Education in Public Health: using Interprofessional Team Objective Structured Clinical Examination (ITOSCE) as an evaluation for collaborative practice

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Abstract:
This study aims to evaluate the experience of a simulated interprofessional pedagogical activity conducted at a Brazilian public university. This exploratory study included both qualitative and quantitative analysis. Undergraduate students from Nursing, Physiotherapy, Medicine, and Dentistry courses were invited to take the Inter-Professional Team Objective Structured Clinical Exam (ITOSCE). Students were observed in groups at stations lasting twenty minutes, each containing daily problem situations in Primary Health Care. Feedback was given at the stations, and expected performance was reviewed. Process evaluation included: an opinion questionnaire, application of the Readiness Interprofessional Learning Scale (RIPLS), and a focus group. The questionnaire was completed by 40 students (26.1 ± 5.26 years) and showed a high average score (90% of the distributed points), indicating that the experience was considered positive. A high RIPLS score (87%) also suggested that students were ready for IPE. In the focus group, students emphasized ITOSCE as a training tool with the potential to develop important collaborative skills, while recognizing the need for interprofessional communication to improve healthcare quality. Results demonstrated that students had positive attitudes

toward collaborative work. The simulated experiment was effective for observing collaborative skills and teamwork, resulting in an educational impact.
Keywords: Interprofessional Education, Interdisciplinary Placement, Public health, Education, Public Health Professional, Health Human Resource Training.

Educação em Saúde Pública: utilização do Exame Clínico Objetivo Estruturado em equipe interprofissional (ITOSCE) como avaliação para a prática colaborativa

Resumo:
Este estudo tem como objetivo avaliar a experiência de atividade pedagógica interprofissional simulada realizada em uma universidade pública brasileira. Trata-se de um estudo exploratório com análise qualitativa e quantitativa. Estudantes de graduação dos cursos de Enfermagem, Fisioterapia, Medicina e Odontologia foram convidados a realizar o *Inter-Professional Team Objective Structured Clinical Exam* (ITOSCE). Os estudantes, por grupo, foram observados em estações, com vinte minutos de duração, contendo situações-problema do cotidiano da Atenção Primária à Saúde. O feedback foi realizado nas estações e o desempenho esperado foi revisto. A avaliação processual incluiu: um questionário de opinião; aplicação da *Readiness Interprofessional Learning Scale* (RIPLS) qe avalia disponibilidade para educação interprofessional (EIP) e um grupo focal. O questionário foi respondido por 40 estudantes (26,1 ± 5,26 anos) e teve uma média alta (90% dos pontos distribuídos), o que revela que a experiência foi considerada positiva. Também foi observada uma alta pontuação no *RIPLS* (87%), o que indica que os estudantes estão disponíveis para a EIP. No grupo focal, os estudantes empatizaram com o ITOSCE como um dispositivo de formação com capacidade de desenvolver habilidades colaborativas importantes, ao mesmo tempo em que reconheceram a necessidade da comunicação interprofissional para qualificar o trabalho em saúde. Os resultados mostraram que os estudantes demonstraram atitudes positivas em relação ao trabalho colaborativo. A experiência simulada foi adequada para observar as competências colaborativas e o trabalho em equipe e resultou num impacto educativo.
Palavras-chave: Educação Interprofissional, Aprendizagem Colaborativa, Saúde Pública, Educação Profissional em Saúde Pública, Capacitação de Recursos Humanos em Saúde.

Educación en Salud Pública: uso del Examen Clínico Estructurado Objetivo del Equipo Interprofesional (ITOSCE) como evaluación para la práctica colaborativa

Resumen:
Este estudio tiene como objetivo evaluar la experiencia de actividad pedagógica interprofesional simulada realizada en una universidad pública brasileña. Se trató de un estudio exploratorio con análisis cualitativo y cuantitativo. Estudiantes de pregrado de los cursos de Enfermería, Fisioterapia, Medicina y Odontología fueron invitados a realizar el Examen Clínico Objetivo Estructurado en Equipo Interprofesional (ITOSCE). Los estudiantes por grupo, fueron observados en estaciones, con veinte minutos de duración, conteniendo situaciones problemáticas cotidianas en Atención Primaria de Salud. La retroalimentación se realizó en las estaciones y se revisó el desempeño esperado. La evaluación del proceso incluyó: un cuestionario de opinión; la aplicación de la Escala de Preparación para el Aprendizaje Interprofesional (RIPLS) y un grupo focal. El cuestionario fue respondido por 40 alumnos (26,1 ± 5,26 años) y tuvo una media alta (90% de los puntos distribuidos), lo que revela que la experiencia fue considerada positiva. También se observó una alta puntuación en el RIPLS (87%), lo que indica que los estudiantes están disponibles para la IPE. En el grupo focal, los estudiantes identificaron el ITOSCE como un dispositivo de formación con capacidad para desarrollar importantes habilidades de colaboración, al tiempo que reconocieron la necesidad de la comunicación interprofesional para cualificar el trabajo sanitario. Los resultados mostraron que los estudiantes demostraron actitudes positivas hacia el trabajo colaborativo. El experimento simulado fue adecuado para observar las habilidades de colaboración y el trabajo en equipo y tuvo un impacto educativo.
Palabras clave: Educación Interprofesional, Prácticas Interdisciplinarias, Salud Pública, Educación en Salud Pública Profesional, Capacitación de Recursos Humanos en Salud.

INTRODUCTION

Technological advances, increased life expectancy, and the prevalence of chronic degenerative diseases necessitate actions to requalify the current model of health practices, which are recognized as deficient and inefficient in the face of today's complex care needs. The search for alternatives to improve care from a comprehensive and shared care perspective has been generating growing interest in Interprofessional Education (IPE) (REEVES et al., 2015). The training of health professionals, by prioritizing work in collaborative teams based on IPE, can promote improved care, increase patient safety, and enhance the quality and resolvability of care (GILBERT; YAN; HOFFMAN, 2010; IPEC, 2016).

IPE activities can follow the guidelines from the Interprofessional Education Collaborative Expert Panel (IPEC, 2016), which classify collaborative competencies according to four main pillars: ethics and attitudes, roles and responsibilities, communication, and teamwork. These guidelines recommend the use of active methodologies such as problematization, observation, simulation, and in-service practices (REEVES et al., 2016).

A recent initiative in Brazil that follows the IPEC guidelines is the Education through Work for Health Program (PET-Saúde Interprofessionality), which aims to boost the implementation of IPE at universities and health services throughout the country (BRASIL, 2021). Created by the Ministry of Health in July 2018, this program is one of the strategies for strengthening national health human resources policy and fostering changes to incorporate shared learning initiatives across different health courses, teacher development in IPE, teaching-service-community integration, and the promotion of interdisciplinarity and intersectoriality (ALMEIDA; TESTON; MEDEIROS, 2019).

In light of the innovative guidelines of IPEC and PET-Health/Interprofessionality, professors from UFMG, a federally funded public institution in southeastern Brazil, responsible for the Public Health internship of six courses, proposed the development of a pilot study aimed at shifting traditional uni-professional training to IPE. This experience, carried out in a simulated environment, involved the application of the Interprofessional Team Objective Structured Clinical Exam (ITOSCE) to develop and evaluate students' skills for interprofessional teamwork (SYMONDS; CULLEN; FRASER, 2003). This methodology has been successfully applied in other studies, demonstrating its effectiveness in developing collaborative skills essential for interprofessional education (KESHMIRI et al., 2016; CULLEN; FRASER; SYMONDS, 2003).

The motivation for this innovative initiative was based on Kolb's (2015) theory, which suggests that the integration of structured and experiential knowledge is essential for professional development. Learning occurs through experience and reflection, not solely on a cognitive level.

Thus, this article aims to evaluate the experience of simulated interprofessional pedagogical activity conducted at a Brazilian public university among students from four undergraduate health courses.

METODOLOGY

This was a mixed exploratory study utilizing both quantitative and qualitative designs to evaluate a simulated interprofessional pedagogical activity and to analyze its acceptability among students for collaborative learning. Undergraduate students from the Schools of Nursing, Physiotherapy, Medicine, and Dentistry at UFMG, who were enrolled in the Public Health internship program during the final year of their respective courses in 2019, were invited to participate in the simulated interprofessional activity.

Over four months, during biweekly meetings, professors from each participating course, along with professors of Pharmacy and Speech Therapy, discussed themes prevalent in Primary Health Care (PHC) (Table 1). For each domain, a problem situation was developed based on the realities and needs of primary health care. Educational objectives, scenarios, tasks, and relevant materials were made available for consultation by the participants.

Table 1 - Problem situations and skills expected in the simulated exercise.

ID	Scenario / Problem Situation	Expected skills
1	Adolescent pregnant as a result of non-consensual sexual intercourse	orientation actions planning of adolescent health care considering its life context and public health policies for women and adolescents
2	Suspected measles case identified in primary care	interprofessional teamwork considering aspects of Health Surveillance when approaching individual and collective actions
3	Denouncing violence against elderly resident in Long Term Care Facility for the Elderly	addressing mistreatment and valuing the roles of professions in comprehensive care
4	Resource allocation decision between health promotion and high-cost treatment	teamwork for decision making - Planning and health management - Conflict management

Source: Gontijo et al, 2024.

To initiate the activity, four adjoining rooms were organized, each with two teacher observers who were instructed not to interact with the students in order to assess the team's performance. The teachers positioned themselves in strategic locations far from the students' visual field to avoid distractions during discussions. A standard form—checklist containing specific items about the case related to collaborative work and aspects common to all stations—was used to guide the observation. Previously, teachers were trained in a 4-hour workshop that consisted of observing and evaluating videos, followed by discussions to reach a consensus on the evaluation criteria.

Two professors acted as external observers with the role of critically evaluating the proposed problem situation, the checklist, the dynamics of collaborative work, and the attitude of the examining professors.

The students received guidance on how ITOSCE works, as this strategy was an innovative experience at the educational institution. During this session, the Informed Consent Form was presented and signed by the participants. The 64 students were initially divided into two groups of 32, represented by students from the four courses, selected for convenience. Each group of 32 students was then organized into four teams, totaling eight teams with two students from each course. All teams experienced the activities in the four problem situation rooms.

Each team had 20 minutes to understand the problem situation, discuss the task, propose and orally synthesize solutions based on national public policies and official recommendations founded in interprofessionality, and consult the relevant bibliography. In two rooms, teachers simulated the roles of a health unit manager and a member of the local health council, respectively. After eighteen minutes, a whistle signaled the remaining two minutes, after which participants were instructed to rotate classrooms. Collective feedback was provided at the end of the process, with the presentation of the expected response patterns and clarification of any doubts.

To assess the students' general satisfaction with the simulated ITOSCE activity and their opinions regarding the proposed structure (clarity of objectives, time adequacy, interprofessional learning experience, usefulness of the proposed situations, communication skills, and problem-solving), a self-administered questionnaire containing eight statements was applied, to be answered using a five-point Likert scale, where one point indicated total disagreement and five points indicated total agreement.

As a complement to the evaluation, we aimed to understand the students' readiness for interprofessional learning. Therefore, we used the Brazilian validated version (PEDUZZI et al., 2015) of the self-applied instrument, the Readiness for Interprofessional Learning Scale (RIPLS), using a five-point Likert scale with three domains: Teamwork and Collaboration (14 items), Professional Identity (8 items: five items that refer to contrary attitudes towards interprofessional learning, and three items referring to professional autonomy and clinical objectives of each profession), and Patient-Centered Care (5 items). The contradicting responses for IPE were scored inversely to allow for correct statistical interpretation.

After completing the round and applying the evaluation, twelve students (three from each course) who had participated in the first round were randomly selected by lottery and agreed to participate in a focus group for a deeper evaluation of the innovative experience. The group was facilitated by a researcher moderator with expertise in focus groups and three observing teachers positioned in different locations outside the discussion to make notes about the reactions and behaviors that occurred during the interaction.

Guiding questions were provided to the participants, seeking to understand aspects related to learning, possible repercussions in clinical practice, general satisfaction with ITOSCE, suggestions for the operationalization of IPE in the institution, and their difficulties

and challenges. The focus group lasted 85 minutes. Their responses were recorded using two voice recorders positioned at different locations on the table.

For quantitative data, descriptive analyses of mean scores for each statement and their respective standard deviations were performed using the Statistical Package for the Social Sciences (SPSS). For comparison between the courses and ages of the participants, including the statement means, analysis of variance (ANOVA One-Way) was conducted using a significance level of 5%. For qualitative analysis, the information obtained in the focus group was explored through content analysis by Greneheim and Lundman (GRENEHEIM, LUNDMAN, 2004), after transcription and reading of the statements.

RESULTS

The 64 participants had a mean age of 26.1 years (±5.26), and 81% were female.

Total score comparisons from the two instruments, the ITOSCE questionnaire and the RIPLS scale (Table 2), with 90% of the mean scores equal to or greater than 40, revealed that the experience of simulating IPE using ITOSCE was considered positive by the participants. There was a difference between the courses, with the highest mean scores attributed to students from the Dentistry (44.20) and Physiotherapy (43.22) courses.

Table 2 - Average distribution of points in the ITOSCE and RIPLS instruments, (in three domains and total) by course and age.

Variables		ITOSCE (45 points)		Teamwork and collaboration		Profissional identity		Patient- centered attention		Total RIPLS (135 points)	
		Mean (SD) Median	p	Mean (SD) Median	p	Mean (SD) Median	p	Mean (SD) Median	p	Mean (SD) Median	p
Curses	Nursing	39.50 (3.40) 39.00	**<0.01**	66.72 (3.92) 68.50	0.22	31.00 (2.97) 31.00	0.49	23.39 (1.88) 24.00	0.40	121.11 (6.11) 122.0	0.28
	Physiotherapy	43.22 (2.05) 44.00		68.78 (2.22) 69.00		32.44 (3.94) 32.00		23.89 (1.54) 25.00		125.11 (5.69) 127.00	
	Dentistry	44.20 (0.83) 44.00		68.40 (2.19) 70.00		33.00 (1.22) 33.00		24.60 (0.89) 25.00		126.00 (3.67) 128.00	
	Medicine	40.90 (4.42) 42.00		63.25 (8.83) 65.50		30.50 (5.20) 31.50		24.25 (1.16) 25.00		118.00 (12.36) 121.00	
Age	Aged to 24	41.10 (3.70) 41.00	0.87	66.84 (6.20) 69.00	0.86	32.79 (3.34) 33.00	**0.02**	24.00 (1.56) 25.00	0.52	123.63 (9.02) 127.00	0.20
	25 or older	41.28 (3.58) 43.00		66.57 (4.00) 69.00		30.29 (3.45) 30.00		23.67 (1.65) 25.00		120.52 (6.18) 122.00	

Source: Gontijo et al, 2024.

According to results from the three domains that comprised the RIPLS (Table 2), there was a similarity between the courses, except for Professional Identity, which had lower scores attributed to students up to 24 years of age (p=0.02). The total average score also had a similar distribution between courses and students' ages. The students from the four courses reported satisfaction with the ITOSCE strategy (p=0.09).

The domain Teamwork and Collaboration (Table 3) showed high averages and medians close to the maximum scale value of five across almost all responses. There was a statistical difference between the courses regarding the students' perception of the need to learn communication skills together (p=0.04). The items that assess students' perception of the basic characteristics of IPE—group respect, interpersonal communication, and patient benefits—obtained means above 4.8 across all courses.

Table 3 - Scores for the "Teamwork and collaboration" domain - RIPLS scale, according to the undergraduate course.

Questions	Nursing	Phsiotherapy	Dentistry	Medicine	Total	p
	Mean (SD) Median					
Helps me become more effective as a healthcare team	4.67 (0.49) 5.00	4.67 (0.71) 5.00	4.80 (1.07) 5.00	4.50 (0.45) 5.00	4.65 (0.66) 5.00	0.94
Patient benefit	4.78 (0.43) 5.00	4.89 (0.33) 5.00	5.00 (0.00) 5.00	4.87 (0.35) 5.00	4.85 (0.36) 5.00	0.65
Increases my ability to understand clinical problems	4.78 (0.42) 5.00	5.00(0.00)5.00	5.00(0.00)5.00	4.50 (1.07)5.00	4.80(0.56) 5.00	0.26
Improves relationships after graduation	4.78 (0.55) 5.00	4.78 (0.44) 5.00	5.00 (0.00) 5.00	4.25 (1.16) 5.00	4.70 (0.69) 5.00	0.19
Must develop communication skills	4.89 (0.32) 5.00	5.00 (0.00) 5.00	4.80 (0.44) 5.00	4.25 (1.35) 5.00	4.77 (0.62) 5.00	**0.04**
Helps you think positively about other professionals	4.72 (0.58) 5.00	5.00 (0.00) 5.00	4.60 (0.55) 5.00	4.62 (0.74) 5.00	4.75 (0.54) 5.00	0.44
Students need to trust and respect each other if it is to work out	4.83 (0.38) 5.00	5.00 (0.00) 5.00	5.00 (0.00) 5.00	4.87 (0.36) 5.00	4.90 (0.33) 5.00	0.50
Must develop teamwork skills	4.94 (0.24) 5.00	4.89 (0.33) 5.00	4.80 (0.45) 5.00	4.75 (0.46) 5.00	4.87 (0.33) 5.00	0.56
Helps you understand your own limitations	4.62 (0.50) 5.00	4.89 (0.33) 5.00	4.60 (0.55) 5.00	4.37 (0.74) 4.50	4.63 (0.54) 5.00	0.28
Skills for solving clinical problems should be learned from students in the course itself*	4.50 (1.15) 5.00	4.33 (1.32) 5.00	5.00 (0.00) 5.00	4.14 (1.57) 5.00	4.46 (1.19) 5.00	0.56
Helps me communicate better with patients and other professionals	4.83 (0.38) 5.00	5.00 (0.00) 5.00	4.80 (0.44) 5.00	4.62 (0.74) 5.00	4.82 (0.44) 5.00	0.41
I would like to have the opportunity to work on small group projects with students from other health professions	4.72 (0.57) 5.00	5.00 (0.00) 5.00	5.00 (0.00) 5.00	4.12 (0.99) 4.50	4.70 (0.65) 5.00	**0.01**
Helps clarify the nature of patients' problems	4.78 (0.43) 5.00	4.89 (0.33) 5.00	5.00 (0.00) 5.00	4.63 (0.74) 5.00	4.80 (0.46) 5.00	0.50
Helps me become a professional who works better as a team	4.72 (0.46) 5.00	4.89 (0.33) 5.00	4.80 (0.45) 5.00	4.62 (0.74) 5.00	4.75 (0.49) 5.00	0.74

Source: Gontijo et al, 2024.

In examining the analysis of the negative items about Professional Identity (Table 4), there was an inversion of the scale, that is, a score of 5 indicated total disagreement. The greatest mean was 4.92, pointing to positive attitudes by students about the need for interprofessional learning, and also that IPE does not translate to time wasted (4.92). The significant difference between the courses was due to a lower score given by medical students. The participants demonstrated a unanimous disagreement in the statement concerning the function of the other professions being to support the physician (4.74), and agreement regarding the similar need between the courses as to knowledge and skills acquisition during the training. On the other hand, there was a greater agreement with the statements "I will be able to use my own judgment in my role as a professional" (2.47) and "*My main responsibility as a professional will be to treat my patient*"(2.85).

Table 4 - Scores for the "Professional Identity" domain - RIPLS scale, according to the undergraduate course.

Questions	Nursing	Physiotherapy	Dentistry	Medicine	Total	p
	Mean (SD) Median					
I don't want to waste my time learning with students from other health professions*	5.00 (0.00) 5.00	5.00 (0.00) 5.00	5.00 (0.00) 5.00	4.62 (0.74) 5.00	4.92 (0.35) 5.00	**.05**
It is not necessary for undergraduate health students to learn together*	5.00 (0.00) 5.00	4.89 (0.33) 5.00	5.00 (0.00) 5.00	4.25 (1.16) 5.00	4.82 (0.59) 5.00	**.01**
The role of other health professionals is mainly to support physicians*	4.62 (0.88) 5.00	5.00 (0.00) 5.00	5.00 (0.00) 5.00	4.5 (1.07) 5.00	4.74 (0.76) 5.00	.44
I need to acquire much more knowledge and skills than students in other health professions*	4.05 (1.30) 5.00	4.22 (1.09) 5.00	4.80 (0.45) 5.00	4.37 (1.06) 5.00	4.25 (1.13) 5.00	.62
I would feel uncomfortable if another health student knew more about a topic than I do*	4.64 (0.70) 5.00	4.55 (1.01) 5.00	4.60 (0.55) 5.00	3.87 (1.64) 5.00	4.46 (1.02) 5.00	.71
I will be able to frequently use my own judgment in my professional role*	2.44 (1.25) 2.00	1.89 (1.27) 2.00	3.20 (1.09) 3.00	2.75 (1.17) 3.00	2.47 (1.24) 2.00	.25
The diagnosis will be the main function of my professional role*	4.16 (0.79) 4.00	3.78 (1.20) 4.00	3.40 (1.14) 3.00	3.63 (1.50) 4.00	3.87 (1.09) 4.00	.44
My main responsibility as a professional will be to treat my patient*	2.50 (1.50) 2.00	3.67 (1.32) 4.00	2.20 (1.09) 2.00	3.12 (0.99) 3.50	2.85 (1.39) 3.00	.12

Note: *negative statements that were analyzed with an inverted scale 5 = total disagreement.
Source: Gontijo et al, 2024.

Students attributed the highest scores to the statements in the domain, Patient-centered attention (table 5), on the RIPLS scale. There was no statistical difference observed between courses.

Table 5 - Scores in the "Patient-centered care" domain - RIPLS scale, according to the undergraduate course, 2019.

Questions	Nursing	Physiotherapy	Dentistry	Medicine	Total	p
	Mean (SD) Median					
I like to understand the problem from the patient's perspective	4.33 (1.06) 5.00	4.44 (0.78) 5.00	5.00 (0.00) 5.00	4.75 (0.46) 5.00	4.52 (0.84) 5.00	0.39
Establishing a trusting relationship with my patients is important to me	5.00 (0.00) 5.00	4.89 (0.33) 5.00	5.00 (0.00) 5.00	4.80 (0.45) 5.00	4.95 (0.22) 5.00	0.22
I try to convey compassion to my patients	4.22 (0.88) 4.50	4.67 (0.50) 5.00	4.80 (0.45) 5.00	4.75 (0.46) 5.00	4.50 (0.71) 5.00	0.17
Thinking of the patient as a person is important to indicate the correct treatment	4.83 (0.38) 5.00	5.00 (0.00) 5.00	5.00 (0.00) 5.00	4.87 (0.35) 5.00	4.90 (0.30) 5.00	0.50
In my profession, interaction and cooperation skills with patients are required	5.00 (0.00) 5.00	4.89 (0.33) 5.00	5.00 (0.00) 5.00	4.87 (0.35) 5.00	4.95 (0.22) 5.00	0.43

Source: Gontijo et al, 2024.

In the Focus Group, students from two courses, Physiotherapy and Medicine, had previous experiences with the application of OSCE (Objective and Structured Observation of Clinical Examination) as individual assessment. All students reported some anxiety, empathizing that they were more related to possible teamwork difficulties and interaction with students that they had not been previously introduced to, than in relation to the content that was addressed. They all identified that *anxiety could be even greater in real situations* and recommended the simulation experience.

In relation to interprofessional teamwork, they reported *that working together promotes greater tranquility, since the responsibility for the results is shared and the knowledge is complementary (P4)*. They perceived that everyone sought to contribute, without "*overlapping one another*" and highlighted the relevance of performance by nursing students: "*They know a lot! (N3)*"; "*They hug everyone! (N2)*" In turn, nursing students stated that they were familiar with the proposed situations in the ITOSCE, which were addressed during the course.

Medicine and Dentistry students stated that they felt "*more isolated and less exposed to interprofessional teamwork during under graduation(D1)*". They revealed that the experience of ITOSCE "*proved that other professions are easier to coexist: when we wear white clothes, we isolate ourselves(M3)*".

As for the clarity of the specifics, they revealed the stigmas that exist within professions, and how much this lack of knowledge of the other can be a barrier to teamwork. For a dental student, when she joined one of the activity groups, the thought was of exclusion: "*when these people learn that I am from the dentistry course, they won't listen to me! That's how it is in real life (D2)*". On the other hand, during the activity, there was no concern in separating the areas of activity, and many times "*they forgot to mention which course they were from (D2)*".

The contribution by the Dentistry course, in problem situation three, explaining weight loss with the inadequacy of a dental prosthesis, surprised many who had not considered this hypothesis. This example was a comprehensive approach to the patient: "*thinking through, together, about the best patient care (P1)*"; "*The collective thinking of the individual(N2)*". In the same rational, a medical student reported that "*an elderly person suffering a fall, for me, is postural hypotension or syncope. The vision of Physiotherapy has expanded these possibilities (M4)*".

The experience in a collaborative team provoked reflections on the practices already experienced during the courses, signaling intentions to improve future professional performance: "*it is necessary to review what happens in real life (M1)*".

The use of ITOSCE as an educational strategy, fulfilling its role of formative assessment was also recognized by the students: "*we learn from this assessment (all)*". They suggested the expansion of the activity at the beginning year of the courses, and exploration of other possibilities such as interprofessional extension activities. Furthermore, they stated that experience can help "*change paradigms(N2)*", because "*we are trained for 'self-excellence', but we don't have to know everything, we have to know how to communicate with other areas. Service failures happen because the professions don't communicate and if it doesn't happen during training, it won't happen at the place of work(N2)*".

The students reported their opportunity to understand the importance of their conduct interaction with other professionals, and that this factor can determine whether their performance will "*help or hinder the patient (D1)*", and also by favoring recognition by others and "*know who to ask for help(D3)*".

Regarding teaching with an emphasis on the public health theme, which is common to all undergraduate courses that participated in the activity, the students reported: "*all courses do the same thing, but each one in his or her own box. Teamwork is everyone together in one box(N4)!*

DISCUSSION

The choice of ITOSCE as a simulated IPE activity proved to be relevant in verifying just how a team of students uses and develops their collaborative skills in addressing health situations. The joint analysis of RIPLS and the focus group showed that students have positive attitudes towards development of collaborative competences: teamwork, identification of roles and responsibilities, communication skills, conflict management and comprehensive care, corroborating with several other studies (LIE *et al.*, 2015; REEVES *et al.*, 2016).

The outcomes of the focus group are in agreement to the positive perception of the experience reported by 90% of the respondents. The students were motivated to collaborate and understood the importance of active teaching methodologies. The interactive nature of the problem-situation approach favors learning, is student-centered and promotes a favorable attitude towards interprofessional performance (LIE *et al.*, 2015), which most likely positively influences their perception of an educational activity.

Active educational activities, such as ITOSCE, add communication skills and collaborative work (SYMONDS; CULLEN; FRASER, 2003), and is a useful and congruent tool with the IPE ((AMINI *et al.*, 2012). Experiences with simulated activities, that is, conducted in a safe environment, aim to increase teamwork trust, since the reduction of stress and anxiety stimulates productive learning. As a transition to real practice in health services, the development of attitudes in scenarios are recommended, in which arising mistakes by students can be learn. In addition, simulated environments represent opportunities for decision making and for the practice of effective communication in interpersonal relationships, as well as guaranteed time for reflection and feedback (GILBERT; YAN; HOFFMAN, 2010). In relation to the experience in question, the use of actors who, allowed for students to put into practice specific public health skills to resolve situations, stimulating the development of communication skills, which are fundamental for shared, health decision making (EMMERT; CAI, 2015).

The IPE prioritizes the integration and flexibility of the workforce, recognizing and respecting the identities of each profession (GILBERT; YAN; HOFFMAN, 2010), which was evidenced in both the qualitative and quantitative data assessment. It was apparent from those students recognized the importance of different viewpoints for quality care, as well as the need to complement the work done by others for care resolution (REEVES *et al.*, 2016). The ITOSCE experience for students was considered relevant to their training as a health professional and not just their core knowledge. At RIPLS, the issue of professional identity refers to competitive attitudes that hinder teamwork and in the present study, all students disagreed with assertions that favor just one professional work over the interprofessional one.

Since this group of evaluated students failed to demonstrate competitive attitudes as measured by the RIPLS, it was expected that the results for the domain for attitudes related

to patient-centered care would result in greater averages, given the inverse relationship between competitive behavior and the subject's center stage during the care process. This hypothesis was proven, and probably expresses part of an effort to change the paradigm of health education in Brazil, as proposed by the Guidelines for National Curriculum (DCN), which, among others, includes the patient's participation during the care process in a humanized manner (FREIRE FILHO *et al.*, 2019). Patient-centered practice is presented in the literature as an essential domain for interprofessional collaboration (PEDUZZI *et al.*, 2015). Despite the fact that interprofessional activities are still incipient in the institution, the presence of themes common to the DCN health courses, such as comprehensiveness, participation of the user and their families in decision-making regarding care, and student field training with PHC teams, may have influenced the valorization of this domain.

A high RIPLS score (87%) suggests that students are available for interprofessional learning, for skills development for teamwork and collaborative work and patient-centered attention (PEDUZZI *et al.*, 2015). Once this plasticity is confirmed, there will be the need to reflect on the barriers that pose challenges to the legitimacy of IPE in educational institutions with more than one health area course. The assessment of students' attitudes and readiness for effective interprofessional learning can be an important source of information (MAHARAJAN *et al.*, 2017), but it does not guarantee the practice of IPE in a learning environment.

There are barriers that hinder IPE, such as the complexity of curricular matrices, the need to guarantee protected areas and the difficulty of making common schedules feasible for integrated activities of different courses (CAMARGOS; AMARAL; ROCHA, 2021). On the other hand, common content in the area of public health and the homogeneous training by teachers can facilitate the development of common and collaborative professional skills (PERUZZO *et al.*, 2018) and increase the predisposition for teamwork. It is worth noting that feedback reaffirmed its role as an essential moment and opportunity to identify strengths and weaknesses during the student and teacher training process, and also recognizing the common contents that can and should be taught in an integrated manner (BURGESS; MELLIS, 2015). The discussion between teachers and students in the analysis of the group's performance and the activity itself, entails the commitment of educational strategies in their collective and institutionally oriented dimension (GONTIJO; ALVIM; LIMA, 2015).

The main limitation of this study was the lack of evaluation prior to the simulated intervention, minimized, in part, by the qualitative approach within the focus group. Voluntary participation may have included participants who are more receptive to IPE. On the other hand, the quantitative and qualitative was a differential approach in the sense of empathizing the importance of IPE in the health care courses. In addition, the similarities between the students, all were at the last stages of their course and had previous clinical experiences, may have contributed to the understanding of the importance of teamwork in the effectiveness and safety of health care (REEVES *et al.*, 2016). More studies are warranted with a larger sample size, randomly allocated and with evaluations done at different moments during the course training, while focusing on elements that contribute to reinforce the importance of implementing IPE.

We recognized this a successful initiative towards the implementation of the IPE during the training of professionals in the healthcare field, demonstrating that policies that stimulate similar initiatives have the potential to bring about good practices for the application of IPE to be shared by institutions of higher healthcare education throughout the country and other locations around the world.

CONCLUSION

The ITOSCE simulated experiment and evaluation process, proved to be adequate for identifying the potential of this educational strategy for the development of collaborative skills, while allowing students and teachers to reflect on the health education weaknesses and strengths, as well as the importance of support and knowledge of the roles and responsibilities of each profession. The experience of sharing teaching and learning led to a proximity of professors from the various health courses at UFMG and demonstrated the effectiveness of interprofessional teamwork in training excellence.

By operationalizing an innovative, educational intervention process, this initiative allows students to collectively practice, in a safe environment, prevalent problem situations in the area of public health that involves patient-centered care. The unanimous agreement by students in relation to this type of approach signals a paradigm shift in health education,

which represents advances in the country for professional training in interprofessional health. The findings may contribute towards fostering interprofessional activities at higher education institutions where courses in the health area coexist.

AUTHOR CONTRIBUTIONS

ED Gontijo, FC Ferreira, AD Moreira, HN Oliveira, NB Rocha, AC Palmier, GL Freitas, MIB Senna, PM Arantes and RAT Aguiar contributed to elaboration of situational problems. ED Gontijo, FC Ferreira, AD Moreira, HN Oliveira and NB Rocha contributed to conception and data analysis. ED Gontijo, FC Ferreira, AD Moreira, and NB Rocha contributed to redaction of article. All authors critically revised the manuscript, gave final approval and agree to be accountable for all aspects of the work. The authors received no financial support and declare no potential conflicts of interest with respect to the authorship and/or publication of this article.

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