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In situ Clinical Simulations in Primary Care applied to emergency training

David Lacasta-Tintorer[1,2,3], Noelia Esplugas-Muñoz[1], Anna Estafanell-Celma[4], Celia Tajada-Vitales[5,6], Jofre Bielsa-Pascual[2,7], Eduard Moreno-Gabriel[2,3,7], Pere Toran-Montserrat[2,7,8]

[1] Centre d'Atenció Primària Gran Sol, Gerència d'Àmbit d'Atenció Primària Metropolitana Nord, Institut Català de la Salut, Badalona, Spain. [2] Unitat de Suport a la Recerca Metropolitana Nord, IDIAP Jordi Gol, Unitat de Suport a la Recerca Metropolitana Nord, Mataró, Barcelona, Spain.[3] Universitat Autònoma de Barcelona, Cerdanyola del Vallès, Bellaterra, Barcelona, Spain.[4] Centre d'Atenció Primària Sant Miquel, Gerència d'Àmbit d'Atenció Primària Metropolitana Nord, Institut Català de la Salut, Granollers, Barcelona, Spain.[5] Centre d'Atenció Primària Centre - Can Marine/Dr. Vilsaeca, Gerència d'Àmbit d'Atenció Primària Metropolitana Nord, Institut Català de la Salut, Santa Coloma Gramenet, Barcelona, Spain.[6] Unitat Docent Multiprofessional d'Atenció Familiar i Comunitària Metropolitana Nord. Gerència d'Àmbit d'Atenció Primària Metropolitana Nord, Institut Català de la Salut. Cerdanyola del Vallès, Barcelona, Spain.[7] Institut Universitari d'Investigació en Atenció Primària (IDIAP Jordi Gol), Barcelona, Spain.[8] Departament de Ciències Mèdiques, Universitat de Girona, Girona, Spain.

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Abstract

A study with a mixed quantitative-qualitative methodology was designed to assess the use of on-site Clinical Simulations in Primary Care applied to training in Myocardial Infarction (MI) Code, Stroke Code, and cardio-pulmonary resuscitation. A total of 95 surveys were completed, and 2 focus groups were conducted with 19 healthcare workers from a health center, representing various professional profiles.

Participants expressed the opinion that the training improved their self-confidence and long-term knowledge, and had been very useful and interesting, as it allowed them to practice aspects impossible to address through other types of training (e.g. material localization). They highlighted the importance of leadership in emergency care and enhanced teamwork. Professionals preferred this methodology for future training activities.

Keywords: *Clinical Simulation; Continous training; Primary Care.*

1. Introduction

1.1. What are clinical simulations (SIM)?

One of the pillars of Primary Care (PC) is continuous training, not only to maintain an adequate update in the management of the most prevalent pathologies, but also to ensure an optimal response in uncommon but serious urgent clinical situations, such as are Acute Myocardial Infarctions (AMI) and Strokes. Continuous training in the Stroke Code and IAM Code is mandatory among the healthcare professionals of PC in Catalonia as part of the indispensable items of the Healthcare Quality Standards. This training, of annual frequency, is usually taught by healthcare professionals face-to-face through a theoretical presentation or through online training.

The relationship between teaching methodology and long-term retention of skills is well known. According to Edgar Dale's learning pyramid, the retention of acquired knowledge varies depending on the student's role in the learning process itself (Dale et al., n.d.). You feel maximum learning if real situations are simulated or especially by performing the actions in a real area. Therefore, the closer the learning methodology is to the real situation, the greater the degree of knowledge retention.

According to the Center for Medical Simulation, simulation (SIM) is a situation or scenario created to allow people to experience the representation of a real event for the purpose of practicing actions, learning, evaluating, testing, or acquiring knowledge of systems or human The SIM responds to an emerging teaching need and aims for students and professionals to acquire and perfect clinical, communicative and teamwork skills.

A SIM is divided into three phases: prebriefing (to clarify objectives, environment and roles, and to create a safe environment highlighting the training value and that confidentiality is guaranteed), simulated activity (a scenario is created with simulated patients, as real as possible, and participants are asked to act as they would in a real situation, and the rest of the participants actively observe their peers' simulation) and debriefing. This last key phase takes place in a workplace different from that of the simulation scenario. In it, the participants themselves review the event, analyze their actions and reflect on the role of thought processes, psychomotor skills and emotional states, to improve their actions in the future.

Finally, the learning acquired through experience ("learning by doing") is transferred to routine clinical practice by modifying behaviors and attitudes.

SIM as a teaching methodology at undergraduate level is being widely used (Fitch, 2007; Seybert et al., 2008), and also at postgraduate level, especially in the field of emergencies, whether in-hospital or out-of-hospital (Martin et al. ., n.d.), and has shown to improve student satisfaction (4), confidence in handling different clinical circumstances (Theilen et al., 2013;

van Schaik et al., 2011), long-term knowledge retention term (Houben et al., 2011), applicability of learning to clinical practice (translation) (Sánchez et al., 2013), patient safety (Abdulmohsen H, 2010; Lavelle et al., 2017; Wang et al., 2019) and communication and teamwork (Garden et al., 2010; Patterson et al., 2013).

It is common to use simulated clinical situations as part of Basic Life Support courses using the Automatic External Defibrillator (SVB+AED), usually without following a well-structured and defined methodology. The use of SIMs could be very interesting not only in this field, but also in other topics within the field of emergencies (AMI code, Stroke code, convulsive crises, hypoglycemia...), as well as in the management of chronic pathology, home patient or communication aspects.

1.2. Clinical simulations in situ

The use of in situ simulations, i.e. carried out in the workplace itself, in the physical environment and with the usual professional team can further improve learning, especially in terms of aspects of communication and teamwork, while allowing to detect errors in the application of the protocols that can only be observed if the practice is carried out in the real environment. According to Motola et al., 2013, in situ SIMs can be an attractive alternative for institutions that do not have their own simulation center, and can improve reliability and safety in high-risk areas or in high-stress environments, especially in interdisciplinary trainings (Cook et al., 2013; Kurup et al., n.d.; Riley et al., 2010; Sørensen et al., 2017).

Although in situ SIM can facilitate the organization of training activities, since they do not require professionals to travel to another specific center, with the consequences that this fact can have on the usual healthcare activity, there are doubts in relation to the viability of this methodology, since it requires having the emergency consultation available for this activity, and this is not always possible.

1.3. How SIMs are evaluated.

One of the tools to assess learning, both formal and informal, is Kirkpatrick's learning assessment model. According to this model, updated in 2019 (Kirkpatrick & Kirkpatrick, n.d.), four levels of evaluation are determined. In the first level, the reactions are evaluated, that is, how the participants have reacted to the learning (through interviews, comments, interest in the course, participants' perceptions of the value of the course, etc.). The second level assesses the learning of knowledge (with pre/post test, observations, etc.). In the third level, the change in behavior/conduct is evaluated (interviews or focus groups) and finally the fourth level analyzes the results, that is to say the transfer to final results in patients (through safety, quality assessments, etc.). According to (Liao & Hsu, 2019), the results of the analysis of the third level (behavior) predict the results of the fourth level, which are usually more difficult to measure.

1.4. Justification of the study

As we have seen, the scientific evidence indicates that SIM methodology is effective in improving the learning of both technical and non-technical skills among healthcare professionals, but there is less experience with the use of SIM in the field of Primary Care, especially developed in the work centers themselves (in situ).

In this sense, the use of SIMs in this area raises some questions: Does it really improve knowledge retention in the long term? And the satisfaction and trust of the professionals? Would healthcare professionals accept the use of this methodology? Is it suitable for everyone, or is there a professional profile for whom it would be more useful and another profile for whom it could become counterproductive? In which other topics relevant to the PC could this methodology be applied? Is it feasible to integrate this methodology into the usual work activity of healthcare professionals, so that gradually all continuing education activities are practiced in this way?

To answer these questions, the present study has been designed, by evaluating the effectiveness of this methodology, based on the Kirkpatrick Evaluation Model, and the feasibility of implementing this methodology in the Primary Care field.

2. Hypothesis.

The use of the in situ SIM methodology applied to training in IAM Code and Stroke Code in Primary Care is feasible and enhances both clinical and non-clinical skills of Primary Care professionals.

3. Objectives

3.1. General objective

- To assess the effectiveness and viability of a training program in IAM Code and Stroke Code based on the SIM in situ methodology.

3.2. Specific objectives

- Analyze the improvement in non-clinical skills: communication, leadership, and teamwork.
- Examine the improvement in knowledge retention over time through this methodology.
- Analyze how the acquired learning results in changes in the clinical practice of professionals and in teamwork.
- Evaluate the satisfaction level of professionals regarding the use of this methodology.

- Assess the feasibility of implementing this training methodology in the Primary Care training program (interference in the daily activities of the center and necessary resources).

4. Methodology

4.1. Type of study

Implementation study using mixed methods.

- Quantitative study in the form of an analytical observational study based on a pre-post questionnaire with a comparison group, evaluating both technical and non-technical skills, as well as the Simulation-Based Training Quality Assurance Tool (SBT-QA10), which analyzes the simulation experience from the learner's perspective.
- Qualitative study based on the principles of Grounded Theory, involving:
    - Focus groups with healthcare and non-healthcare professionals.
    - Individual interviews with managerial positions.
    - Observations during the development of the training activity.

4.2. Determinations

The results of pre and post-intervention questionnaires, SBT-QA10 after each training activity, transcriptions of data recorded in focus groups, and the observer's notes from simulations will be analyzed.

4.3. Statistical analysis

4.3.1. Quantitative data

To compare and objectify the differences in results obtained before and after the intervention, the paired t-test were used for continuous data, and the McNemar test were applied if variables were binary.

4.3.2. Qualitative data

With the aim of generating the necessary knowledge to answer the research question, we consider Grounded Theory as the most appropriate method of analysis. It allows for the inductive generation of the theory of change underlying the intervention and identification of barriers and facilitators to its implementation, based on the perceptions expressed by study participants, rather than relying on assumptions prior to or by the research team.

5. Results

5.1. Quantitative study

A total of 95 professionals answered the survey, of which 88% were women, 55% aged between 31 and 50, 16% over 50 and 29% over 50. By occupation, 27% were specialists in family medicine, 22% were nurses, 18% administrative staff and the rest other professional profiles.

89.1% of the respondents considered that this methodology had contributed to improve their technical knowledge, and 87.3% thought it had improved their communication, coordination, and leadership skills. 92.7% thought it favored long-term learning, as well as self-confidence in handling this type of emergency (94.5%), with a significant improvement in pre- and post-intervention confidence ($p=0.028$) and serenity ($p=0.05$) and a perception of having improved their training ($p=0.012$). In summary, 84.3% recommended using this methodology in future training activities.

5.2. Qualitative study

Two focus groups were carried out, with a total of 19 interviewees, among whom there were 6 family doctors and 6 nurses, while the rest were other types of professionals, such as nursing assistants, administrators and psychologists.

All of the interviewees expressed their satisfaction with this training methodology, since it was more dynamic, more active and required greater involvement on the part of the professional.

The aspects that were valued positively were that teamwork was improved, leadership was practiced and it helped define the necessary roles in responding to an emergency. The interviewees especially highlighted the fact that by carrying out the training in the workplace itself, it allowed them to improve some essential aspects, such as familiarization with the environment, which allows quick location of emergency material and other types of materials (blackboard to record clinical data and interventions) and useful resources (protocols hanging on the wall), as well as solving some organizational problems.

Regarding the methodology of clinical simulations, the participants highlighted both the importance of prebriefing and debriefing. In the first case, it allows professionals to relax, allowing them to act more calmly and spontaneously. They especially highlighted that emphasis was placed on the educational and non-evaluative objective of the activity. Finally, they valued very positively that the debriefing is the space where it is possible to reflect on the performance and improve the necessary aspects.

It is worth noting that some professionals reported that they had been able to apply the knowledge acquired in responding to emergencies that had subsequently occurred in their workplace in the following days, acting more calmly and with better organization.

As proposals for future editions, the possibility of increasing the complexity of the simulations and allocating more time to this training activity was discussed, as well as expanding the topics to be addressed: anaphylaxis, poisoning, troubled patients or mental disorders.

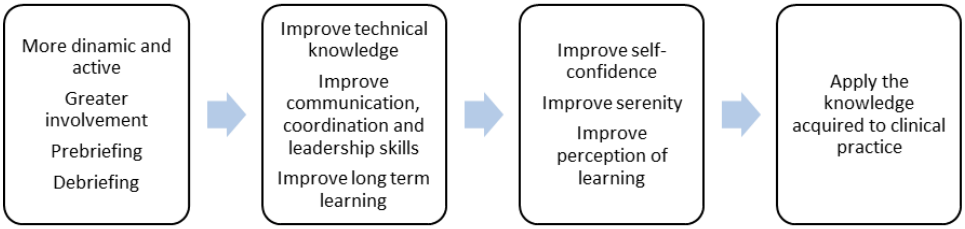

Figure 1. Results

6. Discussion

The use of clinical simulations applied to continuing education in the healthcare field has been used frequently, usually in hospital medical specialties in the field of emergencies (intra or extra-hospital emergencies, intensive care units, anaesthesiology, etc. In Primary Care, emergency care is uncommon but requires an optimal response from health center professionals.To improve skills in this area of PC, both technical and non-technical, the use of SIMs is becoming a tool with great potential, as evidenced by the data from our study, where the professionals interviewed refer to this methodology as helping to improve their technical knowledge, as well as their communication and leadership skills, along the same lines other studies in different areas (Sahin-Bayindir & Buzlu, 2022). Similarly to other studies (Mehrotra et al., 2011), our PC professionals advise the use of this methodology for future training activities on any subject.

Not only that, but also the fact that the SIMs are carried out at the same place of work of the professionals (SIM in situ) allows to improve aspects related to the work center itself, and fulfills the primary objective of the simulations, which is to bring to the maximum learning to a real situation. In this sense, the possibility of carrying out the simulations in multidisciplinary teams is highly valued, which allows a better knowledge of the roles and functions of the other members of the team (Kyrkjebø et al., 2006).

7. Conclusions

In situ clinical simulations applied to primary care emergency training (AMI code, Stroke code and CPR) allow to improve knowledge and teamwork, and could be applicable to continuing training in other areas.

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