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Impacto de um *workshop* interprofissional, baseado em simulação, na perceção de estudantes de medicina e de enfermagem sobre os papéis e competências no trabalho em equipa eficaz: um estudo piloto

Impact of a simulation-based interprofissional workshop in medical and nursing students' perception of roles and competencies in effective teamwork: a pilot study

Março, 2022

FMUP

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DESIGNAÇÃO DA ÁREA DO PROJECTO

Ciências da Saúde

TÍTULO DISSERTAÇÃO

Impacto of a simulation-based interprofissional workshop in medical and nursing students' perception of roles and competencies in effective teamwork: a pilot study

ORIENTADOR

Professora Doutora Carla Sá Couto

COORIENTADOR (se aplicável)

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É AUTORIZADA A REPRODUÇÃO INTEGRAL DESTE TRABALHO APENAS PARA EFEITOS DE INVESTIGAÇÃO, MEDIANTE DECLARAÇÃO ESCRITA DO INTERESSADO, QUE A TAL SE COMPROMETE.	☐
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Faculdade de Medicina da Universidade do Porto, 23/03/2022

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Dedicatória

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Title: Impact of a simulation-based interprofessional workshop in medical and nursing students' perception of roles and competencies in effective teamwork: a pilot study

Brief title: LINKS – Lifting INterprofissional Knowledge through Simulation

Título: Impacto de um *workshop* interprofissional, baseado em simulação, na perceção de estudantes de medicina e de enfermagem sobre os papéis e competências no trabalho em equipa eficaz: um estudo piloto

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Title: Impact of a simulation-based interprofessional workshop in medical and nursing students' perception of roles and competencies in effective teamwork: a pilot study

Abstract

Introduction

Collaboration and communication among healthcare team members are critical components for high-quality patient care therefore Interprofessional (IP) learning should be included in healthcare curricula. There is a scarcity of simulation-based interprofessional education (IPE), especially in the undergraduate education. Considering the above educational need, a simulation-based workshop targeting interprofessional teams of healthcare students (medicine and nursing) was created, aiming the development of IP team perception (understanding of roles and competencies) and the use of Non-Technical-Skills (NTS) to promote effective IP teamwork.

Material and Methods

A total of twenty-three final year students (6th year medical and 4th year nursing students) were invited to participate in the workshop. Teams of three or four elements (medical and nursing students) were exposed to two critical patient management simulation scenarios. To assess the impact of the workshop three validated surveys (ATTITUDES, JSAPNC, and IPEC) were applied before and after the workshop.

Results

Student awareness of interprofessional learning and self-competency in IP practice improved. Statistically significant differences were found when comparing the overall pre- and post- scores, for both medical and nursing students, in the three surveys. All students agreed that the workshop

added educational value to their training, and recommended its integration in the formal curriculum, with a first round in the penultimate year and repeated in the last year.

Discussion and Conclusions

These findings scientifically corroborate the need for simulation-based IP programs, integrated in the undergraduate curricula, promoting clinical interactions of different professional groups. In the Portuguese setting, as in many countries across Europe, such novel program is needed and is expected to be well received.

Resumo

Introdução

A colaboração e a comunicação entre membros de equipas de saúde são componentes críticos para propiciar cuidados de alta qualidade ao paciente, devendo a aprendizagem interprofissional (IP) ser incluída nos currículos. Há uma escassez de educação interprofissional (IPE) baseada na simulação, principalmente no nível pré-graduado. Foi criado um workshop baseado em simulação tendo como alvo equipas interprofissionais compostas por estudantes de medicina e enfermagem, visando desenvolver a sua perceção (compreensão de papeis e competências) e o uso de competências não técnicas (NTS) para promover a eficácia do trabalho em equipa.

Material e Métodos

Um total de vinte e três alunos do 6º ano de medicina e 4º ano de enfermagem foram convidados a participar no workshop. Equipas de três ou quatro elementos (estudantes de medicina e enfermagem) foram expostas a dois cenários de simulação de gestão de doentes críticos. Para avaliar o seu impacto, três questionários validados (ATTITUDES, JSAPNC, e IPEC) foram aplicados antes e depois do workshop.

Resultados

A consciência dos alunos sobre a aprendizagem interprofissional e a autocompetência na prática interprofissional melhoraram. Diferenças estatisticamente significativas foram encontradas nos três questionários na generalidade das comparações pré- e pós- em ambos os grupos. Todos os estudantes concordaram que o workshop acrescentou valor educacional ao seu treino e recomendaram a sua integração no currículo formal, com a sua aplicação inicialmente no penúltimo ano com posterior repetição no último ano.

Discussão e Conclusões

Estes achados corroboram cientificamente a necessidade de programas de educação interprofissional baseados em simulação e integrados nos currículos. Em Portugal e na Europa há uma necessidade de programas inovadores como este e espera-se que sejam bem recebidos.

Keywords: "Interprofessional education", "Simulation Training", "Students, Nursing", "Students, Medical"

Introduction

The constant evolution and multiple challenges that healthcare systems face, advocates for more team-based approaches.[1] Considering that many healthcare incidents are associated with team communication problems and deficient team work skills, effective collaboration and communication among healthcare team members are critical components for high-quality patient care.[2] Clinical errors can cause human suffering or even death and are, nonetheless, financially costly.[3, 4]

Physicians and nurses work together on a daily-basis at the postgraduate level. Despite this fact, what is noticed is that their undergraduate curricula are separate and the training in effective strategies of communication and care participation is often postponed to the future professional practice.[5] There is a scarcity of programs designed for undergraduate interprofessional education in healthcare. In Portugal, the medical and nursing curricula makes little to no reference to interprofessional competencies and challenges (for further information, curricula can be consulted in *Diário da República*).

Interprofessional learning (IPL) is defined by the World Health Organisation (WHO) (2010) as when "students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes".[6] Creating a culture that values teamwork and mutual space for students to learn with and from one another is the way to success in preparing future healthcare professionals.[7] For effective IPE, a "one size fits all" approach is not likely to be successful. Nonetheless, much can be learned from the efforts of others.[7]

Simulation-based activities as IPL facilitator enables the training of complex skills, being broadly used in current interprofessional education (IPE) programs that are slowly arising around medical and nursing schools.[8] This educational strategy can be effective in improving communication and collaboration among healthcare students.[9]

Considering the above educational need, a collaboration between the medical (FMUP) and nursing (ESEP) schools of Porto (Portugal) was established and the program LINKS (Lifting

INterprofessional Knowledge through Simulation) was developed. LINKS is a simulation-based workshop targeting interprofessional teams of healthcare students (medicine and nursing), aiming the development of interprofessional (IP) team practices and the use of Non-Technical-Skills (NTS) to promote effective IP teamwork.

The purpose of this study is to assess the educational effect of this simulation-based workshop, in medical and nursing students' attitudes towards IP teamwork and collaborative practices, and their perception of roles and competencies within an IP team.

Material and Methods

Selection Procedure and Participants

The recruitment of the participants was made by convenience sampling (non-probabilistic). Final year students (6th year medical students and 4th year nursing students) were invited to participate in the workshop via e-mail.

Final year students were selected considering that both medical and nursing students would have competencies and clinical skills for essential treatments, acquired in core clinical clerkships, and have basic competencies for coping with emergency situations. Moreover, participants of this study are at the stage before starting their jobs and are capable to assess their competencies.

Vacancies were limited to eight students per session (four medical and four nursing), with a minimum of six students. At least, two students of each area (medicine/nursing) were needed to run a session. While enrolling the workshop, students were asked to select a date from those available and fill a simple demographic survey. Students were select in a first-come-first-served basis. The recruitment was open for two weeks. After this period, participants received confirmation of their acceptance in the workshop with the information of the date, and where given basic information on ABCDE approach, cardiac arrest management and NTS, through audio-visual support to promote students' engagement and facilitate the review of relevant content.

All participants were informed of the voluntary nature of the research in advance. In each session, a group of 6 to 8 students was distributed in two IP teams. Teams of three or four elements were exposed to two critical patient management scenarios. All participants actively participated in both scenarios.

Setting

The workshop was conducted between November and December, 2021, with a duration of 4h, at the Clinical Simulation Center of Faculty of Medicine of University of Porto. It started with an ice-breaking activity, involving all participants, followed by two clinical simulation scenarios, specifically designed for this workshop, aiming to challenge the clinical team to apply both Technical Skills and Non-Technical Skills (NTS). Students were not informed of the scenario in advance, and assumed roles close to their professional competencies. In each scenario, the initial assessment was conducted either by nursing students (in the role of nurses) or by a team of one nursing and one medical student (assuming the roles of nurse and doctor). Typically, with patient deterioration, the initial team called the remain element(s) and began the management of the patient.

The first scenario presented a patient with an anaphylactic shock followed by a cardiopulmonary arrest. This scenario explored the critical patient systematic approach and the application of resuscitation maneuvers in cardiopulmonary resuscitation context. It provided a context to reflect on how situational awareness evolved throughout the scenario, how leadership was established, and how communication was established in the various moments of the scenario.

The second scenario presented a multi-patient setting (two patients in a ward): one developing a post-op hypovolemic shock and the other requesting urgent pain control management. This provided a context to reflect on the importance of systematic assessment and re-evaluation, how the cooperation/interaction/support of team members has evolved, how the situational awareness changed throughout the scenario and how the communication of critical information (especially in a noisy environment) was established.

Each scenario took 15-20 min to unfold and was followed by a 40-50 min debriefing, conducted by a pair of faculty members. The program details and approximated timings are summarized in Table 1.

"Insert Table 1 here"

Data collection instruments

A simple demographic questionnaire (Appendix 1) was distributed during recruitment, and included age, gender, background (nursing or medical), previous degree, previous contact with simulation scenarios, previous participation in an IP educational context, and the ability to read and understand English at a level that would allow to complete questionnaires in this language.

To assess the impact of the workshop on students' attitudes towards IP teamwork and collaborative practices, three validated surveys (ATTITUDES[10], JSAPNC[11], and IPEC[12]) were applied before and after the workshop (Appendix 2 to 4), in their original version (in English). These questionnaires were completed before (pre-session) and after (post-session) the workshop for logistical reasons and to not interfere with the expected educational impact of the full session. The student's proficiency in English was assessed in the demographic questionnaire and was considered a mandatory inclusion criterion.

Attitude Towards Teamwork in Training Undergoing Designed Educational Simulation (ATTITUDES) is a 30 items scale organized into five sub-factors: IPE relevance (7 items), simulation relevance (5 items), communication (8 items), situation awareness (4 items) and roles and responsibilities (6 items). Questions are scored in a five-point scale from "strongly disagree" (1 point) to "strongly agree" (5 points). Total score is the sum of all item scores. A higher total score indicates a more positive students` attitude toward interprofessional learning through simulation-based IPE.

Jefferson Scale of Attitudes toward Physician-Nurse Collaboration (JSAPNC) scale consists of 15 items arranged in 4 sub-factors: shared educational and collaborative relationships (7 items), caring as opposed to curing (3 items), nurse's autonomy (3 items), and physician's authority (2 items). A four-point scale from "strongly disagree" (1 point) to "strongly agree" (4 points) is used to measure each item. To score the scale, items composing the factor "Physicians' authority" must be reversed. Other items are directly scored based on their ratings. Total score is the sum of all item scores. The higher the total score, the more positively students perceive teamwork and collaboration between physicians and nurses.

Interprofessional Education Collaborative (IPEC) Competency self-assessment tool is a scale composed by two sub-factors: interprofessional interaction (7 items) and interprofessional value (9 items). A five-point scale ranging from "strongly disagree" (1 point) to "strongly agree" (5 points) is used to score each item. Total score is the sum of all item scores. The higher the total score, the more students perceived as more competent in interprofessional practice.

To assess the opinion/satisfaction of the students toward the workshop an informal non-validated questionnaire was applied, via email, 4 to 6 weeks after the intervention (Appendix 5). The questionnaire assessed three areas: 1) Organization (invitation and registration, didactics, and timing); 2) Workshop content and structure (learning objectives, scenario, debriefing, and supportive environment); 3) Workshop feedback and recommendations (positive features, needs improvement features, and educational value). All questions were scored in a five-point scale from "strongly disagree" (1 point) to "strongly agree" (5 points), with the exception of "positive features" and "needs improvement features" that were open, non-mandatory questions.

All questionnaires were anonymous. The association between demographic, pre-, post- and satisfaction questionnaires was possible with the attribution of a unique code to each student.

Design

A pre-post design was used to explore changes in measures through the quantitative surveys completed by medical and nursing students that participated in the workshop. Figure 1 presents a CONSORT flowchart for this single-arm, nonrandomized study.

"Insert Figure 1 here"

Ethical considerations

This study was approved *by Comissão de Ética da Faculdade de Medicina da Universidade do Porto.*

Statistical analysis

Statistical analysis was conducted using IBM SPSS Statistics® software, version 27.0. Both descriptive and inferential analyses were performed. Considering the reduced sample size, non-parametric tests were used for inter- and intra-groups comparisons, considering a significance level of 5%.

Descriptive statistical analyses were conducted to identify the demographic distribution of participants in this study. Wilcoxon signed rank test was used to compare the mean difference between the pre- and post-test results of each scale item within the two subgroups of the sample (medical and nursing students). Mann-Whitney U test was used to compare the mean differences between the two sub-groups. Internal consistency of questionnaire scores was assessed through Cronbach's Alpha.

Results

A total of 23 students engaged the workshop. The participants included 14 nursing students (60.9%) with mean age of 21,6 and 9 medical students (39.1%) with mean age of 23,0. There was a clear predominance of the female population with a total of 19 female students (82.6%) and 4 male (17.4%), with the female population being 4,74 times higher. This difference is concordant with the tendency seen in Portuguese medical and nursing schools and in health systems in general.[13] Among the participants, 21 (91.3%) reported having previous simulation experience. Of all the participants, only 2 (8.7%) had previous IPE experience throughout their academic training. All students indicated to be proficient in English (capable to read and understand). The relevant demographic characteristics of the participants are summarized in Table 2.

"Insert Table 2 here"

ATTITUDES, JSAPNC, and IPEC Competency scores for medical and nursing students before and after participating in IPE programs are shown in Table 3.

"Insert Table 3 here"

Overall post-test scores were higher than the pre-test scores, with a single exception for the item "physician's authority" (sub-factor of JSAPNC scale), which decreased after de IPE among nursing students (pre: M= 3.20 vs. post: M= 2.64) but with no statistical significance (p = 0.052).

The total and sub-factors scores from ATTITUDES and IPEC Competency increased significantly after IPE, for both medical and nursing students. The total score from JSAPNC also increased significantly after IPE and for sub-factors "Shared education and collaborative relationships" and

"Nurse's autonomy". For the sub-factors "caring as opposed to curing" and "physician's authority" the changes in score, for both medical students and nursing students, were not statistically significant.

Mann-Whitney test was used to analyse intergroup differences, both in pre-test and post-test scores. Before IPE, statistically significant differences were found in "Interprofessional value" (IPEC) with concomitant difference in IPEC total score. Also, "Shared educational and collaborative relationships" (JSAPNC) presented a statistically significant difference in the pre-test score. After IPE, statistically significant differences were found in "physician's authority" (JSAPNC) with concomitant difference in JSAPNC total score.

Internal consistency of measures was overall adequate (Cronbach $\alpha > 0.70$) for ATTITUDES and IPEC scores. JSAPNC scores presented a week reliability. Table 4 presents the internal consistency values for each scale, for both pre- and post-test.

"Insert Table 4 here"

The follow-up satisfaction questionnaire had a total of 15 replies, with 8 drop-outs. Overall, students agreed or completely agreed that the workshop was well organized, with a clear and appropriate invitation, adequate bibliography sent in an attractive format (audio-visual), and adequate timing (mean: 4.60; SD: 0.37). All students agreed that this experience should be repeated within few months with different scenarios, and all but two agreed that the final year was the best timing for the workshop.

Similarly, the workshop content was rated high (mean: 4.83; SD: 0.23), with all but one agreeing that the learning objectives were clear, important and adequate (mean: 4.73; SD: 0.26), all agreeing that the scenarios were realistic, with adequate number and time (mean: 4.82; SD: 0.21), all agreeing that debriefing had a constructive approach, allowed reflection on individual and

teamwork performance, and was open to all contributions (mean: 4.93; SD: 0.14), and all but one agreeing that environment was supportive with psychological safety guaranteed (mean: 4.84; SD: 0.54).

All students agreed (mean: 5.00; SD: 0.00) that the workshop added educational value to their training, and recommended its integration in the formal curriculum (mean: 4.80; SD: 0.41), with a first round in the penultimate year and repeated in the last year. The open question on "positive features" and "needs improvement features" were aligned with the previous opinions. The positive comments focused mostly in the interprofessional interaction that the workshop offered (8 comments) with a few comments about the importance of debriefing (3 comments) and the realism of scenarios (2 comments). Possible improvements suggested by students were increasing time and frequency of the workshop (3 comments), and provide additional didactics before the workshop (1 comment).

Discussion

The present study explored the educational effect of a simulation-based IP workshop, in medical and nursing students' attitudes towards IP teamwork and collaborative practices, and their perception of roles and competencies. This study found that both medical and nursing students increased their awareness on interprofessional practice and their perception of roles and competencies within an IP healthcare team, although from a high baseline. These findings are in-line with other studies.[8]

ATTITUDES and IPEC Competency scores showed, for both groups and for all sub-factors, a statistically significant increase between the pre- and post-test, indicating a more positive attitude toward interprofessional learning through simulation-based IPE and a self-perception of higher competency in interprofessional practice. JSAPNC scores presented statistically significant increase, for both groups, for two of the four sub-factors: "shared education and collaborative relationships" and "nurse's autonomy". Interestingly, after the workshop, all medical students scored "nurses' autonomy" with the highest score, showing that, in their perception, nursing students are more autonomous and integrated in the interprofessional practice. One explanation for this result is that internships of nursing students are, in nature, more team-based then medical students' internships. Nursing students are viewed as team members with specific tasks enabling a more autonomous communication within the team (which includes colleagues, tutors, doctors and auxiliary personal) and even with the patient and their families. On the other hand, medical students tend to be focused in technical tasks, attributed by the tutor, and engage only in specific activities. The sub-factors "caring as opposed to curing" and "physician's authority" had no statistically significant difference, in both groups. Of notice is that "physician's authority" was the only sub-factor with a lower score after intervention (nursing students' group). This could be due to a misinterpretation of the questions/scoring scale, as this sub-factor was the only one with inverse rating.

The analysis of the intergroup differences for all questionnaires sub-factors indicate that, overall, both nursing and medical students had similar perspectives towards IPE at the baseline (pre-intervention) and after the workshop (post-intervention). Statistically significant differences were found at baseline in the "Interprofessional value" sub-factor of IPEC and in the "Shared education and collaborative practice" factor of JSAPNC. In the IPEC sub-factor, the nursing students scored statistically significantly higher, and, in the JSAPNC sub-factor, the reverse was observed. Both sub-factors include items on the value of a trusting team despite their members' diversity, values and opinions, the professional identity, roles and autonomy within the team, and the position of oneself in it. Although these intergroup differences were found at baseline, it was not observed after the intervention. It is possible to infer that the IPE experience allowed both nursing and medical students to have a clearer understanding of the team dynamic and their role in it, with the final result of perceiving themselves as more competent in interprofessional practice, teamwork and collaboration between physicians and nurses. After the intervention (post-test), the only statistically significant difference in the inter-groups analysis was in the "physician's authority" sub-factor of JSAPNC. As mentioned above, this may be due to a misinterpretation of the scale. This is corroborated by the week internal consistency of this instrument, as opposed to the high reliability found for the ATTITUDES and IPEC Competency questionnaires. Several studies show that JSAPNC scale has a variable reliability, depending on the sample used, and its adequacy for assessing IPL outcomes has been questioned. A study,[14] evaluating the psychometrics characteristics JSAPNC, found an internal consistency of 0,62, indicating a week reliability.

After participation in a single simulation-based IPE, students reported a greater understanding of the role of the other healthcare professionals, a more positive attitude towards interprofessional teamwork, and increased confidence in their teamwork skills. These results are consistent with the other studies.[8, 15] Teamwork in an educational setting can intuitively promote further interactions by allowing students to more clearly understand the contribution of the other elements in the team. The educational benefit is seen even in the short-term interprofessional simulation

experiences, leading to the conclusion that more sustained opportunities to work alongside with other professionals could bring even greater changes. [15]

Prior to this study, the majority of students had experienced simulation-based training (with the exception of 4 nursing students) but only 2 nursing students had IPE experience. These findings demonstrate that simulation is a well-accepted educational strategy, commonly integrated in both nursing and medical curricula. On the other hand, the same level of importance and acceptance is not observed towards IPE, marked by separate academic pathways, despite the physical proximity that some nursing and medical schools have. The results of the follow-up satisfaction questionnaire corroborate these findings. It highlighted that students understand the importance of this educational approach, requesting for more opportunities to train and practice their IP skills, especially at the end-stage of the undergraduate education. Although, there were 8 drop-outs, this feedback is a starting point to refine the workshop and understand what should be maintained and what should be improved in potential future interventions.

Limitations

The major limitation of this study lies in its reduced sample. The simulation centre and faculty availability, the limited number of people per room in confined spaces due to COVID-19 pandemic, and corresponding students' schedules were the main barriers. A multi-centric study with a larger sample would be beneficial to provide external and ecological validities to the present study. Moreover, using a convenience sample (as opposed to a probabilistic sample) might lead to biased results due to the implicit predisposition to engage in an activity.

Although, all participants had been enrolled in several clinical internships before the study, COVID-19 pandemic peak was during their undergraduate clinical years, which considerable limited their clinical experience and direct involvement with other healthcare professionals. [16] Considering that clinical experience practice provides role modelling observations and enables

collaboration among healthcare professionals [17], the lack of exposure to these situations may affect students' perceptions of interprofessional learning. [18]

Being a single event can also be considered a limiting factor, as different results may emerge after a regular and more consistent IPE program. Regular IPE activities and respective data analysis could provide a deeper understanding of IPE effects and its applicability.

The outcome measurements of this study were based on self-reported, subjective assessment, which *per se* have an intrinsic bias. [8] On the other hand, a longitudinal study, with repeated measurements overtime would explore if there is long-lasting effect of IPE, and the need for a periodical IPE program.

Conclusion

In Portugal, as in many European countries, the healthcare educational system focusses mainly on a single-profession scientific learning, with major gaps in collaborative and teamwork related skills. IPE undergraduate programs can reduce these gaps, promoting a better understanding of teamwork, roles and responsibilities within a team, and professional identity. This study, presents a first approach to this modality and identifies the positive effects of simulation-based IPEs, brings meaningful information that could guide further interventions and curriculum revisions.

The study findings reinforce that interprofessional interactions in an educational setting are well received, perceived as relevant, and can contribute to demystify students' preconceived notions or stereotypes of other professions, particularly the hierarchy of decision making between doctors and nurses.

While a single sim-IPE session has educational benefits, more sustained opportunities could lead to greater advantages. Including sim-IPE programs within the clinical practice, would expose and challenge undergraduate students, in a regular basis, to interactions with other professional groups. Although challenging to current healthcare education programs, such initiatives are needed to develop effective and supportive healthcare teams.

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Tables and Figures

Table 1. Detailed schedule and activities of the workshop, including the study operational process (pre- and post-tests)

Component	Time	Content
Introduction (All)	20 min	Introduction to the workshop and operational processes; Introduction of the study and informed consent obtained; Pre-test questionnaires filled;
Ice-breaking activity (All)	20 min	"Tangled" is an activity that allows the review of team dynamics and concepts
Briefing (All)	15 min	Familiarization of the simulation space and simulators
Simulation 1 (Team of 3-4 elements)	20-25 min	Scenario performance (anaphylactic shock with cardiopulmonary arrest)
Debriefing 1 (Team of 3-4 elements)	40-50 min	Reflective discussion on team performance, based on learning objectives
Coffee-break (All)	15 min	
Simulation 2 (Team of 3-4 elements)	20-25 min	Scenario performance (multiple patients: hypovolemic shock + pain control management)
Debriefing 2 (Team of 3-4 elements)	40-50 min	Reflective discussion on team performance, based on learning objectives
Closing session (All)	20 min	Take-home message; Post-test questionnaires filled;

Table 2. Participant's demographic characteristics (n=23).

	Medical (n=9)	**Nursing** (n=14)
Mean age	23,0	21,6
Gender		
Female	7	12
Male	2	2
Previous simulation experience		
Yes	9	12
No	0	2
Previous IPE experience		
Yes	0	4
No	9	10

Table 3. Comparison of pre- and post-simulation scores of interprofessional education between medical and nursing students. Bold values represent statistical significant mean differences.

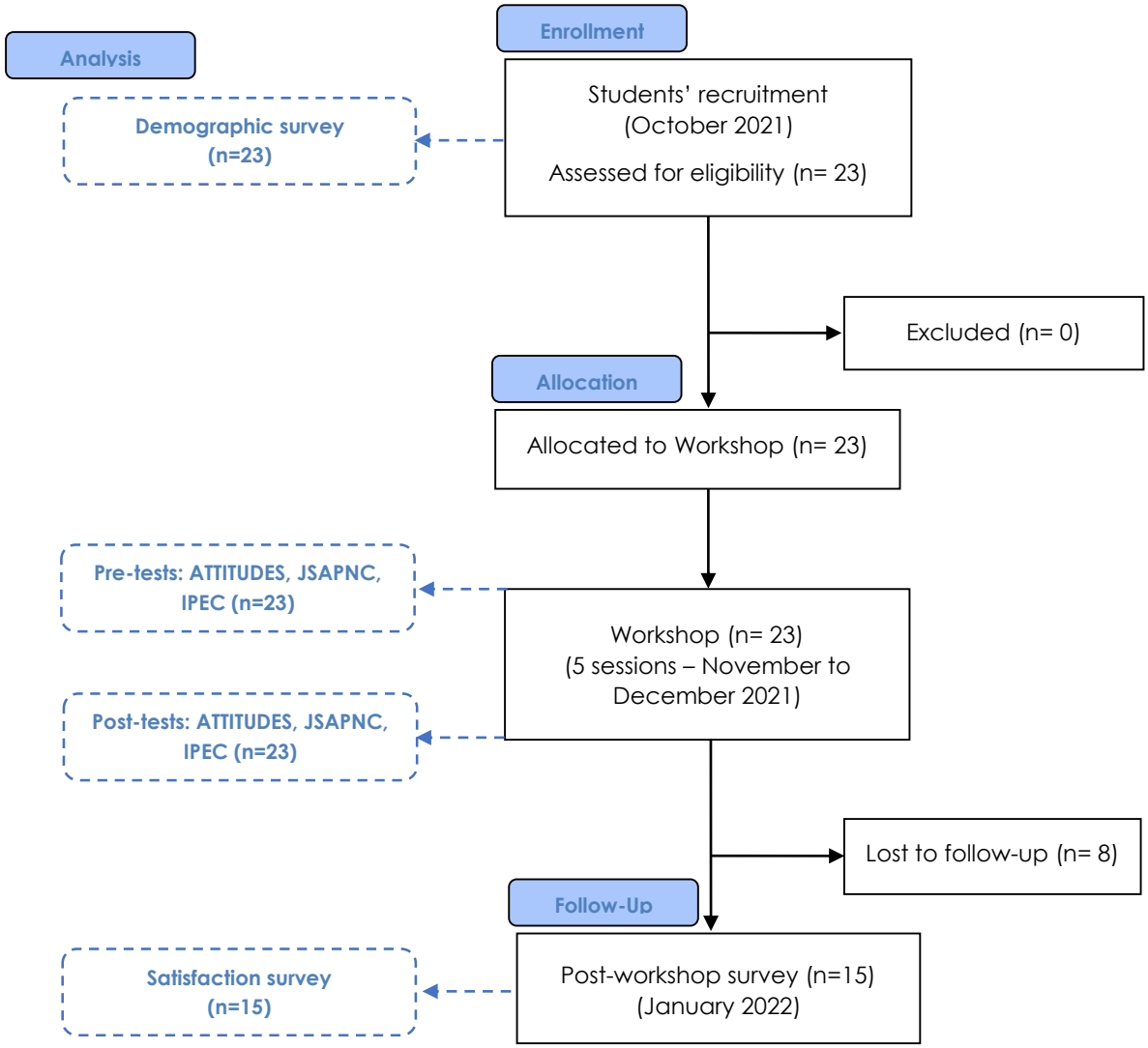
			Medical (n = 9)		Nursing (n = 14)	
			M (SD)	**P value**	**M (SD)**	**P value**
ATTITUDES (1 to 5 scale)	Relevance of IPE	Pre	4.67 (0.27)	**0.018**	4.66 (0.24)	**0.001**
		Post	4.97 (0.06)		4.94 (0.12)	
	Relevance of Simulation	Pre	4.82 (0.19)	**0.038**	4.66 (0.33)	**0.007**
		Post	5.00 (0.00)		4.89 (0.19)	
	Communication	Pre	4.70 (0.31)	**0.027**	4.62 (0.29)	**0.010**
		Post	4.96 (0.06)		4.89 (0.21)	
	Situation Awareness	Pre	4.56 (0.41)	**0.026**	4.44 (0.41)	**0.027**
		Post	4.92 (0.18)		4.84 (0.30)	
	Roles and Responsibility	Pre	4.48 (0.52)	**0.027**	4.61 (0.32)	**0.027**
		Post	4.96 (0.07)		4.86 (0.26)	
	Total	Pre	4.65 (0.28)	**0.012**	4.61 (0.21)	**0.002**
		Post	4.96 (0.05)		4.89 (0.16)	
JSAPNC (1 to 4 scale)	Shared education and collaborative relationships (*)	Pre	3.81 (0.16)	**0.020**	3.65 (0.20)	**0.002**
		Post	3.94 (0.08)		3.89 (0.15)	
	Caring as opposed to curing	Pre	3.70 (0.31)	0.063	3.69 (0.33)	0.317
		Post	3.93 (0.22)		3.76 (0.24)	
	Nurse´s autonomy	Pre	3.85 (0.18)	**0.046**	3.67 (0.29)	**0.020**
		Post	4.00 (0.00)		3.83 (0.25)	
	Physician´s authority (**)	Pre	3.00 (0.71)	0.066	3.17 (0.80)	0.052
		Post	3.44 (0.39)		2.64 (0.95)	
	Total (**)	Pre	3.69 (0.16)	**0.011**	3.60 (0.17)	**0.030**
		Post	3.88 (0.08)		3.69 (0.19)	
IPEC Competency (1 to 5 scale)	Interprofessional interaction	Pre	3.35 (0.51)	**0.007**	3.89 (0.66)	**0.003**
		Post	4.40 (0.56)		4.64 (0.33)	
	Interprofessional value (*)	Pre	4.01 (0.44)	**0.011**	4.54 (0.33)	**0.010**
		Post	4.61 (0.43)		4.87 (0.22)	
	Total (*)	Pre	3.68 (0.44)	**0.008**	4.22 (0.45)	**0.003**
		Post	4.51 (0.48)		4.75 (0.24)	

Intergroup differences were analysed using Mann-Whitney test and statistically significant differences were found in the sections marked with:
(*) Corresponding to pre-test differences; (**) Corresponding to post-test differences.

Table 4. Cronbach's Alpha for each scale, for both pre- and post-test

	Pre-test	**Post-test**
ATTITUDES	0.856	0.881
JSAPNC	0.410	0.558
IPEC Competency	0.905	0.919

Figure 1. CONSORT flow diagram for a single-arm, nonrandomized study of the program LINKS (Lifting INterprofessional Knowledge through Simulation).



Appendixes List

Appendix 1: Demographic Questionnaire

Appendix 2: ATTITUDES Questionnaire

Appendix 3: JSAPNC Questionnaire

Appendix 4: IPEC Questionnaire

Appendix 5: Follow-up Satisfaction Questionnaire

Questionário demográfico

O projeto LINKS pretende estudar os comportamentos e atitudes inerentes ao trabalho em equipa interprofissional, através do recurso a cenários de simulação clínica, ao nível do ensino pré-graduação. Equipas interprofissionais (constituídas por estudantes do último ano de medicina e enfermagem) irão atuar em cenários de simulação clínica, promovendo o treino de competências não-técnicas e de práticas colaborativas.
Parte integrante deste projeto são os trabalhos de tese do Mestrado em Medicina (FMUP), da estudante Filipa Maria Garcez Fernandes, com a orientação da Prof. Doutora Carla Sá Couto.

*Obrigatório

1. Para que seja possível corresponder cada questionário a um determinado estudante, mantendo o anonimato é necessário um código. O CÓDIGO tem 6 carateres e é constituído pelas 2 últimas letra do primeiro nome, seguido dos 2 últimos dígitos do CC e, por último, o dia de nascimento. (Ex: LA5130). *

2. Idade *

3. Género *

Marcar apenas uma oval.

- ◯ Feminino
- ◯ Masculino
- ◯ Indeterminado/Indefinido/Não-binário

4. Sou estudante de *

Marcar apenas uma oval.

- ◯ Medicina
- ◯ Enfermagem

5. Conclui outro curso de ensino superior *

Marcar apenas uma oval.

- ◯ Não
- ◯ Sim

6. Se sim, indique o nome do curso, incluindo o grau (Bacharelato/Licenciatura, Pós-graduação, Mestrado ou Doutoramento)

_____

7. Já tive contacto prévio com cenários de simulação, no contexto do meu percurso académico. *

Marcar apenas uma oval.

- ◯ Sim
- ◯ Não

8. Já participei em contextos educativos interprofissionais (interação/colaboração com estudantes/profissionais de outras áreas), durante o meu percurso académico. *

Marcar apenas uma oval.

- ◯ Sim
- ◯ Não

9. Sinto-me capaz de ler e compreender inglês de forma a responder a questionários neste idioma *

Marcar apenas uma oval.

- ◯ Sim
- ◯ Não

Lifting INterprofissional Knowledge through Simulation

CODE: __ __ __ __ __ __

Last 2 letters of your name; last 2 digits of your CC; Day of birth; (Eg. LA5130)

ATTITUDES questionnaire*

KidSIM Attitude Towards Teamwork in Training Undergoing Designed Educational Simulation

The ATTITUDES questionnaire was designed to assess students' perceptions in the following 5 domains: (1) relevance of Interprofessional Education, (2) relevance of simulation, (3) communication, (4) situation awareness, and (5) roles and responsibilities.

For each of the items express your opinion using a scale from 1 (strongly disagree) to 5 points (strongly agree)

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. Relevance of Interprofessional Education	**1**	**2**	**3**	**4**	**5**
Learning with other professionals is important to collaboration	1	2	3	4	5
Opportunities to learn with other professionals should be a priority in my education	1	2	3	4	5
I want more opportunities to learn with other professionals	1	2	3	4	5
Shared learning with other team members will improve my ability to understand clinical problems	1	2	3	4	5
Interprofessional opportunities for learning will improve patient outcomes	1	2	3	4	5
Attitudes about teamwork can change through opportunities to work with other professionals in simulation	1	2	3	4	5
Learning with other health care professionals before qualification is important for the development of future interprofessional relationships	1	2	3	4	5
2. Relevance of simulation	**1**	**2**	**3**	**4**	**5**
Simulation supports opportunities to change attitudes	1	2	3	4	5
Simulation is a good environment for learning with other health care professionals	1	2	3	4	5
Simulation is a good tool for practicing team decision-making skills	1	2	3	4	5
Deliberate practice can improve clinical decision-making skills	1	2	3	4	5
Opportunities to practice teamwork can help students learn about interprofessional roles	1	2	3	4	5

Lifting INterprofissional Knowledge through Simulation

CODE: __ __ __ __ __ __

Last 2 letters of your name; last 2 digits of your CC; Day of birth; (Eg. LA5130)

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
3. Communication	**1**	**2**	**3**	**4**	**5**
All students should learn how to work in the context of health care teams.	1	2	3	4	5
Team leaders should provide frequent patient updates to other team members	1	2	3	4	5
Team leaders should encourage team members to ask questions	1	2	3	4	5
Communication within the team is as important as technical skills	1	2	3	4	5
Team members providing immediate patient care management should verbalize their activities aloud	1	2	3	4	5
Team members should paraphrase or repeat back instructions to clarify their understanding	1	2	3	4	5
Communication in teamwork is important to patient safety	1	2	3	4	5
The roles of nonleading members of the team are as important for good team functioning as the role of the leader	1	2	3	4	5
4. Situation awareness	**1**	**2**	**3**	**4**	**5**
Opportunities to learn with other health care professionals have increased my understanding of their roles	1	2	3	4	5
I will speak up if I perceive a problem regardless of who might be affected	1	2	3	4	5
Patient care is improved when all team members have a shared understanding about the assessment and treatment	1	2	3	4	5
Teamleaders should provide frequent summaries of patient findings to keep teammembers orientated to patient needs	1	2	3	4	5
5. Roles and responsibility	**1**	**2**	**3**	**4**	**5**
Monitoring what each team member is doing is important to optimize patient safety	1	2	3	4	5
Monitoring will enhance other team members understanding of my role in patient health care	1	2	3	4	5
Teamwork practice will provide me with feedback to enhance my ability to provide optimal patient care	1	2	3	4	5
Teamwork practice will help me recognize how best to help other team members complete their tasks	1	2	3	4	5
It is important for team members to ask for assistance if they need support in completing a task	1	2	3	4	5
Teamwork practice allows for flexibility in roles during times of crisis	1	2	3	4	5

*Sigalet, Elaine; Donnon, Tyrone; Grant, Vincent. Undergraduate Students'Perceptions of and Attitudes Toward a Simulation-Based Interprofessional Curriculum: The KidSIM ATTITUDES Questionnaire. Simulation in Healthcare7(6):353-358, December 2012.

Lifting INterprofissional Knowledge through Simulation

CODE: __ __ __ __ __ __

Last 2 letters of your name; last 2 digits of your CC; Day of birth; (Eg. LA5130)

JSAPNC Questionnaire*

JEFFERSON SCALE OF ATTITUDES TOWARD PHYSICIAN-NURSE COLLABORATION

INSTRUCTIONS: Please indicate the extent of your agreement or disagreement with each of the following statements by circling the appropriate number. For the purposes of this survey, a nurse is defined as "a registered nurse (RN) who is engaged in providing or directly supervising the care of hospitalized patients."

	Strongly disagree	Tend to disagree	Tend to agree	Strongly agree
1. A nurse should be viewed as a collaborator and colleague with a physician rather than his/her assistant	1	2	3	4
2. Nurses are qualified to assess and respond to psychological aspects of patients' needs	1	2	3	4
3. During their education, medical and nursing students should be involved in teamwork in order tounderstand their respective roles	1	2	3	4
4. Nurses should be involved in making policy decisions affecting their working conditions	1	2	3	4
5. Nurses should be accountable to patients for the nursing care they provide	1	2	3	4
6. There are many overlapping areas of responsibility between physicians and nurses	1	2	3	4
7. Nurses have special expertise in patient education and psychological counseling	1	2	3	4
8. Doctors should be the dominant authority in all health care matters	1	2	3	4
9. Physicians and nurses should contribute to decisions regarding the hospital discharge of patients	1	2	3	4
10. The primary function of the nurse is to carry out the physician's orders	1	2	3	4
11. Nurses should be involved in making policy decisions concerning the hospital support services upon which their work depends	1	2	3	4
12. Nurses should also have responsibility for monitoring the effects of medical treatment	1	2	3	4
13. Nurses should clarify a physician's order when they feel that it might have the potential for detrimental effects on the patient	1	2	3	4
14. Physicians should be educated to establish collaborative relationships with nurses	1	2	3	4
15. Interprofessional relationships between physicians and nurses should be included in their educational programs	1	2	3	4

*Hojat M, Fields S, Veloski JJ, Griffiths M, Cohen MJM, Plumb JD. Psychometric properties of an attitude scale measuring physician-nurse collaboration. Eval Health Prof. 1999 Jun;22(2):208-220.

Lifting INterprofissional Knowledge through Simulation

CODE: __ __ __ __ __ __

Last 2 letters of your name; last 2 digits of your CC; Day of birth; (Eg. LA5130)

IPEC Questionnaire*

Competency Self-Assessment Tool

INSTRUCTIONS: Based on your education or experience in the health care environment, select/circle the number that corresponds with your level of agreement or disagreement on each item.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. I am able to choose communication tools and techniques that facilitate effective team interactions.	1	2	3	4	5
2. I am able to place the interests of patients at the center of interprofessional health care delivery.	1	2	3	4	5
3. I am able to engage other health professionals in shared problem-solving appropriate to the specific care situation.	1	2	3	4	5
4. I am able to respect the privacy of patients while maintaining confidentiality in the delivery of team-based care.	1	2	3	4	5
5. I am able to inform care decisions by integrating the knowledge and experience of other professions appropriate to the clinical situation.	1	2	3	4	5
6. I am able to embrace the diversity that characterizes the health care team.	1	2	3	4	5
7. I am able to apply leadership practices that support effective collaborative practice.	1	2	3	4	5
8. I am able to respect the cultures and values of other health professions.	1	2	3	4	5
9. I am able to engage other health professionals to constructively manage disagreements about patient care.	1	2	3	4	5
10. I am able to develop a trusting relationship with other team members.	1	2	3	4	5
11. I am able to use strategies that improve the effectiveness of interprofessional teamwork and team-based care.	1	2	3	4	5
12. I am able to demonstrate high standards of ethical conduct in my contributions to team-based care.	1	2	3	4	5
13. I am able to use available evidence to inform effective teamwork and team-based practices.	1	2	3	4	5
14. I am able to act with honesty and integrity in relationships with other team members.	1	2	3	4	5
15. I am able to understand the responsibilities and expertise of other health professions.	1	2	3	4	5
16. I am able to maintain competence in my own profession appropriate to my level of training.	1	2	3	4	5

*Lockeman, K.S., Dow, A.W., DiasGrandos, D., McNeilly, D.P., Nickol, D., Koehn, M.L. & Knab, M.S. (2016). Refinement of the IPEC Competency Self-Assessment Survey: results from a multi-institutional study. *J Interprof Care, 30(6): 726-731.*

LINKS workshop - Feedback

O projeto LINKS agradece a sua participação no workshop, que irá certamente contribuir para a evolução e melhoria da educação interprofissional. Desta forma, importa perceber o quão adequado, quer em termos teóricos, técnicos e organizacionais, foi o workshop. O seu feedback irá permitir à equipa do projeto LINKS melhorar o workshop para que este cumpra o seu propósito e vá de encontro às expectativas e necessidades dos participantes.

Desde já agradecemos a sua colaboração. Qualquer dúvida ou questão, p.f., contacte-nos através do email: simulacao@med.up.pt.

Parte integrante deste projeto são os trabalhos de tese do Mestrado em Medicina (FMUP), da estudante Filipa Maria Garcez Fernandes, com a orientação da Prof. Doutora Carla Sá Couto.

*Obrigatório

Para que seja possível corresponder cada questionário a um determinado estudante, mantendo o anonimato é necessário um código. O CÓDIGO tem 6 carateres e é constituído pelas 2 últimas letra do primeiro nome, seguido dos 2 últimos dígitos do CC e, por último, o dia de nascimento. (Ex: LA5130). Por favor, use o mesmo código que usou nos questionários que respondeu durante o workshop. *

A sua resposta

Organização

Preencha previamente as respostas e, em seguida, clique em "Obter link".

CONVITE E REGISTO: Faz corresponder cada frase à opção que melhor reflete a tua opinião *

	Discordo totalmente	Discordo parcialmente	Não tenho opinião	Concordo parcialmente	Concordo totalmente
O convite foi elucidativo.	☐	☐	☐	☐	☐
O convite foi apelativo.	☐	☐	☐	☐	☐
O intervalo dado para inscrição foi adequado.	☐	☐	☐	☐	☐

BIBLIOGRAFIA: Faz corresponder cada frase à opção que melhor reflete a tua opinião *

	Discordo totalmente	Discordo parcialmente	Não tenho opinião	Concordo parcialmente	Concordo totalmente
A fundamentação teórica fornecida à priori foi ao encontro das exigências do workshop.	☐	☐	☐	☐	☐
A bibliografia foi apresentada num formato fácil e apelativo.	☐	☐	☐	☐	☐
O tempo despendido na preparação do workshop foi adequado.	☐	☐	☐	☐	☐
A bibliografia foi enviada	☐	☐	☐	☐	☐

Preencha previamente as respostas e, em seguida, clique em "Obter link".

TIMING: Faz corresponder cada frase à opção que melhor reflete a tua opinião *

	Discordo totalmente	Discordo parcialmente	Não tenho opinião	Concordo parcialmente	Concordo totalmente
O workshop foi dado na melhor altura da minha formação (último ano).	☐	☐	☐	☐	☐
Se fosse hoje, não me inscreveria no workshop.	☐	☐	☐	☐	☐
Gostaria de repetir o workshop daqui a uns meses, com outros cenários.	☐	☐	☐	☐	☐

Workshop - Conteúdo e Estrutura

Faz corresponder cada frase à opção que melhor reflete a tua opinião

Preencha previamente as respostas e, em seguida, clique em "Obter link".

OBJETIVOS DE APRENDIZAGEM *

	Discordo totalmente	Discordo parcialmente	Não tenho opinião	Concordo parcialmente	Concordo totalmente
O grau de dificuldade foi adequado às minhas competências enquanto estudante do último ano.	☐	☐	☐	☐	☐
As exigências técnicas e não técnicas foram ao encontro do que era expectável.	☐	☐	☐	☐	☐
Foram abordadas temáticas de interesse para a minha formação como profissional de saúde.	☐	☐	☐	☐	☐
Foi me fornecida a informação necessária à participação ativa nos cenários.	☐	☐	☐	☐	☐
O objetivo de aprendizagem de cada cenário foi claro.	☐	☐	☐	☐	☐

Preencha previamente as respostas e, em seguida, clique em "Obter link".

CENÁRIOS *

	Discordo totalmente	Discordo parcialmente	Não tenho opinião	Concordo parcialmente	Concordo totalmente
O tempo dedicado a cada cenário foi suficiente.	☐	☐	☐	☐	☐
O número de cenários foi adequado.	☐	☐	☐	☐	☐
Os cenários eram realistas.	☐	☐	☐	☐	☐

Preencha previamente as respostas e, em seguida, clique em "Obter link".

DEBRIEFING *

	Discordo totalmente	Discordo parcialmente	Não tenho opinião	Concordo parcialmente	Concordo totalmente
Permitiu-me refletir sobre os aspetos mais importantes da minha atuação.	☐	☐	☐	☐	☐
Permitiu-me refletir sobre os aspetos mais importantes sobre a atuação em equipa.	☐	☐	☐	☐	☐
Teve uma abordagem construtiva.	☐	☐	☐	☐	☐
Tive oportunidade e expressar a minha opinião.	☐	☐	☐	☐	☐
Tive oportunidade de ouvir as perspetivas dos outros participantes.	☐	☐	☐	☐	☐
O tempo dedicado à discussão foi suficiente.	☐	☐	☐	☐	☐

Preencha previamente as respostas e, em seguida, clique em "Obter link".

AMBIENTE DE APOIO *

	Discordo totalmente	Discordo parcialmente	Não tenho opinião	Concordo parcialmente	Concordo totalmente
Senti estar num ambiente seguro à minha aprendizagem.	☐	☐	☐	☐	☐
Senti que tinha o apoio necessário durante o workshop.	☐	☐	☐	☐	☐
Os professores mostraram-se disponíveis para esclarecimentos de qualquer âmbito	☐	☐	☐	☐	☐

Feedback e Recomendações futuras

Indica os aspetos que mais te AGRADARAM no workshop

A sua resposta

Indica os aspetos que podem ser MELHORADOS no workshop

A sua resposta

Preencha previamente as respostas e, em seguida, clique em "Obter link".

VALOR EDUCATIONAL: Faz corresponder cada frase à opção que melhor reflete a tua opinião *

	Discordo totalmente	Discordo parcialmente	Não tenho opinião	Concordo parcialmente	Concordo totalmente
Gostaria que o workshop fosse integrado no penúltimo ano do curso e repetido no último ano.	☐	☐	☐	☐	☐
O workshop não trouxe mais-valias à minha formação.	☐	☐	☐	☐	☐
O workshop deveria estar integrado na formação pré-graduada dos estudantes de medicina e enfermagem.	☐	☐	☐	☐	☐

Obter link

Nunca envie palavras-passe através dos Google Forms.

Este conteúdo não foi criado nem aprovado pela Google. Denunciar abuso - Termos de Utilização - Política de privacidade

Google Formulários

Preencha previamente as respostas e, em seguida, clique em "Obter link".

Anexos

1. Reporting guidelines

2. Normas de Publicação da Acta Médica Portuguesa

3. Material Suplementar

CONSORT 2010 checklist of information to include when reporting a randomised trial*

Section/Topic	Item No	Checklist item	Reported on page No
Title and abstract			
	1a	Identification as a randomised trial in the title	Not applicable. The current study is a single-arm non-randomised trial.
	1b	Structured summary of trial design, methods, results, and conclusions (for specific guidance see CONSORT for abstracts)	Pages 2-3: "**Abstract** **Introduction** Collaboration and communication among healthcare team members are critical components for high-quality patient care therefor Interprofessional (IP) learning should be included in healthcare curricula. There is a scarcity of simulation-based interprofessional education (IPE), especially in the undergraduate education. Considering the above educational need, a simulation-based workshop targeting interprofessional teams of healthcare students (medicine and nursing) was created, aiming the development of IP team perception (understanding of roles and competencies) and the use of Non-Technical-Skills (NTS) to promote effective IP teamwork. **Material and Methods** A total of twenty-three final year students (6th year medical and 4th year nursing students) were invited to participate in the workshop. Teams of three or four elements (medical and nursing students) were exposed to two critical patient management simulation scenarios. To assess the impact of the workshop three validated surveys (ATTITUDES, JSAPNC, and IPEC) were applied before and after the workshop. **Results** Student awareness of interprofessional learning and self-competency in IP practice improved. Statistically significant differences were found when comparing the

overall pre- and post- scores, for both medical and nursing students, in the three surveys. All students agreed that the workshop added educational value to their training, and recommended its integration in the formal curriculum, with a first round in the penultimate year and repeated in the last year.

Discussion and Conclusions

These findings scientifically corroborate the need for simulation-based IP programs, integrated in the undergraduate curricula, promoting clinical interactions of different professional groups. In the Portuguese setting, as in many countries across Europe, such novel program is needed and is expected to be well received."

Introduction

Background and objectives	2a	Scientific background and explanation of rationale	Page 6: "The constant evolution and multiple challenges that healthcare systems face, advocates for more team-based approaches.[1] Considering that many healthcare incidents are associated with team communication problems and deficient team work skills, effective collaboration and communication among healthcare team members are critical components for high-quality patient care.[2] Clinical errors can cause human suffering or even death and are, nonetheless, financially costly.[3, 4] Physicians and nurses work together on a daily-basis at the postgraduate level. Despite this fact, what is noticed is that their undergraduate curricula are separate and the training in effective strategies of communication and care participation is often postponed to the future professional practice.[5] There is a scarcity of programs designed for undergraduate interprofessional education in healthcare. In Portugal, the medical and nursing curricula makes little to no reference to interprofessional competencies and challenges (for further information, curricula can be consulted in *Diário da República*). Interprofessional learning (IPL) is defined by the World Health Organisation (WHO) (2010) as when "students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes".[6] Creating a culture that values teamwork and mutual space for students to learn with and from one another is the way to success in preparing future healthcare professionals.[7] For effective IPE, a "one size fits all" approach is not likely to be

			successful. Nonetheless, much can be learned from the efforts of others.[7] Simulation-based activities as IPL facilitators enables the training of complex skills, being broadly used in current interprofessional education (IPE) programs that are slowly arising around medical and nursing schools.[8] This sort of teaching strategy can be effective in improving communication and collaboration among healthcare students.[9] "
	2b	Specific objectives or hypotheses	Page 7: "The purpose of this study is to assess the educational effect of this simulation-based workshop, in medical and nursing students' attitudes towards IP teamwork and collaborative practices, and their perception of roles and competencies within a IP team."
Methods			
Trial design	3a	Description of trial design (such as parallel, factorial) including allocation ratio	Page 11: "A pre-post design was used to explore changes in measures through the quantitative surveys completed by medical and nursing students that participated in the workshop. Figure 1 presents a CONSORT flowchart for this single-arm, nonrandomized study. "
	3b	Important changes to methods after trial commencement (such as eligibility criteria), with reasons	Not applicable, no changes were made.
Participants	4a	Eligibility criteria for participants	Page 8: "The recruitment of the participants was made by convenience sampling (non-probabilistic). Final year students (6th year medical students and 4th year nursing students) were invited to participate in the workshop via e-mail." Page 8: "Vacancies were limited to eight students per session (four medical and four nursing), with a minimum of six students. At least, two students of each area (medicine/nursing) were needed to run a session. While enrolling the workshop, students were asked to select a date from those available and fill a simple demographic survey. Students were select in a first-come-first-served basis. The recruitment was open for two weeks."

	4b	Settings and locations where the data were collected	Page 8: “While enrolling the workshop via email, students were asked to select a date from those available and fill a simple demographic survey.” Page 9: “The workshop was conducted between November and December, 2021, with a duration of 4h, at the Clinical Simulation Center of the Faculty of Medicine of University of Porto”
Interventions	5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered	Note: This is a single-arm study. A single intervention (workshop) is described. Page 9: “The workshop was conducted between November and December, 2021, with a duration of 4h, at the Clinical Simulation Center of the Faculty of Medicine of University of Porto. It started with an ice-breaking activity, involving all participants, followed by two clinical simulation scenarios, specifically designed for this workshop, aiming to challenge the clinical team to apply both Technical Skills and Non-Technical Skills (NTS). Students were not informed of the scenario in advance, and assumed roles close to their professional competencies. In each scenario, the initial assessment was conducted either by nursing students (in the role of nurses) or by a team of one nursing and one medical student (assuming the roles of nurse and doctor). Typically, with patient deterioration, the initial team called the remain element(s) and began the management of the patient. The first scenario presented a patient with an anaphylactic shock followed by a cardiopulmonary arrest. This scenario explored the critical patient systematic approach and the application of resuscitation maneuvers in cardiopulmonary resuscitation context. It provided a context to reflect on how situational awareness evolved throughout the scenario, how leadership was established, and how communication was established in the various moments of the scenario. The second scenario presented a multi-patient setting (two patients in a ward): one developing a post-op hypovolemic shock and the other requesting urgent pain control management. This provided a context to reflect on the importance of systematic assessment and re-evaluation, how the cooperation/interaction/support

			of team members has evolved, how the situational awareness changed throughout the scenario and how the communication of critical information (especially in a noisy environment) was established. Each scenario took 15-20 min to unfold and was followed by a 40-50 min debriefing, conducted by a pair of faculty members. The program details and approximated timings are summarized in Table 1."
Outcomes	6a	Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed	Pages 10-11: "A simple demographic questionnaire (Appendix 1) was distributed during recruitment, and included age, gender, background (nursing or medical), previous degree, previous contact with simulation scenarios during formation, previous participation in IP educational contexts during formation and the ability to read and understand English enough to complete questionnaires in this language. To assess the impact of the workshop students' attitudes towards IP teamwork and collaborative practices, three validated surveys (ATTITUDES[10], JSAPNC[11], and IPEC[12]) were applied before and after the workshop (Appendix 2 to 4), in their original version (in English). These questionnaires were completed before (pre-session) and after (post-session) the workshop for logistical reasons and to not to interfere with the expected educational impact of the full session. The student's proficiency in English was assessed in the demographic questionnaire and was considered an inclusion criterion. Attitude Towards Teamwork in Training Undergoing Designed Educational Simulation (ATTITUDES) is a 30 items scale organized into five sub-factors: IPE relevance (7 items), simulation relevance (5 items), communication (8 items), situation awareness (4 items) and roles and responsibilities (6 items). Questions are scored in a five-point scale from "strongly disagree" (1 point) to "strongly agree" (5 points). Total score is the sum of all item scores. A higher total score indicates a more positive students` attitude toward interprofessional learning through simulation-based IPE. Jefferson Scale of Attitudes toward Physician-Nurse Collaboration (JSAPNC) scale consists of 15 items arranged in 4 sub-factors: shared educational and collaborative relationships (7 items), caring as opposed to curing (3 items), nurse's

			autonomy (3 items), and physician's authority (2 items). A four-point scale from "strongly disagree" (1 point) to "strongly agree" (4 points) is used to measure each item. To score the scale, items composing the factor "Physicians' authority" must be reversed. Other items are directly scored based on their ratings. Total score is the sum of all item scores. The higher the total score, the more positively students perceive teamwork and collaboration between physicians and nurses. Interprofessional Education Collaborative (IPEC) Competency self-assessment tool is a scale composed by two sub-factors: interprofessional interaction (7 items) and interprofessional value (9 items). A five-point scale ranging from "strongly disagree" (1 point) to "strongly agree" (5 points) is used to score each item. Total score is the sum of all item scores. The higher the total score, the more students perceived as more competent in interprofessional practice. To assess the opinion/satisfaction of the students toward the workshop an informal non-validated questionnaire was applied, via email, 4 to 6 weeks after the intervention (Appendix 5). The questionnaire assessed three areas: 1) Organization (invitation and registration, didactics, and timing); 2) Workshop content and structure (learning objectives, scenario, debriefing, and supportive environment); 3) Workshop feedback and recommendations (positive features, needs improvement features, and educational value). All questions were scored in a five-point scale from "strongly disagree" (1 point) to "strongly agree" (5 points), with the exception of "positive features" and "needs improvement features" that were open, non-mandatory questions. All questionnaires were anonymous. The association between demographic, pre-, post- and satisfaction questionnaires was possible with the attribution of a unique code to each student."
	6b	Any changes to trial outcomes after the trial commenced, with reasons	Not applicable, no changes were made.
Sample size	7a	How sample size was determined	Not applicable, since it is a pilot study a convenience sampling method was used.
	7b	When applicable, explanation of any interim analyses and stopping guidelines	Not applicable, no changes were made.

Randomisation:			
Sequence generation	8a	Method used to generate the random allocation sequence	Not applicable, since this is a single-arm, nonrandomized study.
	8b	Type of randomisation; details of any restriction (such as blocking and block size)	Not applicable, since this is a single-arm, nonrandomized study.
Allocation concealment mechanism	9	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned	Not applicable, since this is a single-arm, nonrandomized study.
Implementation	10	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	Not applicable, since this is a single-arm, nonrandomized study.
Blinding	11a	If done, who was blinded after assignment to interventions (for example, participants, care providers, those assessing outcomes) and how	Not applicable, it was not done.
	11b	If relevant, description of the similarity of interventions	Not applicable, since this is a single-arm there was only one intervention.
Statistical methods	12a	Statistical methods used to compare groups for primary and secondary outcomes	Page 12: “Descriptive statistical analyses were conducted to identify the demographic distribution of participants in this study. Wilcoxon signed rank test was used to compare the mean difference between the pre- and post-test results of each scale item within the two subgroups of the sample (medical and nursing students). Mann-Whitney U test was used to compare the mean differences between the two sub-groups. “
	12b	Methods for additional analyses, such as subgroup analyses and adjusted analyses	Page 12: “Internal consistency of questionnaire scores was assessed through

			Cronbach's Alpha. "
Results			
Participant flow (a diagram is strongly recommended)	13a	For each group, the numbers of participants who were randomly assigned, received intended treatment, and were analysed for the primary outcome	Page 13: "A total of 23 students engaged the workshop." Page 14: "The follow-up satisfaction questionnaire had a total of 15 replies, with 8 drop-outs."
	13b	For each group, losses and exclusions after randomisation, together with reasons	Page 13: "A total of 23 students engaged the workshop." Page 14: "The follow-up satisfaction questionnaire had a total of 15 replies, with 8 drop-outs."
Recruitment	14a	Dates defining the periods of recruitment and follow-up	Not applicable, this information is mentioned in the "Material and Methods: Selection Procedure and Participants" section.
	14b	Why the trial ended or was stopped	The trial ended with the end of the intervention (workshop).
Baseline data	15	A table showing baseline demographic and clinical characteristics for each group	Page 25: **"Table 2.** Participant's demographic characteristics (n=23)."

	Medical (n=9)	**Nursing** (n=14)
Mean age	23,0	21,6
Gender		
Female	7	12
Male	2	2
Previous simulation experience		
Yes	9	12

No	0	2	
Previous IPE experience			
Yes	0	4	
No	9	10	

Numbers analysed	16	For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups	Page 13: “A total of 23 students engaged the workshop.” Page 14: “The follow-up satisfaction questionnaire had a total of 15 replies, with 8 drop-outs.”
Outcomes and estimation	17a	For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval)	For the sake of simplicity, effect size and confidence intervals were not included in the manuscript, but were calculated. A large effect size was found for the overall scores of the three instruments used, as presented below: Medical Students ATTITUDES – ES: 1,12; CI [0,25; 1,94] JSAPNC – ES: 1,35; CI [0,41; 2,25] IPEC – ES: 1,61; CI [0,58; 2,60] Nursing Students ATTITUDES – ES: 1,33; CI [0,59; 2,04] JSAPNC – ES: 0,68; CI [0,09; 1,25] IPEC – ES: 1,15; CI [0,46; 1,82]
	17b	For binary outcomes, presentation of both absolute and relative effect sizes is recommended	Not applicable, there are no binary outcomes.
Ancillary analyses	18	Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing pre-specified from exploratory	Page 14: “Internal consistency of measures was overall adequate (Cronbach α > 0.70) for ATTITUDES and IPEC scores. JSAPNC scores presented a week reliability. Table 4 presents the internal consistency values for each scale, for both pre- and post-test.”

			Pages 14-15: “The follow-up satisfaction questionnaire had a total of 15 replies, with 8 drop-outs. Overall, students agreed or completely agreed that the workshop was well organized, with a clear and appropriate invitation, adequate bibliography sent in an attractive format (audio-visual), and timing was adequate (mean: 4.60; SD: 0.37). All students agreed that this experience should be repeated within few months with different scenarios, and all but two agreed that the final year was the best timing for the workshop Similarly, the workshop content was rated high (mean: 4.83; SD: 0.23), with all but one agreeing that the learning objectives clear, important and adequate (mean: 4.73; SD: 0.26), all agreeing that the scenarios were realistic, with adequate number and time (mean: 4.82; SD: 0.21), all agreeing that debriefing had a constructive approach, allowed reflection on individual and teamwork performance, and was open to all contributions (mean: 4.93; SD: 0.14), and all but one agreeing that environment was supportive with psychological safety guaranteed (mean: 4.84; SD: 0.54). All students agreed (mean: 5.00; SD: 0.00) that the workshop added educational value to their training, and recommended its integration in the formal curriculum (mean: 4.80; SD: 0.41), with a first round in the penultimate year and repeated in the last year. The open question on “positive features” and “needs improvement features” were aligned with the previous opinions. The positive comments focused mostly in the interprofessional interaction that the workshop offered (8 comments) with a few comments about the importance of debriefing (3 comments) and the realism of scenarios (2 comments). Possible improvements suggested by students were increasing time and frequency of the workshop (3 comments), and provide more didactics before the workshop (1 comment).”
Harms	19	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)	Page 15: “all but one agreeing that environment was supportive with psychological safety guaranteed”

Discussion”

Limitations	20	Trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analyses	Pages 18-19: "***Limitations*** The major limitation of this study lies in its reduced sample. The simulation centre and faculty availability, the limited number of people per room in confined spaces due to COVID-19 pandemic, and corresponding students' schedules were the main barriers. A multi-centric study with a larger sample would be beneficial to provide external and ecological validities to the present study. Moreover, using a convenience sample (as opposed to a probabilistic sample) might lead to biased results due to the implicit predisposition to engage in an activity. Although, all participants had been enrolled in several clinical internships before the study, COVID-19 pandemic peak was during their undergraduate clinical years, which considerable limited their clinical experience and direct involvement with other healthcare professionals. [16] Considering that clinical experience practice provides role modelling observations and enables collaboration among healthcare professionals[14], the lack of exposure to these situations may affect students' perceptions of interprofessional learning. [15] Being a single event can also be considered a limiting factor, as different results may emerge after a regular and more consistent IPE program. Regular IPE activities and respective data analysis could provide a deeper understanding of IPE effects and its applicability. The outcome measurements of this study were based on self-reported, subjective assessment, which *per se* have an intrinsic bias. [8] On the other hand, a longitudinal study, with repeated measurements overtime would explore if there is long-lasting effect of IPE, and the need for a periodical IPE program."
Generalisability	21	Generalisability (external validity, applicability) of the trial findings	Page 18: "The major limitation of this study lies in its reduced sample. The simulation centre and faculty availability, the limited number of people per room in confined spaces due to COVID-19 pandemic, and corresponding students' schedules were the main barriers. A multi-centric study with a larger sample would be beneficial to provide external and ecological validities to the present study."

Interpretation	22	Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence	Pages 16-18: “The present study explored the educational effect of a simulation-based IP workshop, in medical and nursing students’ attitudes towards IP teamwork and collaborative practices, and their perception of roles and competencies. This study found that both medical and nursing students increased their awareness on interprofessional practice and their perception of roles and competencies within an IP healthcare team, although from a high baseline. These findings are in-line with other studies. [8] ATTITUDES and IPEC Competency scores showed, for both groups and for all sub-factors, a statistically significant increase between the pre- and post-test, indicating a more positive attitude toward interprofessional learning through simulation-based IPE and a self-perception of higher competency in interprofessional practice. JSAPNC scores presented statistically significant increase, for both groups, for two of the four sub-factors: “shared education and collaborative relationships” and “nurse’s autonomy”. Interestingly, after the workshop, all medical students scored “nurses’ autonomy” with the highest score, showing that, in their perception, nursing students are more autonomous and integrated in the interprofessional practice. One explanation for this result is that internships of nursing students are, in nature, more team-based then medical students’ internships. Nursing students are viewed as team members with specific tasks enabling a more autonomous communication within the team (which includes colleagues, tutors, doctors and auxiliary personal) and even with the patient and their families. On the other hand, medical students tend to be focused in technical tasks, attributed by the tutor, and engage only in specific activities. The sub-factors “caring as opposed to curing” and “physician’s authority” had no statistically significant difference, in both groups. Of notice is that “physician’s authority” was the only sub-factor with a lower score after intervention (nursing students’ group). This could be due to a misinterpretation of the questions/scoring scale, as this sub-factor was the only one with inverse rating. The analysis of the intergroup differences for all questionnaires sub-factors indicate that, overall, both nursing and medical students had similar perspectives

towards IPE at the baseline (pre-intervention) and after the workshop (post-intervention). Statistically significant differences were found at baseline in the "Interprofessional value" sub-factor of IPEC and in the "Shared education and collaborative practice" factor of JSAPNC. In the IPEC sub-factor, the nursing students scored statistically significantly higher, and, in the JSAPNC sub-factor, the reverse was observed. Both sub-factors include items on the value of a trusting team despite their members' diversity, values and opinions, the professional identity, roles and autonomy within the team, and the position of oneself in it. Although these intergroup differences were found at baseline, it was not observed after the intervention. It is possible to infer that the IPE experience allowed both nursing and medical students to have a clearer understanding of the team dynamic and their role in it, with the final result of perceiving themselves as more competent in interprofessional practice, teamwork and collaboration between physicians and nurses. After the intervention (post-test), the only statistically significant difference in the inter-groups analysis was in the "physician's authority" sub-factor of JSAPNC. As mentioned above, this may be due to a misinterpretation of the scale. This is corroborated by the week internal consistency of this instrument, as opposed to the high reliability found for the ATTITUDES and IPEC Competency questionnaires. Several studies show that JSAPNC scale has a variable reliability, depending on the sample used, and its adequacy for assessing IPL outcomes has been questioned. A study,[18] evaluating the psychometrics characteristics JSAPNC, found an internal consistency of 0,62, indicating a week reliability.

After participation in a single simulation-based IPE, students reported a greater understanding of the role of the other healthcare professionals, a more positive attitude towards interprofessional teamwork, and increased confidence in their teamwork skills. These results are consistent with the other studies.[8, 19] Teamwork in an educational setting can intuitively promote further interactions by allowing students to more clearly understand the contribution of the other elements in the team. The educational benefit is seen even in the short-term interprofessional simulation experiences, leading to the conclusion that more sustained opportunities to work alongside with other professionals could bring even greater

			changes. [19] Prior to this study, the majority of students had experienced simulation-based training (with the exception of 4 nursing students) but only 2 nursing students had IPE experience. These findings demonstrate that simulation is a well-accepted educational strategy, commonly integrated in both nursing and medical curricula. On the other hand, the same level of importance and acceptance is not observed towards IPE, marked by separate academic pathways, despite the physical proximity that some nursing and medical schools have. The results of the follow-up satisfaction questionnaire corroborate these findings. It highlighted that students understand the importance of this educational approach, requesting for more opportunities to train and practice their IP skills, especially at the end-stage of the undergraduate education. Although, there were 8 drop-outs, this feedback is a starting point to refine the workshop and understand what should be maintained and what should be improved in potential future interventions."
Other information			
Registration	23	Registration number and name of trial registry	Not applicable.
Protocol	24	Where the full trial protocol can be accessed, if available	Not applicable.
Funding	25	Sources of funding and other support (such as supply of drugs), role of funders	Page 1: "This article was supported by National Funds through FCT - Fundação para a Ciência e a Tecnologia within CINTESIS, R&D Unit (reference UID/IC/4255/2019)."

*We strongly recommend reading this statement in conjunction with the CONSORT 2010 Explanation and Elaboration for important clarifications on all the items. If relevant, we also recommend reading CONSORT extensions for cluster randomised trials, non-inferiority and equivalence trials, non-pharmacological treatments, herbal interventions, and pragmatic trials. Additional extensions are forthcoming: for those and for up to date references relevant to this checklist, see www.consort-statement.org.

Normas de Publicação da Acta Médica Portuguesa

Acta Médica Portuguesa's Publishing Guidelines

Conselho Editorial ACTA MÉDICA PORTUGUESA
Acta Med Port 2016, 30 dezembro 2016

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Constituir o fórum de publicação de normas de orientação.

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Lema: "Primum non nocere, primeiro a Acta Médica Portuguesa"

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Nota: Este documento assinado só deverá ser enviado quando o manuscrito for aceite para publicação.

Editor da Acta Médica Portuguesa

O(s) Autor(es) certifica(m) que o manuscrito intitulado: _____ (ref. AMP_____) é original, que todas as afirmações apresentadas como factos são baseados na investigação do(s) Autor(es), que o manuscrito, quer em parte quer no todo, não infringe nenhum *copyright* e não viola nenhum direito da privacidade, que não foi publicado em parte ou no todo e que não foi submetido para publicação, no todo ou em parte, noutra revista, e que os Autores têm o direito ao *copyright*.

Todos os Autores declaram ainda que participaram no trabalho, se responsabilizam por ele e que não existe, da parte de qualquer dos Autores conflito de interesses nas afirmações proferidas no trabalho.

Os Autores, ao submeterem o trabalho para publicação, partilham com a Acta Médica Portuguesa todos os direitos a interesses do *copyright* do artigo.

Todos os Autores devem assinar

Data:_____

Nome (maiúsculas):_____

Assinatura:_____

7. CONFLITOS DE INTERESSE

O rigor e a exactidão dos conteúdos, assim como as opiniões expressas são da exclusiva responsabilidade dos Autores. Os Autores devem declarar potenciais conflitos de interesse. Os autores são obrigados a divulgar todas as relações financeiras e pessoais que possam enviesar o trabalho.

Para prevenir ambiguidade, os autores têm que explicitamente mencionar se existe ou não conflitos de interesse.

Essa informação não influenciará a decisão editorial mas antes da submissão do manuscrito, os autores têm que assegurar todas as autorizações necessárias para a publicação do material submetido.

Se os autores têm dúvidas sobre o que constitui um relevante interesse financeiro ou pessoal, devem contactar o editor.

8. CONSENTIMENTO INFORMADO e APROVAÇÃO ÉTICA

Todos os doentes (ou seus representantes legais) que possam ser identificados nas descrições escritas, fotografias e vídeos deverão assinar um formulário de consentimento informado para descrição de doentes, fotografia e vídeos. Estes formulários devem ser submetidos com o manuscrito (modelo disponível em http://www.actamedicaportuguesa.com/info/consentimento_informado_do_doente.doc).

A Acta Médica Portuguesa considera aceitável a omissão de dados ou a apresentação de dados menos específicos para identificação dos doentes. Contudo, não aceitaremos a alteração de quaisquer dados.

Os autores devem informar se o trabalho foi aprovado pela Comissão de Ética da instituição de acordo com a declaração de Helsínquia.

9. LÍNGUA

Os artigos devem ser redigidos em português ou em inglês. Os títulos e os resumos têm de ser sempre em português e em inglês.

10. PROCESSO EDITORIAL

O autor correspondente receberá notificação da recepção do manuscrito e decisões editoriais por *email*.

Todos os manuscritos submetidos são inicialmente revistos pelo editor da Acta Médica Portuguesa. Os manuscritos são avaliados de acordo com os seguintes critérios: originalidade, actualidade, clareza de escrita, método de estudo apropriado, dados válidos, conclusões adequadas e apoiadas pelos dados, importância, com significância e contribuição científica para o conhecimento da área, e não tenham sido publicados, na íntegra ou em parte, nem submetidos para publicação noutros locais.

A Acta Médica Portuguesa segue um rigoroso processo cego (*single-blind*) de revisão por pares (*peer-review*, externos à revista). Os manuscritos recebidos serão enviados a peritos das diversas áreas, os quais deverão fazer os seus comentários, incluindo a sugestão de aceitação, aceitação condicionada a pequenas ou grandes modificações ou rejeição. Na avaliação, os artigos poderão ser:

a) aceites sem alterações;

b) aceites após modificações propostas pelos consultores científicos;

c) recusados.

Estipula-se para esse processo o seguinte plano temporal:

• Após a recepção do artigo, o Editor-Chefe, ou um dos Editores Associados, enviará o manuscrito a, no mínimo, dois revisores, caso esteja de acordo com as normas de publicação e se enquadre na política editorial. Poderá ser recusado nesta fase, sem envio a revisores.

• Quando receberem a comunicação de aceitação, os Autores devem remeter de imediato, por correio electrónico, o formulário de partilha de direitos que se encontra no *site* da Acta Médica Portuguesa, devidamente preenchido e assinado por todos os Autores.

• No prazo máximo de quatro semanas, o revisor deverá responder ao editor indicando os seus comentários relativos ao manuscrito sujeito a revisão, e a sua sugestão de quanto à aceitação ou rejeição do trabalho. O Conselho Editorial tomará, num prazo de 15 dias, uma primeira decisão que poderá incluir a aceitação do artigo sem modificações, o envio dos comentários dos revisores para que os Autores procedam de acordo com o indicado, ou a rejeição do artigo.

Os Autores dispõem de 20 dias para submeter a nova versão revista do manuscrito, contemplando as modificações recomendadas pelos peritos e pelo Conselho Editorial. Quando são propostas alterações, o autor deverá no prazo máximo de vinte dias, carregar na plataforma electrónica da Acta Médica Portuguesa uma versão revista do artigo, com as alterações inseridas destacadas com cor diferente, bem como um novo Documento Suplementar respondendo a todas as questões colocadas.

• O Editor-Chefe dispõe de 15 dias para tomar a decisão sobre a nova versão: rejeitar ou aceitar o artigo na nova versão, ou submetê-lo a um ou mais revisores externos cujo parecer poderá, ou não, coincidir com os resultantes da primeira revisão.

• Caso o manuscrito seja reenviado para revisão externa, os peritos dispõem de quatro semanas para o envio dos seus comentários e da sua sugestão quanto à aceitação ou recusa para publicação do mesmo.

• Atendendo às sugestões dos revisores, o Editor-Chefe poderá aceitar o artigo nesta nova versão, rejeitá-lo ou voltar a solicitar modificações. Neste último caso, os Autores dispõem de um mês para submeter uma versão revista, a qual poderá, caso o Editor-Chefe assim o determine, voltar a passar por um processo de revisão por peritos externos.

• No caso da aceitação, em qualquer das fases anteriores, a mesma será comunicada ao Autor principal. Num prazo inferior a um mês, o Conselho Editorial enviará o artigo para revisão dos Autores já com a formatação final, mas sem a numeração definitiva. Os Autores dispõem de cinco dias para a revisão do texto e comunicação de quaisquer erros tipográficos. Nesta fase, os Autores não podem fazer qualquer modificação de fundo ao artigo, para além das correcções de erros tipográficos e/ou ortográficos de pequenos erros. Não são permitidas, nomeadamente, alterações a dados de tabelas ou gráficos, alterações de fundo do texto, etc.

• Após a resposta dos Autores, ou na ausência de resposta, após o decurso dos cinco dias, o artigo considera-se concluído.

• Na fase de revisão de provas tipográficas, alterações de fundo aos artigos não serão aceites e poderão implicar a sua rejeição posterior por decisão do Editor-Chefe.

Chama-se a atenção que a transcrição de imagens, quadros ou gráficos de outras publicações deverá ter a prévia autorização dos respectivos autores para dar cumprimentos às normas que regem os direitos de autor.

11. PUBLICAÇÃO *FAST-TRACK*

A Acta Médica Portuguesa dispõe do sistema de publicação *Fast-Track* para manuscritos urgentes e importantes desde que cumpram os requisitos da Acta Médica Portuguesa para o *Fast-Track*.

a) Os autores para requererem a publicação *fast-track* devem submeter o seu manuscrito em http://www.actamedicaportuguesa.com/ “submeter artigo” indicando claramente porque consideram que o manuscrito é adequado para a publicação rápida. O Conselho Editorial tomará a decisão sobre se o manuscrito é adequado para uma via rápida (*fast-track*) ou para submissão regular;

b) Verifique se o manuscrito cumpre as normas aos autores da Acta Médica Portuguesa e que contém as informações necessárias em todos os manuscritos da Acta Médica Portuguesa.

c) O Gabinete Editorial irá comunicar, dentro de 48 horas, se o manuscrito é apropriado para avaliação *fast-track*. Se o Editor-Chefe decidir não aceitar a avaliação *fast-track*, o manuscrito pode ser considerado para o processo de revisão normal. Os autores também terão a oportunidade de retirar a sua submissão.

d) Para manuscritos que são aceites para avaliação

fast-track, a decisão Editorial será feita no prazo de 5 dias úteis.

e) Se o manuscrito for aceite para publicação, o objectivo será publicá-lo, online, no prazo máximo de 3 semanas após a aceitação.

12. REGRAS DE OURO ACTA MÉDICA PORTUGUESA

a) O editor é responsável por garantir a qualidade da revista e que o que publica é ético, actual e relevante para os leitores.

b) A gestão de reclamações passa obrigatoriamente pelo editor-chefe e não pelo bastonário.

c) O peer review deve envolver a avaliação de revisores externos.

d) A submissão do manuscrito e todos os detalhes associados são mantidos confidenciais pelo corpo editorial e por todas as pessoas envolvidas no processo de peer-review.

e) A identidade dos revisores é confidencial.

f) Os revisores aconselham e fazem recomendações; o editor toma decisões.

g) O editor-chefe tem total independência editorial.

h) A Ordem dos Médicos não interfere directamente na avaliação, selecção e edição de artigos específicos, nem directamente nem por influência indirecta nas decisões editoriais.

i) As decisões editoriais são baseadas no mérito de trabalho submetido e adequação à revista.

j) As decisões do editor-chefe não são influenciadas pela origem do manuscrito nem determinadas por agentes exteriores.

k) As razões para rejeição imediata sem peer review externo são: falta de originalidade; interesse limitado para os leitores da Acta Médica Portuguesa; conter graves falhas científicas ou metodológicas; o tópico não é coberto com a profundidade necessária; é preliminar de mais e/ou especulativo; informação desactualizada.

l) Todos os elementos envolvidos no processo de peer review devem actuar de acordo com os mais elevados padrões éticos.

m) Todas as partes envolvidas no processo de peer review devem declarar qualquer potencial conflito de interesses e solicitar escusa de rever manuscritos que sintam que não conseguirão rever objectivamente.

13. NORMAS GERAIS

ESTILO

Todos os manuscritos devem ser preparados de acordo com o "AMA Manual of Style", 10th ed. e/ou "Uniform Requirements for Manuscripts Submitted to Biomedical Journals".

Escreva num estilo claro, directo e activo. Geralmente, escreva usando a primeira pessoa, voz activa, por exemplo, "Analisámos dados", e não "Os dados foram analisados". Os agradecimentos são as excepções a essa directriz, e deve ser escrito na terceira pessoa, voz activa; "Os autores gostariam de agradecer". Palavras em latim ou noutra língua que não seja a do texto deverão ser colocadas em itálico.

Os componentes do manuscrito são: Página de Título, Resumo, Texto, Referências, e se apropriado, legendas de figuras. Inicie cada uma dessas secções em uma nova página, numeradas consecutivamente, começando com a página de título.

Os formatos de arquivo dos manuscritos autorizados incluem o *Word* e o *WordPerfect*. Não submeta o manuscrito em formato PDF.

SUBMISSÃO

Os manuscritos devem ser submetidos online, via "Submissão Online" da Acta Médica Portuguesa http://www.actamedicaportuguesa.com/revista/index.php/amp/about/submissions#onlineSubmissions.

Todos os campos solicitados no sistema de submissão *online* terão de ser respondidos.

Após submissão do manuscrito o autor receberá a confirmação de recepção e um número para o manuscrito.

Na primeira página/ página de título:

a) Título em **português** e **inglês**, conciso e descritivo

b) Na linha da autoria, liste o Nome de todos os Autores (primeiro e último nome) com os títulos académicos e/ou profissionais e respectiva afiliação (departamento, instituição, cidade, país)

c) Subsídio(s) ou bolsa(s) que contribuíram para a realização do trabalho

d) Morada e *e-mail* do Autor responsável pela correspondência relativa ao manuscrito

e) Título breve para cabeçalho

Na segunda página

a) Título (sem autores)

b) Resumo em **português** e **inglês**. Nenhuma informação que não conste no manuscrito pode ser mencionada no resumo. Os resumos não podem remeter para o texto, não podendo conter citações nem referencias a figuras.

c) Palavras-chave (*Keywords*). Um máximo de 5 *Keywords* em inglês utilizando a terminologia que consta no Medical Subject Headings (MeSH), http://www.nlm.nih.gov/mesh/MBrowser.html, devem seguir-se ao resumo.

Na terceira página e seguintes:

Editoriais:

Os Editoriais serão apenas submetidos por convite do Editor. Serão comentários sobre tópicos actuais. Não devem exceder as 1.200 palavras nem conter tabelas/figuras e terão um máximo de 5 referências bibliográficas. Não precisam de resumo.

Perspectiva:

Artigos elaborados apenas por convite do Conselho Editorial. Podem cobrir grande diversidade de temas com interesse nos cuidados de saúde: problemas actuais ou emergentes, gestão e política de saúde, história da medicina, ligação à sociedade, epidemiologia, etc.

Um Autor que deseje propor um artigo desta categoria

deverá remeter previamente ao Editor-Chefe o respectivo resumo, indicação dos autores e título do artigo para avaliação.

Deve conter no máximo 1200 palavras (excluindo as referências e as legendas) e até 10 referências bibliográficas. Só pode conter uma tabela ou uma figura. Não precisa de resumo.

Artigos Originais:

O texto deve ser apresentado com as seguintes secções: Introdução (incluindo Objectivos), Material e Métodos, Resultados, Discussão, Conclusão, Agradecimentos (se aplicável), Referências, Tabelas e Figuras.

Os Artigos Originais não deverão exceder as 4.000 palavras, excluindo referências e ilustrações. Deve ser acompanhado de ilustrações, com um máximo de 6 figuras/tabelas e 60 referências bibliográficas**.**

O resumo dos artigos originais não deve exceder as 250 palavras e serão estruturados (com cabeçalhos: Introdução, Materiais e Métodos, Resultados, Discussão e Conclusão).

A Acta Médica Portuguesa, como membro do ICMJE, exige como condição para publicação, o registo de todos os ensaios num registo público de ensaios aceite pelo ICMJE (ou seja, propriedade de uma instituição sem fins lucrativos e publicamente acessível, por ex. clinicaltrials.gov). Todos os manuscritos reportando ensaios clínicos têm de seguir o CONSORT *Statement* http://www.consort-statement.org/.

Numa revisão sistemática ou meta-análise siga as PRISMA *guidelines*.

Numa meta-análise de estudos observacionais, siga as MOOSE *guidelines* e apresente como um ficheiro complementar o protocolo do estudo, se houver um.

Num estudo de precisão de diagnóstico, siga as STARD *guidelines*.

Num estudo observacional, siga as STROBE *guidelines.*

Num *Guideline* clínico incentivamos os autores a seguir a GRADE *guidance* para classificar a evidência.

Artigos de Revisão:

Destinam-se a abordar de forma aprofundada, o estado actual do conhecimento referente a temas de importância. Estes artigos serão elaborados a convite da equipa editorial, contudo, a título excepcional, será possível a submissão, por autores não convidados (com ampla experiência no tema) de projectos de artigo de revisão que, julgados relevantes e aprovados pelo editor, poderão ser desenvolvidos e submetidos às normas de publicação.

Comprimento máximo: 3500 palavras de texto (não incluindo resumo, legendas e referências). Não pode ter mais do que um total de 4 tabelas e / ou figuras, e não mais de 50-75 referências.

O resumo dos artigos de revisão não deve exceder as 250 palavras e serão estruturados (com cabeçalhos: Introdução, Materiais e Métodos, Resultados, Discussão, Conclusão.

Caso Clínico:

O relato de um caso clínico com justificada razão de publicação (raridade, aspectos inusitados, evoluções atípicas, inovações terapêuticas e de diagnóstico, entre outras). As secções serão: Introdução, Caso Clínico, Discussão, Referências.

A linha de autoria deste tipo de artigos não deverá exceder quatro autores. Outros contributos poderão ser reconhecidos no final do texto, sob o parágrafo “Agradecimentos”.

O texto não deve exceder as 1.000 palavras e 15 referências bibliográficas. Deve ser acompanhado de figuras ilustrativas. O número de tabelas/figuras não deve ser superior a 5**.**

Inclua um resumo não estruturado que não exceda 150 palavras, que sumarie o objectivo, pontos principais e conclusões do artigo.

Imagens em Medicina (Imagem Médica):

A Imagem em Medicina é um contributo importante da aprendizagem e da prática médica. Poderão ser aceites imagens clínicas, de imagiologia, histopatologia, cirurgia, etc. Podem ser enviadas até duas imagens por caso.

Deve incluir um título com um máximo de oito palavras e um texto com um máximo de 150 palavras onde se dê informação clínica relevante, incluindo um breve resumo do historial do doente, dados laboratoriais, terapêutica e condição actual. Não pode ter mais do que três autores e cinco referências bibliográficas. Não precisa de resumo.

Só são aceites fotografias originais, de alta qualidade, que não tenham sido submetidas a prévia publicação. Para informação sobre o envio de imagens digitais, consulte as «Normas técnicas para a submissão de figuras, tabelas ou fotografias».

***Guidelines* / Normas de orientação:**

As sociedades médicas, os colégios das especialidades, as entidades oficiais e / ou grupos de médicos que desejem publicar na Acta Médica Portuguesa recomendações de prática clínica, deverão contactar previamente o Conselho Editorial e submeter o texto completo e a versão para ser publicada. O Editor-Chefe poderá colocar como exigência a publicação exclusiva das recomendações na Acta Médica Portuguesa.

Poderá ser acordada a publicação de uma versão resumida na edição impressa cumulativamente à publicação da versão completa no *site* da Acta Médica Portuguesa.

Cartas ao Editor:

Devem constituir um comentário a um artigo da Acta Med Port ou uma pequena nota sobre um tema ou caso clínico. Não devem exceder as 400 palavras, nem conter mais de uma ilustração e ter um máximo de 5 referências bibliográficas. Não precisam de resumo.

Deve seguir a seguinte estrutura geral: Identificar o artigo (torna-se a referência 1); Dizer porque está a escrever; fornecer evidência (a partir da literatura ou a partir de uma

experiência pessoal) fornecer uma súmula; citar referências.

A(s) resposta(s) do(s) Autor(es) devem observar as mesmas características.

Uma Carta ao editor discutindo um artigo recente da Acta Med Port terá maior probabilidade de aceitação se for submetida quatro semanas após a publicação do artigo.

Abreviaturas: Não use abreviaturas ou acrónimos no título nem no resumo, e limite o seu uso no texto. O uso de acrónimos deve ser evitado, assim como o uso excessivo e desnecessário de abreviaturas. Se for imprescindível recorrer a abreviaturas não consagradas, devem ser definidas na primeira utilização, por extenso, logo seguido pela abreviatura entre parenteses. Não coloque pontos finais nas abreviaturas.

Unidades de Medida: As medidas de comprimento, altura, peso e volume devem ser expressas em unidades do sistema métrico (metro, quilograma ou litro) ou seus múltiplos decimais.

As temperaturas devem ser dadas em graus Celsius (ºC) e a pressão arterial em milímetros de mercúrio (mm Hg).

Para mais informação consulte a tabela de conversão "Units of Measure" no *website* da AMA Manual Style.

Nomes de Medicamentos, Dispositivos ou outros Produtos: Use o nome não comercial de medicamentos, dispositivos ou de outros produtos, a menos que o nome comercial seja essencial para a discussão.

IMAGENS

Numere todas as imagens (figuras, gráficos, tabelas, fotografias, ilustrações) pela ordem de citação no texto.

Inclua um título/legenda para cada imagem (uma frase breve, de preferência com não mais do que 10 a 15 palavras).

A publicação de imagens a cores é gratuita.

No manuscrito, são aceitáveis os seguintes formatos: BMP, EPS, JPG, PDF e TIF, com 300 dpis de resolução, pelo menos 1200 *pixeis* de largura e altura proporcional.

As Tabelas/Figuras devem ser numeradas na ordem em que são citadas no texto e assinaladas em numeração árabe e com identificação, figura/tabela. Tabelas e figuras devem ter numeração árabe e legenda. Cada Figura e Tabela incluídas no trabalho têm de ser referidas no texto, da forma que passamos a exemplificar:

Estes são alguns exemplos de como uma resposta imunitária anormal pode estar na origem dos sintomas da doença de Behçet (Fig. 4).

Esta associa-se a outras duas lesões cutâneas (Tabela 1).

Figura: Quando referida no texto é abreviada para Fig., enquanto a palavra Tabela não é abreviada. Nas legendas ambas as palavras são escritas por extenso.

Figuras e tabelas serão numeradas com numeração árabe independentemente e na sequência em que são referidas no texto.

Exemplo: Fig. 1, Fig. 2, Tabela 1

Legendas: Após as referências bibliográficas, ainda no ficheiro de texto do manuscrito, deverá ser enviada legenda detalhada (sem abreviaturas) para cada imagem. A imagem tem que ser referenciada no texto e indicada a sua localização aproximada com o comentário "Inserir Figura nº 1… aqui".

Tabelas: É obrigatório o envio das tabelas a preto e branco no final do ficheiro. As tabelas devem ser elaboradas e submetidas em documento *word*, em formato de tabela simples (*simple grid*), sem utilização de tabuladores, nem modificações tipográficas. Todas as tabelas devem ser mencionadas no texto do artigo e numeradas pela ordem que surgem no texto. Indique a sua localização aproximada no corpo do texto com o comentário "Inserir Tabela nº 1… aqui". Neste caso os autores autorizam uma reorganização das tabelas caso seja necessário.

Quaisquer tabelas submetidas que sejam mais longas/largas do que duas páginas A4 serão publicadas como Apêndice ao artigo.

As tabelas devem ser acompanhadas da respectiva legenda/título, elaborada de forma sucinta e clara.

Legendas devem ser auto-explicativas (sem necessidade de recorrer ao texto) – é uma declaração descritiva.

Legenda/Título das Tabelas*:* Colocada por cima do corpo da tabela e justificada à esquerda. Tabelas são lidas de cima para baixo. Na parte inferior serão colocadas todas as notas informativas – notas de rodapé (abreviaturas, significado estatístico, etc.) As notas de rodapé para conteúdo que não caiba no título ou nas células de dados devem conter estes símbolos *, †, ‡, §, ||, ¶, **, ††, ‡‡, §§, ||||, ¶¶,

Figuras: Os ficheiros «figura» podem ser tantos quantas imagens tiver o artigo. Cada um destes elementos deverá ser submetido em ficheiro separado, obrigatoriamente em versão electrónica, pronto para publicação. As figuras (fotografias, desenhos e gráficos) não são aceites em ficheiros *word*.

Em formato TIF, JPG, BMP, EPS e PDF com 300 *dpis* de resolução, pelo menos 1200 *pixeis* de largura e altura proporcional.

As legendas têm que ser colocadas no ficheiro de texto do manuscrito.

Caso a figura esteja sujeita a direitos de autor, é responsabilidade dos autores do artigo adquirir esses direitos antes do envio do ficheiro à Acta Médica Portuguesa.

Legenda das Figuras: Colocada por baixo da figura, gráfico e justificada à esquerda. Gráficos e outras figuras são habitualmente lidos de baixo para cima.

Só são aceites imagens de doentes quando necessárias para a compreensão do artigo. Se for usada uma figura em que o doente seja identificável deve ser obtida e remetida à Acta Médica Portuguesa a devida autorização. Se a fotografia permitir de forma óbvia a identificação do doente, esta poderá não ser aceite. Em caso de dúvida, a decisão final será do Editor-Chefe.

- **Fotografias**: Em formato TIF, JPG, BMP e PDF com 300 *dpis* de resolução, pelo menos 1200 *pixeis* de largura e altura proporcional.
- **Desenhos e gráficos**: Os desenhos e gráficos devem ser enviados em formato vectorial (AI, EPS) ou em ficheiro bitmap com uma resolução mínima de 600 dpi. A fonte a utilizar em desenhos e gráficos será obrigatoriamente Arial.

As imagens devem ser apresentadas em ficheiros separados submetidos como documentos suplementares, em condições de reprodução, de acordo com a ordem em que são discutidas no texto. As imagens devem ser fornecidas independentemente do texto.

AGRADECIMENTOS (facultativo)

Devem vir após o texto, tendo como objectivo agradecer a todos os que contribuíram para o estudo mas não têm peso de autoria. Nesta secção é possível agradecer a todas as fontes de apoio, quer financeiro, quer tecnológico ou de consultoria, assim como contribuições individuais. Cada pessoa citada nesta secção de agradecimentos deve enviar uma carta autorizando a inclusão do seu nome.

REFERÊNCIAS

Os autores são responsáveis pela exactidão e rigor das suas referências e pela sua correcta citação no texto.

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Meltzer PS, Kallioniemi A, Trent JM. Chromosome alterations in human solid tumors. In: Vogelstein B, Kinzler KW, editors. The genetic basis of human cancer. New York: McGraw-Hill; 2002. p. 93-113.

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Lugg DJ. Physiological adaptation and health of an expedition in Antarctica: with comment on behavioural adaptation. Canberra: A.G.P.S.; 1977. Australian Government Department of Science, Antarctic Division. ANARE scientific reports. Series B(4), Medical science No. 0126

Documento electrónico:

1.CD-ROM

Anderson SC, Poulsen KB. Anderson's electronic atlas of hematology [CD-ROM]. Philadelphia: Lippincott Williams & Wilkins; 2002.

2. Monografia da Internet

Van Belle G, Fisher LD, Heagerty PJ, Lumley TS. Biostatistics: a methodology for the health sciences [e-book]. 2nd ed. Somerset: Wiley InterScience; 2003 [consultado 2005 Jun 30]. Disponível em: Wiley InterScience electronic collection

3. Homepage/Website

Cancer-Pain.org [homepage na Internet]. New York: Association of Cancer Online Resources, Inc.; c2000-01; [consultado 2002 Jul 9].Disponível em: http://www.cancer-pain.org/.

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Supplementary file[1] of "Impact of a simulation-based interprofessional workshop in medical and nursing students' perception of roles and competencies in effective teamwork: a pilot study"

Interprofessional education

Historically, interactions between health professionals have been authoritarian and dominated by doctors. The paradigm has shifted. Health care systems are constantly evolving and facing multiple challenges that advocates for more team-based approaches to health care. [1] The division of labor among medical, nursing and allied health practitioners means that no single professional can deliver a complete episode of healthcare. [2] Rapid and relentless innovation is needed to improve the quality of care delivered, patient outcomes, and patient satisfaction. Such evolution brings with it, the need to revisit important concepts such as nurse-physician collaboration. [3] Maximizing effective collaboration and communication among health care team members is critical for providing safe medical care. Many healthcare incidents are associated with communication problems within the healthcare team and lack of teamwork skills. [4] Communication failures are extremely common, being the leading cause of inadvertent patient harm. [5] In addition to causing human suffering and death, medical errors are financially costly and burden a system already in its limits. [6, 7]

Preparing future healthcare professionals is not just a matter of discipline-specific knowledge acquisition, but creating a culture that values teamwork and mutual space for students to learn with and from one another. [8] Interprofessional learning (IPL) is defined by the World Health Organisation (WHO) (2010) as when "students from two or more professions learn about, from and with each other to enable effective collaboration and

[1] The supplementary file presents a brief literature review of relevant concepts and introduces the motivation of the research work.

improve health outcomes". In particular, the aim of IPL is to develop teamwork capabilities and collaborative behaviours. [9]

At the postgraduate level, interprofessional work (IPW) is essential to all involved in healthcare teams. Previous studies have reported that interprofessional hierarchies have considerable bearing on communication and collaboration. [10] Despite the fact that physicians and nurses work together, their academic courses are separate and the training in effective strategies of communication and care participation is often postponed to the future professional practice. [11] Traditional and monoprofessional educational structures offer little opportunity for future doctors, nurses, and other health professionals to learn in shared environments. [12] Interprofessional education (IPE) should be initiated as early as in undergraduate level to cultivate effective communication and collaboration skills among future medical personnel [13] and to demystify the belief that physicians are supposed to make decisions in a top-down approach within medical teams. Such thinking can be a barrier to IPW in the field. [10] International organizations such as [Institute of Medicine (US), World Health Organization, Joint Commission (US), Agency for Healthcare Research and Quality (US)] have considered IPE as an essential educational requirement in the health professional curricula. [9, 11, 14-16] IPL is gaining popularity between medical schools. From a theoretical concept to a more practical one, either through single interventions, multiple sessions or even training over semester, IPL is currently included in many health curricula throughout the world. [17] with a reasonable number of published papers providing methods and tips to implement it. [18, 19] Moreover, we might think this is a tendency seen mostly in high-resource settings, in wealthy countries such Germany [12], Japan [10] and Korea. [13] However, there are given proofs that the implementation of an IP simulation curriculum for undergraduate students is feasible in a low-resource setting. [20]

Portuguese healthcare education

In Portugal, the sustained increase in the number of medical graduates since 2000 reflects both an increase in the numerus clausus of existing traditional universities and the creation of new medical schools in younger universities outside the main Portuguese cities. As a result, in 2019, Portugal was one of the countries above OECD average in medical graduates per capita. [21] Currently, Portugal has eleven medical schools across country, including islands. Nursing, in the other hand, has been evolving to an opposite tendency, being one of the countries below OECD average in nursing graduates per capita in 2019. [22] There is an extensive list of nursing schools across all national territory, with a distribution following the demographic density.

Current curricular plans in medical education, shows residual relevance to non-technical competencies. Although clinical communication skills (CCS) are present in most of curricula (in *Diário da República*), students admit to need more training in CCS in their residency year and highlight that during the clinical cycle of undergraduate medical education should integrate these topics. [23] Furthermore, no references are made to IPE modalities within the study plan. Nursing curricula shows a different reality. Although no practical courses exist on IPE, there are some topics integrated in their curricula that raise awareness to the value and function of healthcare teams. (in *Diário da República*). Despite the growing awareness of its importance, up to our knowledge, there have been no cases in Portugal where well-structured programs, targeting medical and nursing students, have been implemented and assessed.

Considering the reasons mentioned above, Portuguese healthcare educators and stakeholders need to raise awareness and mobilize resources (e.g. human, technical, and financial) in order to build and reinforce capacity on patient safety education, training and research. Because their multidisciplinary nature, healthcare schools can have a central role in creating capacity through educational courses and researches programmes and by fostering national and international networks on healthcare quality and patient safety. Furthermore, this investment should go beyond research and educational developments to translate knowledge gained into policies and practices. [24]

IPL can be a useful approach to overcome this issue and improve the healthcare education in Portugal.

Simulation-Enhanced Interprofessional Education

Simulated-Based Learning Experience is defined as "an array of structured activities that represent actual or potential situations in education and practice. These activities allow participants to develop or enhance their knowledge, skills, and attitudes, or to analyze and respond to realistic situations in a simulated environment." [25] The artificial representation of a complex real-world process with sufficient fidelity aims to facilitate learning through immersion, reflection and feedback. Moreover, it minimizes the risks inherent to practicing in a similar real-life experience. Clinical simulation can benefit the individual learner, the multidisciplinary team, and the hospital as a whole. [26] When conducted with opportunity for repetitive practice in a team-based environment, it improves clinical performance and teamwork skills, in many clinical areas. [20] Many institutions use simulation-based activities to facilitate IPL, with the aim of preparing healthcare professionals for the challenges and pressures they will face in the workplace. [17] Simulation-Enhanced Interprofessional Education / (Sim-IPE) is defined as "the education of healthcare professionals with different but complementary knowledge and skills in a simulation environment that promotes a collaborative team approach." [25] This sort of training strategy can be effective in improving communication and collaboration among students from different healthcare professions. [27] For effective IPE, a "one size fits all" approach is not likely to be successful. Nonetheless, much can be learned from the efforts of others. [8]

Creating meaningful, systemic, and sustainable IPE is challenging and barriers are well documented. At a cultural level, an entrenched belief that practitioners are individually responsible for patient outcomes continue to present an issue to the team approach. [8] The logistical barriers to synchronising different timetables to bring students together at

the same place and time is a significant hurdle. As it is the rigid/condensed core curricula and extra-curricular activities and its conciliation with elective/mandatory course/unit. Furthermore, simulation is a resource intensive teaching modality with significant costs in many cases. There are also individual deadlocks such as a high workload, lack of reward and perceived value and even bias towards own profession. From another perspective, the factors that have the capacity to negatively influence the outcome and sustainability of an IPE, have also the capacity to positively influence it too. For instant, funding provided by Government and Professional stakeholders, although identified as a barrier to IPE, when available, enables the development and implementation of IPE programs in higher education healthcare professional curricula. This can be extended to other fields and the many barriers can be transposed with hard work and dedication. [28]

In line with the literature, evidence demonstrating efficacy and supporting ongoing program of IPE combined with simulation activities is useful. Further research efforts should be directed to increase the evidence and awareness of IPE based simulation and its benefits to effective teamwork and patient safety. [17]

LINKS - Lifting INterprofessional Knowledge through Simulation

Considering the above educational need, a collaboration between the medical (FMUP) and nursing (ESEP) schools of Porto (Portugal) was established and the program LINKS (Lifting INterprofessional Knowledge through Simulation) was developed. LINKS is a simulation-based workshop targeting interprofessional teams of healthcare students (medicine and nursing), aiming the development of interprofessional (IP) team perception (understanding of roles and competencies), and the use of Non-Technical-Skills (NTS) to promote effective IP teamwork.

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