: *t*=20.0919, df=22, standard error of difference=0.147. SD: Standard deviation, SEM: Standard error of the mean, CI: Confidence interval

results/marks given in the three domains were recorded, and then they were subjected to do role-plays on different clinical scenarios after which they were subjected to post-sensitization test. The student's post-sensitization examination marks were significantly better [Table 1].

In all the three domains (psychomotor, cognitive, affective), the mean marks obtained in the post-sensitization test were not only better but they were statistically extremely significant (*P* < 0.001) applying Student's paired *t*-test [Tables 2-4].

Role-play is widely used as an educational method for learning about communication in medical education. Although role-play is regularly used to develop communication skills in medical students [1-8], there are few published papers that evaluate role-play as an educational method. Experiences of using role-play to teach students about communicating have met with mixed success. Introducing role-play to a group almost always meets with resistance and/or anxiety from some students. This is manifested in student apprehension, reporting of prior unhelpful experiences and not taking role-

play seriously. Other researchers have also reported similar pre-conceptions to role-play. Stevenson and Sander (2002) reported that "role-play and student presentations" are the least preferred teaching method by 32% of new medical students [9]. Of these students, 75% believed it to be ineffective while 25% reported personal reasons (e.g., embarrassment) for their response. Role-play is used as a training method to acquire knowledge, attitudes and skills in a range of disciplines and with learners of different ages [10-14]. The idea of role-play, in its simplest form, is that of asking someone to imagine that they are either themselves or another person in a particular situation. In order for a simulation to occur the participants must accept the duties and responsibilities of their roles and functions, and do the best they can in the situation in which they find themselves in [15].

Role-play activities can be performed in different ways. For the acquisition of patient-centred interviewing skills we tend to use the approach in which students play their role as a medical student so they are expected to perform as they would in real clinical encounters. However, there are many variations on this theme. Role-play can be fully scripted (all players act from verbatim scripts) or partially scripted (players have certain prompts-often an opening line). Alternatively, one player (e.g., patient) is given a description of their role while the other (e.g., student) is provided with their task. Players can rotate through roles within a single role-play (switching) with the intention of gaining insight into other roles, or perspectives or players can be substituted at various points in the role-play by observers. Some role-play activities use role cards as a way of inserting new information into a role-play. In this study, the role-plays were pre-scripted and rehearsed before they were acted upon.

Knowles (2005) in his study has set out principles associated with adult learning. They include the learner having a need to know, are self-directed, has and draws on diverse experiences, has a readiness to learn, that the learning should be problem-centred and that there is an internal motivation to learn [15]. Role-plays should be created and implemented with these principles in mind. Role-plays based on a different problem oriented clinical scenarios actually attracts the learner to gain knowledge in a totally different way. Education becomes a felt need for the students. The students see themselves in the clinical situation and while enacting, they gain the experiences and learn the nuances of theoretical, practical, clinical and behavioral aspects of clinical problem solving in an amicable environment in a holistic manner.

In this study, the final MBBS students were chosen who had prior knowledge of medical cases. While in the traditional clinical teaching methods, the case is discussed by a teacher in front of a clinical batch, questions are asked, some clinical signs are demonstrated. But, unfortunately, not all students get a chance to participate in the thrill and action. Introvert students always prefer to avoid interaction with the teacher, though they have the inclination to learn. The low achievers never get the guts to come forward and ask their doubts and apprehensions. By role-play, all the categories of students get an equal chance to perform and learn.

Charlton [3] in his study used role-plays to teach communication skills in palliative medicine using a 3 h exercise involving role-plays, a time of feedback and discussion, teaching video and a reading list. Using this teaching method self-rating of perceived skills recorded on the questionnaire before and 4 weeks after the exercises showed a significant increase in both undergraduates and post-graduates. The validity of these self-ratings as a tool to measure communication skills was assessed by correlating the self-ratings with the ratings given by the participant and the observers after the clinical scenarios from the questionnaire were simulated in role-plays.

In this study partly akin to Charlton's, undergraduate students were subjected to a pre-sensitization clinical test where they were tested for affective (behavioral and communication skills), cognitive (knowledge and its application) and psychomotor domains (clinical skills to be demonstrated on the patients, that is; examination of cases) and evaluated by marking them in each domain. Then after that over a period of 2 months they were involved in reading different clinical scenarios, making scripts of role-plays, rehearsing the plays where corrections were done, and advice was given to improve technical aspects, and all were also taught to examine patients in a perfect way, then finally plays were performed. The plays were video recorded and shown to the students. Feedback was given to the students, and a verbal feedback about their experiences and improvement was taken formally. Then the students were again examined (post-sensitization) in the same format, and there was a significant improvement in all the three domains as observed. It proves that role-play can be an effective tool in teaching clinical medicine.

Kneebone [16] described a theory-based approach to learning clinical skills in simulation drawing on literature on expertise, supportive tailored tutoring, learning within a professional context and affective elements of learning. Using this theory he identified criteria for evaluating simulations given below;
1. Simulations should allow for sustained and deliberate practice in a safe environment and that simulations ensure skills are consolidated and aligned with other curricula activity. This study strictly adhered to the same. All the case scenarios were from the curricula of final MBBS. The role-plays were practiced well before finally they were seen by the audience students. They did not intervene with any form of experiment regarding patient management or patient care. Proper consent was taken from the patients.
2. Simulations should provide access to expert tutors. In this study, all the role-plays were guided and seen by the investigator himself. The scripts of each role-plays were scrutinized, mistakes corrected, and all were rehearsed two to three times so that the clinical skills of examining the patients were mastered and perfected. It was emphasized that all the dialogues and acts were relevant to the clinical situation.
3. Simulations should map on to real life clinical experience. This study dealt with real life clinical cases/simulations.
4. Simulation based learning should provide a supportive, motivational and learner-centred environment. All the role-plays were student centred and all the students were motivated by these role-plays.

Maier (2002) suggested that role-play method be selected according to whether the educational goal addresses knowledge, attitudes or skills. In the acquisition of knowledge, role-plays can be valuable to observe and then discuss - the experience of the role-players themselves is less important than the opportunity to observe, understand and assimilate information. For attitude development especially that which focuses on change of affect, then role-plays should be loosely structured so that players experience emotions spontaneously. While for skills acquisition, the opportunity for repeated opportunities with feedback is critical [17]. This study was unique in the sense that apart from behavioural skills the student's affective and psychomotor domains were also tested. So all the students after being given a particular case scenario were asked to read the topic in details, practice the clinical tests/demonstration of clinical signs, make the script discussing within themselves, prepare the dialogues embarking on all the possible important questions and finally rehearse and show the role-play to the investigator, so that mistakes were corrected, feed backs were given, and then only the final role-play of that group was seen by all the students. This encouraged the students more and helped them to be more confident.

Role-play was reported to be an effective means of learning communication skills. After participating in this study, almost all students reported role-play as an extremely valuable tool for learning clinical medicine. Students identified helpful and unhelpful aspects of prior and current experiences of teaching and learning medicine, as per the guidelines identified by Knowles [15].

In particular, the "need to know," "readiness to learn" and "orientation to learning (problem-centred)." These role-plays also complement the criteria that Kneebone. evaluated in his clinical simulations study [16].

The guidelines also support those outlined in a recent paper by Joyner and Young (2006) that appear to be based on their extensive experience [7]. According to them, role playing can be a great way to get students involved in the subject matter. Students can play all the characters involved in a course related issue (past or present). Role playing isn't limited to playing people. The positive impacts of role-plays noted in their study were comparable with the experiences of this study. They are briefly discussed below.
1. Role playing forced students to become actively involved in the issues brought up in traditional clinical teaching.
2. It fostered the empathy and a greater understanding of the problem surrounding the role-play. Students gained a number of new perspectives on the topic. It helped students to understand the material better. It linked them to real world clinical cases and processes.
3. It increased their awareness of the multifacetedness of issues.
4. It made a strong impression on students, and helped them to retain material better.
5. It improved students' public speaking abilities.
6. It provided a safe place for students to present contrary or unpopular opinions.

As with all instructional techniques, role-playing requires planning. It is important to allow students enough time to prepare for their roles. For large or complicated role-playing situations, students should be researching their roles well in advance. All of these guidelines were meticulously followed in this study. The students were given the tasks weeks in advance, and all the students prepared a well-researched report on their character, or on the issue which their character was representing. It was made sure that, the role-plays ran its course effectively. All the students were involved in the role-plays. Even if they weren't characters, as observers they were allowed to ask questions and spark discussions among the role-players after the role-play was over. After each role-play, students and investigator spent some time discussing the perspectives or problems that had been raised in the role-play, and it was made sure that the students understood what they were supposed to get out of the experience. In relation to experiential learning theory, this study encouraged and gave opportunities to the learners to consider each orientation of the Kolb and Fry's four learning environments, those are; thinking, feeling, watching and doing.

Kolb and Fry's [18], famous model consists of four elements: Concrete experience, observation and reflection, the formation of abstract concepts and testing in new situations. They argue that the learning cycle can begin at any one of the four points-and that it should really be approached as a continuous spiral. However, it is suggested that the learning process often begins with a person carrying out a particular action and then seeing the effect of the action in this situation. Following this, the second step is to understand these effects in a particular instance so that if the same action was taken in the same circumstances it would be possible to anticipate what would follow from the action. In this pattern, the third step would be understanding the general principle under which the particular instance falls. To a great extent role-plays satisfy these concepts in learning medicine, that is understanding a clinical problem, reading and learning about it then applying the behavioral and psychomotor skills in dealing with the clinical problem and finally apply the same concepts of experimental learning in real life situations.

Structured role-plays directed students to think about what had taken place in each role-play as well as the value of role-play before and after participating in the session. This prompted students to draw on their prior experience - An important component of adult learning as well as promoting reflection-on-action.

Like most educational methods, role-play on its own probably contributes only a little to the development of patient-centred interviewing skills but as part of a broader communication programme, like experimented in this study that used a wide range of methodologies addressing knowledge acquisition, attitude and skills development, role-play appeared to be beneficial. For this reason, it is difficult and in some ways unreasonable to try to evaluate the impact of singular educational methods. It is also important to recognise that students learn in different ways and that role-play may be the preferred method for students who learn through concrete experiences.

This study explored student's prior experiences with traditional bedside clinical teaching as well as those from the session in order to differentiate previous and current experience. All the students admitted that the role-plays really brought the students close to real life situations and made them confident in dealing with clinical cases. No doubt the increase in the level of confidence occurred due to repeated practice and rehearsals before the final plays and all the players lived their roles seriously.

Contrary to Stevenson and Sander's [9] opinion, nearly all the students gave positive remarks about role-plays. Even the introverts and low achievers showed substantial improvements in post-test examination.

CONCLUSION

This study has provided a practical foundation for the use of role-play as an educational method in the broader context of simulations in clinical medicine. It's time to give a serious thought so as to inculcate role-play in the current system of medical education as an effective tool for teaching and learning clinical methods in medicine. Future research should investigate the relevance of role-plays for more experienced students and practitioners and in different contexts and scenarios in medicine.

Limitations

The relatively small sample size limits the generalizability of our results. Comparisons among more students playing similar roles or the same student playing different roles might help address this. Additional studies involving different types of problems and different contexts might increase our understanding of the use of role-plays across a variety of situations. Finally, whatever may be the clinical scenario the student's subconsciously know that this is not the true real-life event and this evokes a comfort zone within which the learner learns. Whether learning gained through role-plays will generate equal clinical efficiency in real-life situations will remain uncertain.

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