Adherence and Perceptions Regarding Simulation Training in Undergraduate Health Sciences

Adesão e Percepções sobre Simulação em Graduação nas Ciências da Saúde

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KEYWORDS

– Education, Undergraduate
– Simulation
– Prevalence.

ABSTRACT

Background: *Simulation techniques are spreading rapidly in medicine. Such resources are increasingly concentrated in Simulation Laboratories. The MSRP-USP is structuring such a laboratory and is interested in the prevalence of individual initiatives that could be centralized there. The MSRP-USP currently has five full-curriculum courses in the health sciences: Medicine, Speech Therapy, Physical Therapy, Nutrition, and Occupational Therapy, all consisting of core disciplines.* **Goal***: To determine the prevalence of simulation techniques in the regular courses at MSRP-USP.* **Methods***: Coordinators of disciplines in the various courses were interviewed using a specifically designed semi-structured questionnaire, and all the collected data were stored in a dedicated database. The disciplines were grouped according to whether they used (GI) or did not use (GII) simulation resources.* **Results and Discussion***: 256 disciplines were analyzed, of which only 18.3% used simulation techniques, varying according to course: Medicine (24.7.3%), Occupational Therapy (23.0%), Nutrition (15.9%), Physical Therapy (9.8%), and Speech Therapy (9.1%). Computer simulation programs predominated (42.5%) in all five courses. The resources were provided mainly by MSRP-USP (56.3%), with additional funding coming from other sources based on individual initiatives. The same pattern was observed for maintenance. There was great interest in centralizing the resources in the new Simulation Laboratory in order to facilitate maintenance, but there was concern about training and access to the material.* **Conclusions***: 1) The MSRP-USP simulation resources show low complexity and are mainly limited to computer programs; 2) Use of simulation varies according to course, and is most prevalent in Medicine; 3) Resources are scattered across several locations, and their acquisition and maintenance depend on individual initiatives rather than central coordination or curricular guidelines.*

PALAVRAS-CHAVE

– Educação de Graduação em Medicina
– Simulação
– Prevalência

RESUMO

Introdução: *O ensino superior tem sido constantemente pressionado para inserir novas técnicas. Em que se pese a vasta utilização das técnicas, ainda há carência de informações sobre sua utilização e impacto. A FMRP-USP está estruturando um Laboratório de Habilidades e necessita de dados sobre a prevalência de uso destes recursos.* **Objetivo***: Avaliar a prevalência de recursos de simulação nos cursos oferecidos pela FMRP-USP.* **Métodos:** *Entrevista estruturada através de questionário desenvolvido especificamente aos responsáveis pelas disciplinas de graduação da FMRP-USP. Os dados obtidos foram armazenados em banco de dados desenvolvido na plataforma Microsoft Access. Os cursos foram divididos entre aqueles que oferecem algum tipo de recurso (GI) e os que se limitam a recursos tradicionais (GII) e foi utilizado o teste de qui-quadrado para a comparação de proporções entre os grupos.* **Resultados:** *Analisou-se 256 disciplinas. O percentual de disciplinas que compuseram o GI foi de 18,3%, variando de acordo com o curso — Medicina (24,7%), Terapia Ocupacional (23,0%), Nutrição (15,9%), Fisioterapia (9,8%) e Fonoaudiologia (9,1%). Há predominância do uso de programas de computador (42,5%) independente do curso. A origem dos recursos é de predomínio da FMRP-USP (56,3%), mas apresenta importante contribuição de outros setores. A manutenção, porém, é quase exclusividade da FMRP-USP. Os recursos estão alocados predominantemente nos Departamentos. Verificou-se grande interesse na centralização desses recursos em um laboratório de simulação.* **Conclusão:** *1) Os recursos de simulação são predominantemente de baixa complexidade e em sua maioria restritos à programas de computador; 2) Há diversidade no uso dos recursos na dependência da área de aplicação, com maior uso em Medicina; 3) Os recursos estão dispersos na FMRP-USP, com aquisição e manutenção dependentes de iniciativas individuais dos cursos, sem centralização.*

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BACKGROUND

Simulation relies more on teacher preparedness than on complex, costly, and high-fidelity simulators, whose effectiveness is still arguable[1]. Nevertheless, the tools are becoming more and more complex and expensive, forcing institutions to concentrate resources in training facilities in order to optimize acquisition and maintenance[1-3]. Despite this recent centralizing tendency, simulation has been introduced into health sciences schools mostly through independent initiatives, driven by disciplines seeking alternatives to deal with the lack of opportunities for teaching rare procedures or to address ethical concerns, as in emergency medicine and anesthesiology[2,4-6].

The introduction of newer simulation laboratories should take into consideration the resources already acquired and distributed across the institution[7]. Besides the economic benefits, it is important to identify how simulation is being used and to provide opportunities for faculty training[4]. We conducted a cross-sectional survey in a traditional Brazilian health sciences school to identify the prevalence and characteristics of simulation resources in order to help introduce a simulation laboratory.

METHODS

The Medical School of Ribeirão Preto of the University of São Paulo (MSRP-USP) is a renowned public Brazilian institution that dates to the 1950s[8]. More recently, it started four other courses in the health sciences: Physical Therapy (2002), Occupational Therapy (2002), Speech Therapy (2003), and Nutrition (2003). MSRP-USP recently created a simulation facility, but it is still underutilized[7].

We conducted a cross-sectional survey with the faculty in charge of all the mandatory disciplines comprising the five course curricula: Medicine (75 disciplines); Physical Therapy (61); Occupational Therapy (73); Speech Therapy (77); and Nutrition (63). The survey used a dedicated structured questionnaire applied by a single trained interviewer. Simulation taxonomy used in the questionnaire was that recommended by the Society for Simulation in Healthcare[4]. If simulation was used as an educational tool by the discipline, information was elicited on the complexity, intensity, maintenance, and educational results or impressions. If simulation was not being used by the discipline, we asked about the interest in (and potential reasons for) introducing it. In both situations, we asked whether professors were aware of the existence of the Simulation Laboratory and whether they had plans to combine resources. If they were not interested in simulation, we asked why. At the end of the interview, we left room for any additional observations the faculty might like to add. All the subjects provided informed consent, signing a term approved by the Institutional Review Board (Case No. 922/2009).

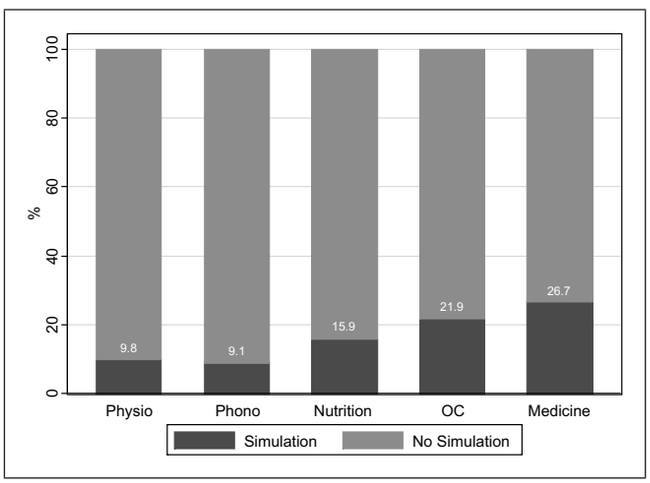
Categorical variables were expressed as percentages, and chi-square or Fisher´s exact test were used for group comparisons as applicable. We stratified the analysis by course, and specifically by year of the course in the case of Medicine. We also performed a qualitative analysis of the professors' impressions on use of simulation, based on content summary techniques[9]. Statistical significance was set at p-value less than 0.05 for all tests. Data analysis used Intercool STATA 10[10].

RESULTS

Of the 349 course disciplines, only 59 (17%) were using any form of simulation resources. The majority of such resources showed low to intermediate complexity, like software (26; 44%), followed by actors/role-playing (15; 25%), full-body low-fidelity simulators (13; 22%), and others (8; 5%). The degree of utilization of simulation in these disciplines was less than 5% in 11 disciplines (18.6%), 5 to 10% in 20 (33.9%), 10 to 25% in 9 (15.2%), and greater than 25% in 19 (32.2%). Figure 1 shows the distribution of utilization (A), complexity of resources (B), and intensity (C) of utilization according to course. Figure 2 shows the same analysis for medicine alone.

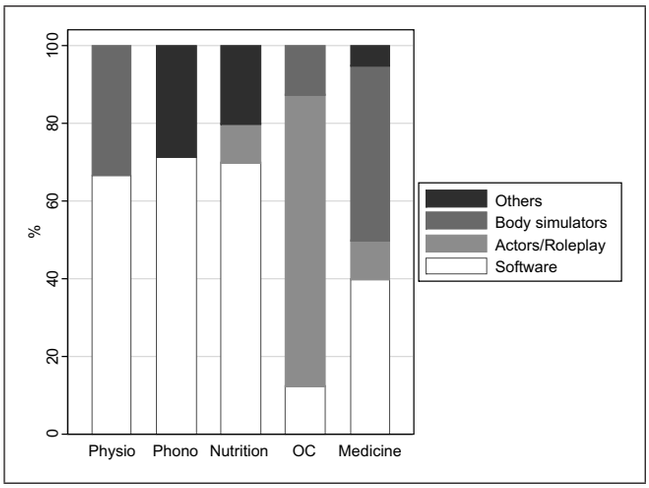
FIGURE 1

Distribution of utilization (A), complexity of resources (B), and intensity (C) of simulation use according to course



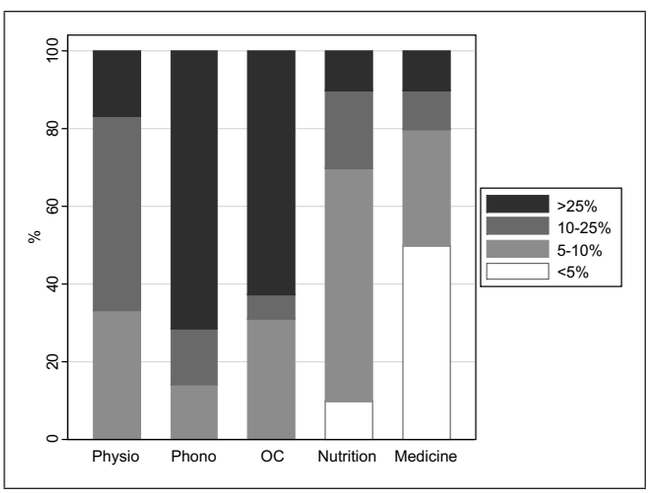
The majority of the resources were acquired through grants from the University of São Paulo (49%), but maintenance was funded mainly through other sources (53%). All the funding sources were public. Simulation resources were spread across different locations, and only 4 disciplines (7%) were housing their resources in the Simulation Laboratory.

Figure 2
Distribution of utilization (A), complexity of resources (B), and intensity (C) of simulation use according to year of medical school



Most of the course disciplines (191; 54.7%) reported being aware of the Simulation Laboratory, but only 64 of these 191 (33.5%) showed interested in centralizing their simulation resources. Figure 3 depicts the interest in centralizing resources according to awareness of the Simulation Laboratory.

Figure 3
Interest in centralizing simulation resources according to awareness of the Simulation Laboratory



The main reasons cited for not being interested in centralizing resources were that the resources were highly specific to the given course discipline and that the Simulation Laboratory was not close enough to the University Hospital.

Regarding introducing or incrementing simulation techniques, even though there were professors with plans for acquiring new resources, most were either limited to software or cited budget constraints for implementing the project. All the professors with plans for acquiring more elaborate resources were in favor of centralizing resources in the Simulation Laboratory.

No concrete evaluation of the impact of introducing simulation as a teaching technique was provided. A qualitative analysis of the arguments against introducing simulation could be summarized as expressing satisfaction with the current resources, viewing the technique as too time-consuming given the time allotted to the discipline in the curriculum, lack of preparation as a teacher to use simulation, and not considering simulation useful after previous attempts to implement it. Professors in favor of introducing simulation but who had not used it showed incomplete knowledge of its full potential and insufficient interest in proper training. Professors already using simulation mainly expressed interest in acquiring newer and more complex simulators, improved training, and the increased interest of students in the course subject when using simulation.

DISCUSSION

Most attention in simulation has focused on resources for training and trained instructors for its implementation. Curricular institutionalization, meaning an institution's commitment to implement strategies for patient safety and effective teaching of skills such as simulation, is the third link in the chain, although largely neglected, even though it is as important as the others[11]. This institutional commitment has been proposed theoretically as several steps — awareness, interest, evaluation, trial, and adoption — and has been described in detail elsewhere[11]. MSRP-USP is an example of an institution that experienced these various steps and is now reaching the adoption phase with the emblematic implementation of a Simulation Laboratory[5,7,12-16]. To fully implement this facility, tailored to the institution's educational needs, this study was conducted to identify resources already implemented and guide future actions.

The MSRP-USP simulation resources have low to intermediate fidelity, varying according to the course type and complexity. They are being used in 17% of the course disciplines. Although there has been considerable discussion on how, how much, and when simulation should be employed in health sciences education, to our knowledge there is no definitive standard[2,4]. Previous experiences mostly relate to specific situations with advanced trainees. Lambton et al conducted a

study under conditions similar to those in our institution and suggest that the prevalence of simulation in the curriculum should be tailored to specific needs. In their study, 25% of course disciplines used simulation, but the needs were to train advanced undergraduate students[3]. Further research should establish the proportion of time allotted to a specific discipline considering the use of simulation.

An interesting finding regards the proportion of simulation use among the different health sciences courses at MSRP--USP. Although Medicine is the leading course, the relatively newer courses also use a considerable proportion of simulation. For example, Occupational Therapy has a similar rate to that of Medicine. This should be interpreted with caution, but one of the reasons is that while the medical school was founded more than fifty years ago when no alternative such as simulation existed or was demanded by society, the implementation of simulation has been gradual, depending mostly on changes in cultural patterns. For the newer courses, simulation is a reality to deal with, not as an alternative, but as a necessary tool.

Another important issue is that most disciplines that reported using simulation are doing so in less than 10% of the total course time. A recent study in emergency medicine reported similar findings on use of simulation laboratories by residents and identified several factors, such as teacher preparedness and the cost of using the facility[17]. We were only able to analyze that issue qualitatively, but our findings suggest that faculty preparedness for simulation is an important issue. Courses to publicize simulation and train faculty to use it effectively will be a key strategy in the ongoing implementation of the MSRP-USP Simulation Laboratory.

Implementing a simulation facility can be highly expensive, so cost can be an obstacle to its institutionalization in the curriculum. We found that most of the original funds came from the University of São Paulo, but the maintenance funding came mostly from other sources. Most of the solutions described in the literature for private institutions in developed countries will certainly not apply to a public institution in a developing country like Brazil[2], as emphasized by the fact that the other sources for complementing acquisition and maintenance were also public, even though not from the University of São Paulo. Until now, the new resources acquired by the MSRP-USP Simulation Laboratory were of low to intermediate fidelity, more cost-effective for the needs of the first years of the health sciences courses which were targeted at this phase. Price drops resulting from competition among manufacturers are raising new prospects for implementing high-fidelity simulation in our institution, but we still depend on individual fundraising for acquiring the more sophisticated resources. Most of these will certainly depend on government research funding agencies and the ability to convince the University of São Paulo to invest in simulation as it has in other teaching techniques.

Although institutionalization, also described as a "top--down" strategy, is a crucial step, the "bottom-up" approach should not be overlooked[2]. Identifying professors interested in simulation is a cornerstone for expanding its use in the institution. We identified 64 professors responsible for core disciplines in the five courses at MSRP-USP that are interested in participating in the Simulation Laboratory, and this is highly encouraging. Besides spreading the technique, it should allow us to apply for grants from government agencies to acquire high-fidelity simulators and to implement related research.

Most of our faculty that are using simulation are restricted to software or actors, and when asked to define simulation or techniques to be implemented, most reported a lack of formal training and felt that improving simulation techniques would require the acquisition of more complex high-fidelity simulators. Our staff is apparently not properly trained in simulation techniques, and this finding led us to abandon our intent to investigate how the existing techniques were being implemented. This is certainly a limitation to our study.

In conclusion, the MSRP-USP simulation resources consist of low to intermediate-fidelity simulators, mostly software, varying according to course and used in 17% of the disciplines. Most use simulation less than 10% of the time allotted to the discipline, and most of the resources were allocated outside the Simulation Laboratory. There is considerable staff interest in simulation training and participating in the Simulation Laboratory, which could provide an exciting combination of "top-down" and "bottom-up" strategies for increasing the use of simulation at the MSRP-USP.

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AUTHORS' CONTRIBUTIONS

The authors participated sufficiently in the conception and design of this study and in the analysis and interpretation.

CONFLICTS OF INTEREST

The authors had no conflicts of interest.

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