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Interprofessional education in health based on the *framework for action on interprofessional education & collaborative practice*: A systematic review

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ABSTRACT

Introduction: Interprofessional Education (IPE) in health is a strategy with an historical evolution and theoretical contribution with which many educators are not familiar. This study analysed the theoretical and conceptual contribution of IPE, comparing the "Framework for Action on Interprofessional Education & Collaborative Practice" with more recent publications of higher impact factor from the *Web of Science.* **Methods:** This is a systematic review based on the following descriptors: interprofessional education, undergraduate, university program and university degree. The study includes articles from 2011 to March 2018, excluding systematic review articles and/or those analysing one single professional category. Two independent researchers reached an agreement on divergences about the corpus in a consensus meeting. **Results:** Of the 65 initially identified articles, 29 were selected upon full reading of the texts for a thematic analysis of content and NVivo version 11. Five thematic categories were prepared: Assumptions, Basic Theories, Curriculum, Mechanisms and Research. Even though the analysed material is scarce in the conceptual propositions of IPE, there is progress being made in the use of theories (cultural, educational, and psychosocial, among others) towards developing programmes, assessment and evidence research. **Conclusion:** The theoretical and conceptual progress of this field will require consolidating research associated with IPE programmes. Study limitations were due to non-inclusion of articles with other impact factors.

Keywords: Interprofessional Education, Health, Undergraduate Studies, Theoretical Assumptions.

INTRODUCTION

Interprofessional Education in Health (IPE) is a strategy that offers the possibility of cooperative training at different levels of teaching and practices in healthcare, and is sustained by a growing bibliography (ARAIN *et al.*, 2017; BALDWIN, 2007; HERATH *et al.*, 2017; REEVES, 2016; REEVES *et al.*, 2013). Nevertheless, it remains underused by many higher education institutions across the world. In fact, many university educators lack the basic concepts this area has been developing, which thus requires an ongoing and updated reflection on the topic.

For researchers in this area, and in specialised journals, IPE is commonly recognised as a collaborative learning activity developed between two or more people (undergraduates and/or professionals) who learn together in order to improve the quality of healthcare provided to those served by health systems (WHO, 2010). Accordingly, IPE offers an opportunity for cooperative learning and has consequently been associated with better outcomes in healthcare. This is because, through IPE, students and/or professionals may develop key skills in real practice contexts and thus optimise resources (REEVES, 2016).

Background

Literature puts the origin of IPE in the 70s, as the World Health Organization (WHO) presented the Alma-Ata Declaration in 1978, identifying education in health, based on the articulated research and actions among several sectors, as a relevant condition to provide better healthcare to the worldwide population. However, it was in 1988 that WHO widened the meaning of IPE through the document "Learning together to work together for health. Report of a WHO study group on multiprofessional education for health personnel: The team approach" (WHO, 1988), when it recommended a substantial change in the culture of healthcare, questioning both the idea of education and of health, together with the possible articulation between the two.

"Learning together…" was key to promoting the concept of IPE at an institutional/inter-institutional level, fostering the growth of formal and informal relations intra and among institutions in training health professionals, with the assumption of improving communication, cooperative training, practicing in real-life contexts and research, among others. Also at a national level, recommending WHO member states should reorganise health policies and activities, focusing on the concept of team, restructuration of healthcare systems based on primary healthcare and on the optimisation of their health workforce, seeking a better definition and communication of each professional competencies.

Over two decades after “Learning together…”, there was another institutional comprehensive leap and a new dynamic surge in IPE assumptions, through “Framework for Action on Interprofessional Education & Collaborative Practice”, elaborated by the WHO Study Group on IPE and collaborative practices (WHO, 2010). This group was led by John H. V. Gilbert, Jean Yan and Steven J. Hoffman, with contributions from dozens of other IPE professionals and scholars, who elaborated evidence-based directives to guide health players around the world, such as policy-makers, educators, health professionals and community leaders.

“Framework for...” articulates two essential pillars: IPE and collaborative practices, one depending on the development of the other. IPE is put forward as a strategy to mitigate the global crisis regarding the offer and quality of health workforce training in meeting the growing and, sometimes, unusual demands of health systems across the globe. IPE implies rearticulating and questioning the concepts of education and health and the collaboration of students (or professionals) of two or more professions in order to learn more about, from and with each other, a strategy anchored in disciplinary heterogeneity. Thus, students and professionals acquire competencies to work as a team and in collaborative practices (WHO, 2010).

Collaborative practices include clinical and non-clinical approaches (in management, education, engineering, among others), but always around the users, families, carers and communities in general, focused on health in its entirety and in real life situations. As such, the concept of health professional widens and faces different healthcare realities, being inclusive since it encompasses all those who promote or preserve health, regulated or not. Additionally, the concept of health system also evolves, conceived as the collective organisations and people who, at different levels of care, proposals and training, collaborate to achieve better health outcomes in society (WHO, 2010).

The theoretical and conceptual aspects of IPE have been questioned in various forms. In his “Reply”, when questioning the path of IPE in Brazil (a reflection that is applicable to other realities), Reeves (2016) wrote it is important to be critical when reading literature so that its assumptions, evidence, successes and failures are understood and underpin approaches that are coherent with the different local educational and health realities. Accordingly, the Pan American Health Organization (PAHO/WHO) began a webinar in 2018, directed at Latin-American health professionals, named “Interprofessional Education: From Policies to Practice in the Region of the Americas”, investing in the conceptual levelling and training of (potential) leaders.

This study, which is part of an investigation about higher education faculty attitudes and experiences with IPE, led by two research groups (Brazilian and Portuguese) and based on the PICo (GREENHALGH, 2005) recommendation, questions how the IPE theoretical and conceptual arguments, provided by impact factor international literature, during 2011 and

March 2018, moved forward regarding the “Framework for...”. Thus, the goal of this review is to understand the theoretical and conceptual evolution of IPE comparing the “Framework for Action on Interprofessional Education & Collaborative Practice” with publications in journals of higher impact factor, available on the *Web of Science*, between 2011 and early 2018.

METHOD

This systematic review of literature, without meta-analysis, was registered in the *International Prospective Register of Systematic Reviews* (PROSPERO), of the University of York, under number 95425, and used to approach the question of this research on the conceptual evolution of IPE. This type of review is used in order to integrate information from independent studies on the topic of interest, and may present similar or conflicting results, in addition to identifying topics that need further research (MOHER *et al.*, 2015; SAMPAIO; MANCINI, 2007).

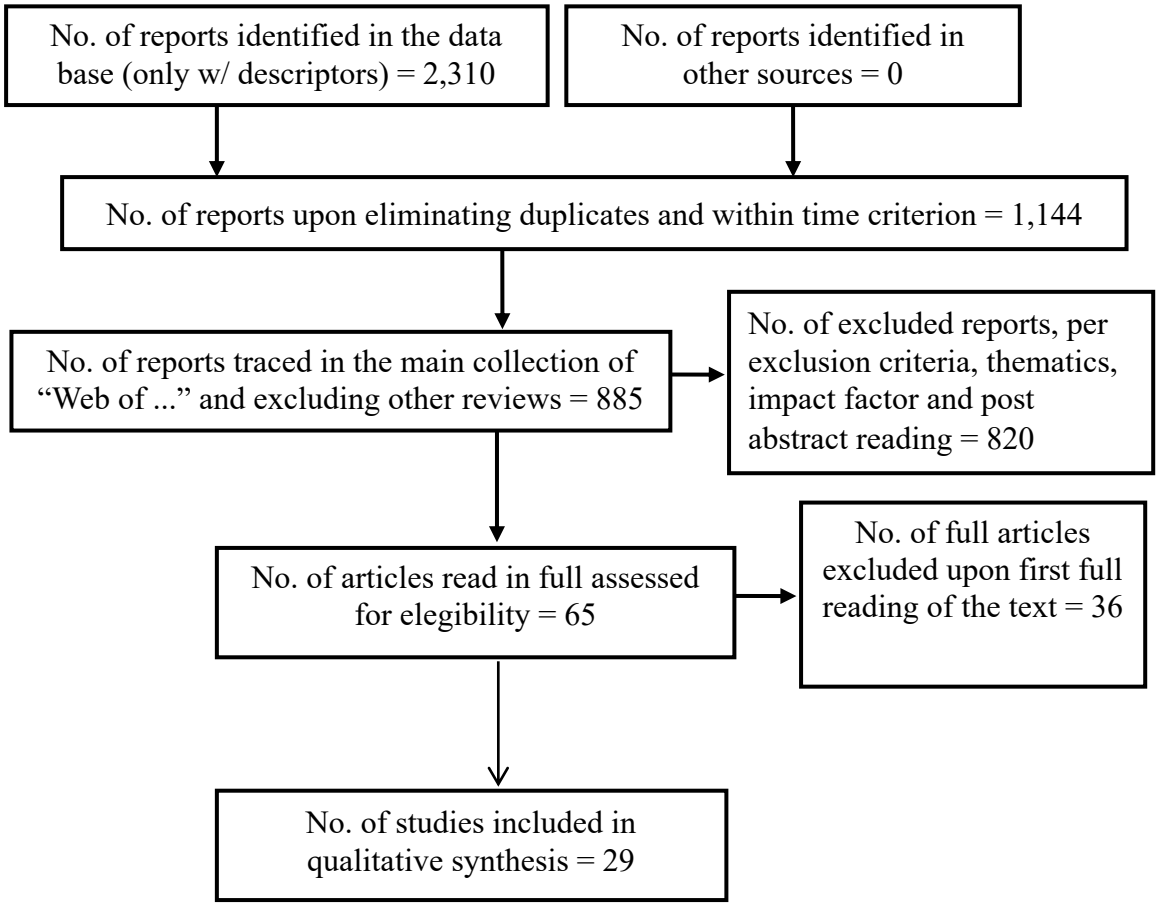
Research strategies, inclusion and exclusion criteria and results from data extraction

The strategy used to begin building the corpus (or group of articles considered for analysis) was the following combination of key words through the Boolean operators (OR/AND): “interprofessional education” OR “multi-professional education” OR “interprofessional learning” AND “undergraduate” OR “undergraduate degree” OR “university degree” OR “university program”. These descriptors were first compared with the Health Sciences Descriptors – DeCS, 2017 version, to confirm term similarities (BIREME/PAHO/WHO, 2017). The research was conducted on the *Web of Science* by two researchers (one with higher education training in health and the other with health-related higher education training), who worked independently using the inclusion and exclusion criteria.

Inclusion criteria were as follows: a) research timeframe: between 2011 and 01 March 2018; b) peer-reviewed articles; c) phenomena of interest: theoretical aspects on interprofessional training, interprofessional education and teaching practices on teamwork in health within higher education programmes; and, d) qualitative, quantitative and theoretical studies. The following exclusion criteria were adopted: a) studies focused on uniprofessional or unidisciplinary training in health; and, b) systematic review articles.

The two independent researchers reached an agreement on the divergences found in a face-to-face meeting. Hence, it was necessary to adjust the meaning of the research question and the use of the inclusion and exclusion criteria to compile the final group of articles (Figure 1), presented according to the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses - PRISMA.

Figure 1. Flow diagram of identification, triage, eligibility and inclusion of articles on the theoretical assumptions of Interprofessional Education in Health, in accordance with the PRISMA Flow Diagram.



Source: Elaborated by the authors.

Figure 1 shows that upon applying the descriptors, 2310 publications were first found, and then reduced to 1144 upon application of the time criterion. Taking into consideration the analysis covers the theoretical and conceptual evolution of IPE after the "Framework for..." (WHO, 2010), the timeframe was limited to publications between 2011 and March, 1st 2018. Upon considering the main collection from the *Web of Science*, and excluding articles classified as systematic review, the research detected 885 articles. Upon abstract reading, the research excluded articles that, despite mentioning the term interprofessional education/ learning, only analysed results of one single professional category or were aimed at validating instruments. Additionally, the research also excluded articles outside the Q1 and Q2 quartil of the journal impact factor, resulting in 65 articles read in full. At this point, each article was considered regarding two questions: 1) Does it answer the research question in an appropriate manner (internal validity)?; and, 2) To what extent can the answer to the question be applied to other realities (external validity)? In the end, 29 articles were analysed and reread in full.

Data analysis

Upon compiling the corpus, the 29 articles were organised in accordance with the following items: references, type of article, concept or notion of IPE, theoretical assumptions. The analysis process took place in two moments. First, there was a thematic analysis of the theoretical and conceptual content found in all articles (corpus), per Bardin´s (2013) recommendations. The thematic categories were built using an inductive approach.

In a second moment, the corpus content or references (extracted in their full thematic sense) of the produced categories (BARDIN, 2013) were imported to the Nvivo 11 program, building five categories (nodes) and six sub-categories (child nodes), namely: 1) Assumptions, 2) Basic Theories, 3) IPE Mechanisms, 4) Curriculum, and 5) Research. The sub-categories derived from the category of Theoretical Assumptions (Interprofessional Education – "IPE", Interprofessional Collaboration – "IPC", and Integration between IPE and IPC – "IPEIPC") and of Curriculum (Structure, Content and Assessment). For language standardisation, the terms "category/subcategory" will hereinafter be used exclusively as equivalent to the "node/child node" terms of NVivo 11.

Subsequently, the full text of "Framework for..." was imported to NVivo 11, from which excerpts in their full thematic sense were also taken, and in turn redistributed among the thematic categories and subcategories (deductive analysis). Accordingly, references were then distributed per category and sources (corpus and "Framework for..." report) with consequent analysis of source comparison.

RESULTS

Of the 29 studies identified for analysis, most of them were theoretical studies (n=12; 41.4%), followed by quantitative studies (n=11; 38%) and qualitative studies (n=5; 17.2%). Only one study had a mixed qualitative-quantitative design (3.4%; WILLIAMS *et al,* 2011). Regarding the concept or notion of IPE used, most articles (n=15; 51.7%) mentioned the concept coined by the Centre for the Advancement of Interprofessional Education – CAIPE (WHO, 2010). Others were not explicit, but did present notions with content similar to that of CAIPE (n=6; 20.7%). One of the articles (ROBERTS *et al*., 2018) used the explicit notion of IPE and contained a conceptual structure derived from CAIPE (WHO, 2010). According to this Centre, IPE is understood as a collaborative learning activity developed between two or more people (undergraduates and/or professionals) who learn together so as to improve the quality of the healthcare provided to those served by health systems. However, seven studies (22.1%) did not define the concept of IPE (Table 1).

Table 1. Characteristics of interprofessional education (IPE) studies in health, per author(s)/year, title, and concept/notion of IPE.

Author(s)/Year	Title	Concept/notion of IPE
Mahler, Schwarzbeck, Mink e Goetz (2018)	Students´ perception of interprofessional education in the bachelor program "Interprofessional Health Care" in Heidelberg, Germany: an exploratory case study.	WHO (2010)[1]
Roberts, Davis, Radley-Crabb e Broughton (2018).	Perceived relevance mediates the relationship between professional identity and attitudes towards interprofessional education in first-year university students.	IPE must focus: a) on user-focused care, b) on user safety, and c) on the quality and practice of collaborative IPE.
Filho, Da Costa, Forster e Reeves (2017).	New national curricula guidelines that support the use of interprofessional education in the Brazilian context: An analysis of key documents.	Not explicit, but in line with WHO (2010).
Keshmiri, Rezai, Mosaddegh, Moradi, Hafezimoghadam, Zare et al. (2017)	Effectiveness of an interprofessional education model based on the transtheoretical model of behaviour change to improve interprofessional collaboration.	WHO (2010)
Berger, Goetz, Leowardi-Bauer, Schultz, Szecsenyi e Mahler (2016).	Anchoring interprofessional education in undergraduate curricula: The Heidelberg story.	WHO (2010)
Hwang, Yoon, Jin, Park, Park e Lee (2016).	Patient safety competence for final-year health professional students: Perceptions of effectiveness of an interprofessional education course.	Not explicit.
Brewer e Barr (2016).	Interprofessional Education and Practice Guide No. 8: Team-based interprofessional practice placements.	Not explicit, but in line with WHO (2010).
Anderson, Ford e Kinnair (2016).	Interprofessional Education and Practice Guide No. 6: Developing practice-based interprofessional learning using a short placement model.	Not explicit, but in line with WHO (2010).
Lutfiyya, Brandt, Delaney, Pechacek e Cerra (2016).	Setting a research agenda for interprofessional education and collaborative practice in the context of United States health system reform.	WHO (2010).
Brashers, Erickson, Blackhall, Owen, Thomas e Conaway (2016).	Measuring the impact of clinically relevant interprofessional education on undergraduate medical and nursing student competencies: A longitudinal mixed methods approach	WHO (2010).
Kururi, Tozato, Lee, Kazama, Katsuyama,Takahashi, et al. (2016).	Professional identity acquisition process model in interprofessional education using structural equation modelling: 10-year initiative survey.	Not explicit.
Shrader, Hodgkins, Laverentz, Zaudke, Waxman, Johnston e Jernigan (2016).	Interprofessional Education and Practice Guide No. 7: Development, implementation, and evaluation of a large-scale required interprofessional education foundational programme.	Not explicit, but in line with WHO (2010).
Olson, Bidewell, Dune e Lessey (2016).	Developing cultural competence through self-reflection in interprofessional education: Findings from an Australian university.	WHO (2010).
Anderson, Smith e Hammick, (2015).	Evaluating an interprofessional education curriculum: A theory-informed approach	Not explicit.
Loversidge e Demb (2015).	Faculty perceptions of key factors in interprofessional education.	WHO (2010).
Herrmann,Woermann e Schlegel (2015).	Interprofessional Education in Anatomy: Learning Together in Medical and Nursing Training.	WHO (2010).
Roberts e Forman (2015).	Interprofessional education for first year psychology students: career plans, perceived relevance and attitudes.	WHO (2010).
Brashers, Owen e Haizlip (2015).	Interprofessional Education and Practice Guide No. 2: Developing and implementing a center for interprofessional education.	Not explicit.
Willgerodt, Blakeney, Brock, Liner, Murphy e Zierler (2015).	Interprofessional education and practice guide No. 4: Developing and sustaining interprofessional education at an academic health center.	Not explicit, but in line with WHO (2010).
Hall e Zierler (2015).	Interprofessional Education and Practice Guide No. 1: Developing faculty to effectively facilitate interprofessional education.	Not explicit, but in line with WHO (2010).
Foster e Clark (2015).	Moderating the stereotypical views of health and social care students: the role of interprofessional education.	Not explicit.
Brown (2014).	Towards Defining Interprofessional Competencies for Global Health Education: Drawing on Educational Frameworks and the Experience of the UW-Madison Global Health Institute.	Not explicit.
Gilligan, Outram e Levett-Jones (2014).	Recommendations from recent graduates in medicine, nursing and pharmacy on improving interprofessional education in university programs: a qualitative study.	WHO (2010).
Fitzsimmons, Cisneros e Sannore (2014).	A learner developed longitudinal interprofessional education curriculum.	WHO (2010).

Author(s)/Year	Title	Concept/notion of IPE
Mellor, Cottrell e Moran (2013).	"Just working in a team was a great experience..." – Student perspectives on the learning experiences of an interprofessional education program.	WHO (2010).
Pardue (2013).	Not left to chance: Introducing an undergraduate interprofessional education curriculum.	WHO (2010).
Missen, Jacob, Barnett, Walke e Cross (2012).	Interprofessional clinical education: Clinicians' views on the importance of leadership.	WHO (2010).
Williams, Lewis, Boyle e Brown (2011).	The impact of wireless keypads in an interprofessional education context with health science students.	Not explicit.
Hamilton (2011).	Two birds with one stone: Addressing interprofessional education aims and objectives in health profession curricula through interdisciplinary cultural competency training.	WHO (2010).

[1] Upon the adoption of the definition of IPE similar to the concept of the Centre for the Advancement of Interprofessional Education - CAIPE (WHO, 2010): understood as a collaborative learning activity between two or more people (undergraduates and/or professionals) who learn together to improve the quality of healthcare provided to those served by health systems.

Source: Elaborated by the authors.

Concerning the thematic categories, "Theoretical Assumptions" included all references to theoretical, reflexive or propositional aspects about IPE or interprofessional collaboration (IPC) or about the interaction between the two (IPEIPC). Examples include the following excerpts: "training in IPE is important for patient care and to improve interprofessional skills" (MAHLER *et al.*, 2018); or "IPE improves attitudes towards interprofessional collaboration" (ROBERTS *et al.*, 2018).

Additionally, because it is of particular interest for the analysis, the second category of "Basic Theories" was built, encompassing references about developed theories that are recognised in different areas of knowledge, which have been used, proposed or mentioned by researchers to solve IPE problems. References such as: "Invitation to social constructivism (GERGEN, 2009)" (FILHO *et al.*, 2017); or "Use of the constructivist learning theory, the adult learning theory and of experiential learning theories" (KESHMIRI *et al.*, 2017).

The third category of IPE "Mechanisms" constitutes a group of references informing on a series of practical, institutional, political, management, among other aspects that perfect or allow for the proposition and better outcomes of IPE. "A Sustainability Plan is required: to create a committee to overlook all items of the programme" (BREWER; BARR, 2016); "by establishing an organisational infrastructure, partner organisations are expected to share responsibilities: teaching material, appropriate spaces, funds for all involved professionals, etc." (ANDERSON *et al.*, 2016).

The fourth category is called "Curriculum" and gathers references on: a) Content, for example, "collaborative care best practice models - CCBPMs – established IPE competencies such as communication, professionalism, shared problem-solving and decision-making" (BRASHERS *et al.*, 2016); b) Structure of the training plan, for example: "Mapping outcomes and assessing IPE competencies must serve as basic structures in the curriculum" (SHRADER

et al., 2016); and, C) Assessment, for example: "assess students' evolution and activities using a variety of rigorous methods" (WILLGERODT *et al.*, 2015).

Last, but not least, the fifth category, "Research", concerns the group of references reporting on the concerns, aspirations, or even, the practices and needs observed by researchers for IPE to continue to be a topic of research. As a result, it will be possible to answer questions sometimes raised by IPE theoretical assumptions and thus make more progress in this field: "there is limited empiric evidence on the positive impact of IPE in stereotyped beliefs" (FOSTER; CLARK, 2015); "an important limitation consists on the restricted use of qualitative methods, which could provide data on how IPE affects change" (MELLOR *et al.*, 2013).

DISCUSSION

Teaching and service delivery in healthcare have not experienced a linear development (BALDWIN, 2007), much like Interprofessional Education (IPE) and interprofessional collaborative practices (IPC) have not experienced a linear interest or historical advance around the world. On the contrary, IPE and IPC are immensely complex and entail trial and error activities, in a context that lacks better evidence, needs institutional support and an ongoing debate about the best theoretical, conceptual and methodological terms of reference. Hence, this review seeks to understand aspects of how theoretical assumptions have evolved since the edition of "Framework for..." (WHO, 2010).

The theoretical and conceptual "Assumptions" presented by WHO (2010) are clear in the notion that IPE is achieved when two or more professions learn together and become stronger in their organic relation with IPC, as real practice healthcare services are delivered through teamwork, with the purpose of providing the best care to individuals and communities in general. On the other hand, both the development of each part and the articulation between IPE and IPC address aspects regarding training, stereotypes, power, economy, ethical views and conducts. As such, it is necessary to step away from a certain autistic disciplinary stance, at least, as a means to achieve a more social and human effectiveness and responsibility.

Post "Framework for...", the theoretical "Assumptions" restate the key positions defended by WHO (2010) as well as the problems of IPE and IPC in different contexts (ANDERSON *et al.*, 2016; BERGER *et al.*, 2016; MAHLER *et al.*, 2018; ROBERTS *et al.*, 2018; SHRADEr *et al.*, 2016). IPE strengthens, on the one hand, the professional who develops key skills (social, communication, decision-making, among others) and, on the other, the basic commitment of providing qualified answers to people's health needs. IPE demands a continuous close relation with the reality of local health systems and their idiosyncrasies, while also pushing for modern ways to teach, think, do and relate with and among people of different origins (OLSON *et al.*, 2016).

Naturally, “Framework for...” does not provide Basic Theories to sustain IPE and IPC. This aspect has been a great contribution from later publications which highlight, among others: the constructivist theory, the adult learning theory, the experiential learning theory and the transtheoretical model - TTM (KESHMIRI *et al.*, 2017); the 3P conceptual model: “Presage, Process e Product” and the Social Constructivist Theory (ANDERSON *et al.*, 2015); Structural Equation Modelling (KURURI *et al.*, 2016); the Model of Cultural Competence (OLSON *et al.*, 2016); and the Social Identity Theory (FOSTER; CLARK, 2015). Many of these models are still in the process of producing better evidence on the effects of IPE and IPC.

Different IPE and IPC experts have alerted to the need for educators to develop IPE programmes based on theories that can guide the principles, goals, activities and assessment throughout the training process (KESHMIRI *et al.*, 2017). Moreover, many obstacles to the development of IPE and IPC may be associated with the traditional teaching-learning theoretical conceptions based on the acquisition of accumulated knowledge and on “profession-centrism”, as described by Hamilton (2011). IPE programmes are proposed in negotiation between leaderships that, at times, represent different positions, which means that the coexistence between theories is considered yet another challenge to be addressed.

In order for IPE and IPC to move from being isolated activities or actions, developed in a short period and intermittently, among other inhibiting aspects, as has been observed throughout History (REEVES, 2013), WHO (2010) predicted several improvement and sustainability “Mechanisms”. These mechanisms include aspects of micro (ongoing observation of training content or curricula, others), meso (institutional support, management, others) and macro contexts (legislation, health systems funding, others). In short, there is a range of aspects with great impact on IPE-IPC outcomes that go beyond the relationship between educator-student-professional, that need to be identified, predicted, managed and addressed.

Literature reviewed on IPE/IPC also highlights the “Mechanisms” related with educators, teaching plans (curricula) and research, very much in accordance and in addition to WHO (2010). The process of IPE-IPC qualification should always bear in mind the foundation of accumulated knowledge, the search for partnerships (ANDERSON *et al.*, 2016; BREWER; BARR, 2016), raising and optimising resources (BRASHERS *et al.*, 2015), planning (BERGER *et al.*, 2016; HALL; ZIERLER, 2015; SHRADER *et al.*, 2016), promoting (internal and externally), and dialoguing - and then dialogue some more. Additionally, processes of accreditation have also been a factor in fostering the development of IPE-IPC (WILLGERODT *et al.*, 2015).

As regards to curriculum, “Framework for...” mentions aspects that may be grouped in: structure, content and assessment. In this study, curricular “structure” refers to factors related with content or skills or competences to be developed that add a different dynamic to the teaching-learning process. Accordingly, WHO (2010) refers a trilogy (learning activities,

expected outcomes and assessment of what was learned) to propose programmes with flexible chronograms, rational resources and logistics, different scenarios of contextual learning, use of adult learning principles and good practices in education, paired with the assimilation of student feedback (dialogical factor).

After “Framework for...”, literature highlights the following curriculum’s explicit structural elements: a) training duration, ranging from a few weeks (BREWER; BARR, 2016) to years of graduation (KURURI *et al.*, 2016); b) variety of content, dividing students in levels, offering content throughout their graduation studies, engaging students in different events, others (WILLGERODT *et al.*, 2015); and c) teaching methodologies: active pedagogies, questioning, conflict simulation, building and/or analysing clinical cases (FITZSIMMONS *et al.*, 2014; SHRADER *et al.*, 2016), preparing teaching material and the use of technologies (WILLIAMS *et al.*, 2011).

As regards to Content, “Framework for...” does not necessarily provide a group of programmes (or menus) to be developed by WHO state members. Instead, it presents elements that can be specified in: overcoming bad experiences and meeting health demands in the real world, learning about the particularities of other professionals’ work; working as a team, and performing as leaders. Additionally: identifying barriers, understanding the role and responsibilities of one’s professions and of others, expressing one’s opinions assertively, developing the ability to transfer knowledge when engaging with patients and families, relating with other professionals of the health system, and following an ethical practice.

In the period following the “Framework for...” some topics were reasserted while others were broadened in order to be further developed in IPE programmes. On occasions, such topics are presented as transversal syllabus content (BRASHERS *et al.*, 2016; BROWN, 2014; FILHO *et al,* 2017; HERRMANN *et al,* 2015; HWANG *et al.*, 2016; PARDUE, 2013). These include principles and values, global health, epidemiology, transcultural health practices, analysis of health systems infrastructures, territoriality and subject complementarity (definition of roles and responsibilities of one’s profession and of others, reflection on prejudice and “professional centrism”), among others.

On other occasions, literature suggests the development of competences and skills. These include the ability to maintain positive interrelationships (problem solving, conflict solving, ability to interact and act professionally, collaboration and respect towards the contribution of each profession, teamwork, others). Likewise, communication (with users of the health system, families and other professionals evolving to academic writing and oral presentations at events); evidence-based work; selectively choosing information in health; preparing diagnosis; use of electronic systems; and, management, leadership and decision-making (BROWN, 2014; FILHO *et al,* 2017; HERRMANN *et al,* 2015; MISSEN *et al.*, 2012; PARDUE, 2013).

As regards to Assessment, it is understood that the "Framework for..." takes on a training stance. It raises awareness to the fact that outcomes are influenced by the students' physical and social environment, as well as by the level of education. Thus, evaluators must know the student: what, how and when to apply knowledge and use skills. Recent literature demands the development of different assessment methodologies, qualitative and quantitative, using reliable measures (ANDERSON *et al.*, 2015; BRASHERS *et al.*, 2016; WILLGERODT *et al.*, 2015), while placing students at the centre of the assessment process. As highlighted by Mellor *et al.* (2013), traditional forms of assessment inhibit IPC and are, therefore, contradictory to its purposes.

Lastly, in WHO (2010), research results revealed the impact of collaborative practices on the patients' access to comprehensive care and on mitigating several vulnerabilities. As can be observed in other realities, Research propels the development and advance of knowledge. Consequently, in the literature following the "Framework for...", several mentions were naturally found to the association of systemised research in IPEIPC programmes, exploring, describing, correlating or understanding several aspects of IPEIPC theoretical and conceptual assumptions postulated throughout the years (LOVERSIDGE; DEMB, 2015; MAHLER *et al.*, 2018; REEVES, 2013; ROBERTS *et al,* 2018, 2015; others).

Literature post-2010 has ratified the role of Research, both to further IPEIPC knowledge, and as a device to its evolution (FITZSIMMONS *et al.*, 2014; HERRMANN *et al.*, 2015; LOVERSIDGE; DEMB, 2015; MELLOR *et al.*, 2013; ROBERTS; FORMAN, 2015). In other words, research is also a condition to join different professions in a training and collaborative process. In that sense, researchers endeavour to use or develop valid and reliable instruments, namely in different research designs (GILBERT, 2013). Also, there is a wide range of possibilities to be explored by qualitative studies, mainly because those estudies may address questions related with the implicit curriculum (informal aspects of complex measurement, which have an impact by conveying values, experiences, models and notions of ethics) in IPEIPC programmes.

CONCLUSION

Literature following the "Framework for..." has made progress in the use of theoretical assumptions that need proving evidence. However, the use of different terms of reference reveal there is still work to accomplish towards building a theory that will provide a basis for IPE in different realities. Even though we did not observe conceptual progress in the reviewed material, this field has gained strength by building a more consensual language that has allowed to establish dialogue and connections with other theories related to education and health, and mostly deepen the understanding of its implications. The results of this review

show and further confirm of the need for an ongoing debate about the theoretical framework that must follow the proposal of new IPE programmes, their empirical evidence and ongoing assessment. Finally, other systematic reviews, from different indexation bases, could be carried out with the purpose of surveying, analysing and monitoring the evolution of studies that question and discuss the theoretical and conceptual bases of IPE.

Limitations of the study:

per the inclusion criterion, based on the data of the journal's impact factor, many IPE articles were not analysed for being outside of the Q1 and Q2 quartiles of the *Web of Science*, perhaps for several historical, technical or operational reasons even though those articles may be the result of extreme and rigorous dedication of qualified investigators and/or groups of investigation.

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REFERENCES

1. ANDERSON, E.; SMITH, R.; HAMMICK, M. Evaluating an interprofessional education curriculum: A theory-informed approach. *Medical Teacher*, v. 38, ed. 4, p. 385-394, 2015. DOI: 10.3109/0142159X.2015.1047756. Disponível em: http://dx.doi.org/10.3109/0142159X.2015.1047756.

2. ANDERSON, E. S.; FORD, J.; KINNAIR, D. J. Interprofessional Education and Practice Guide No. 6: Developing practice-based interprofessional learning using a short placement model. *Journal of Interprofessional Care*, v. 30, ed. 4, p. 433-440, 2016. DOI: 10.3109/13561820.2016.1160040. Disponível em: http://dx.doi.org/10.3109/13561820.2016.1160040

3. ARAIN, M. *et al.* Interprofessional education for internationally educated health professionals: an environmental scan. *Journal of Multidisciplinary Healthcare*, v. 10, p. 87-93, 2017.

4. BARDIN, L. *Análise de conteúdo*. Lisboa: Edições70, 2013.

5. BALDWIN, D. C. Jr. Some historical notes on interdisciplinary and interprofessional education and practice in health care in the USA. *Journal of Interprofessional Care*, v. 21, (S1), p. 23-37, 2007. (Originally published in: Journal of Interprofessional Care, v. 10, n. 2, p. 173-187, 1996).

6. BERGER, S.; GOETZ, K.; LEOWARDI-BAUER, C.; SCHULTZ, J-H.; SZECSENYI, J.; MAHLER, C. Anchoring interprofessional education in undergraduate curricula: The Heidelberg story. *Journal of Interprofessional Care*, v. 31, ed. 2, p. 173-179, 2016. DOI: 10.1080/13561820.2016.1240156. Disponível em: https://doi.org/10.1080/13561820.2016.1240156.

7. BIREME/PAHO/WHO *Health Sciences Descriptors: DeCS*. São Paulo, 2017. Disponível em: http://decs.bvsalud.org/I/homepagei.htm. Access on 01 February 2018.

8. BRASHERS, V.; ERICKSON, J. M.; BLACKHALL, J.; OWEN, J. A.; THOMAS, S. M.; CONAWAY, M. R. Measuring the impact of clinically relevant interprofessional education on undergraduate medical and nursing student competencies: A longitudinal mixed methods approach. *Journal of Interprofessional Care*, v. 30, n. 4, p. 448-457, 2016. DOI: 10.3109/13561820.2016.1162139. Disponível em: http://dx.doi.org/10.3109/13561820.2016.1162139.

9. BRASHERS, V.; OWEN, J.; HAIZLIP, J. Interprofessional Education and Practice Guide No. 2: Developing and implementing a center for interprofessional education. *Journal of Interprofessional Care*, v. 29, n. 2, p. 95-99, 2015.

10. BREWER, M. L., & BARR, H. Interprofessional Education and Practice Guide No. 8: Team-based interprofessional practice placements. *Journal of Interprofessional Care*, v. 30, n. 6, p. 747-753, 2016. DOI: 10.1080/13561820.2016.1220930. Disponível em: http://dx.doi.org/10.1080/13561820.2016.1220930.

11. BROWN, L. D. Towards Defining Interprofessional Competencies for Global Health Education: Drawing on Educational Frameworks and the Experience of the UW-Madison Global Health Institute. *Journal of Law, Medicine & Ethics*, v.42, Supplement 2, p. 32-37, 2014. DOI: 10.1111/jlme.12185. Disponível em: https://doi.org/10.1111/jlme.12185

12. FILHO, J. R. F.; DA COSTA, M. V.; FORSTER, A. C.; REEVES, S. New national curricula guidelines that support the use of interprofessional education in the Brazilian context: An analysis of key documents. *Journal of Interprofessional Care*, v. 31, ed. 6, p. 754-760, 2017. DOI: 10.1080/13561820.2017.1346592. Disponível em: http://dx.doi.org/10.1080/13561820.2017.1346592

13. FITZSIMMONS, A.; CISNEROS, B.; SANNORE, J. A learner developed longitudinal interprofessional education curriculum. *Journal of Interprofessional Care*, v. 28, n. 1, p. 66-67, 2014.

14. FOSTER, R.; CLARK, J. M. Moderating the stereotypical views of health and social care students: the role of interprofessional education. *Journal of Interprofessional Care*, v. 29, n. 1, p. 34-40, 2015.

15. GILLIGAN, C.; OUTRAM, S.; LEVETT-JONES, T. Recommendations from recent graduates in medicine, nursing and pharmacy on improving interprofessional education in university programs: a qualitative study. *BMC Medical Education*, v. 14, n. 52, 2014.

16. GREENHALGH, T. *Como ler artigos científicos*: fundamentos da medicina baseada em evidências. 2. ed. Porto Alegre: Artmed, 2005.

17. HALL, L. W.; ZIERLER, B. K. Interprofessional Education and Practice Guide No. 1: Developing faculty to effectively facilitate interprofessional education. *Journal of Interprofessional Care*, v. 29, n. 1, p. 3-7, 2015. DOI: 10.3109/13561820.2014.937483. Disponível em: https://doi.org/10.3109/13561820.2014.937483

18. HAMILTON, J. Two birds with one stone: Addressing interprofessional education aims and objectives in health profession curricula through interdisciplinary cultural competency training. *Medical Teacher*, v. 33, n. 4, p. e199-e203, 2011. DOI: 10.3109/0142159X.2011.557414. Disponível em: https://doi.org/10.3109/0142159X.2011.557414

19. HERATH, C.; ZHOU, Y.; GAN, Y.; NAKANDAWIRE, N.; GONG,Y.; LU, Z. A comparative study of interprofessional education in global health care - A systematic review. *Medicine*, v. 96, n. 1, p. 38, 2017.

20. HERRMANN, G.; WOERMANN, U.; SCHLEGEL, C. Interprofessional Education in Anatomy: Learning Together in Medical and Nursing Training. *Anatomical Sciences Education*, v. 8, p. 324-330, 2015.

21. HWANG, J-I.; YOON, T-Y.; JIN, H-J.; PARK, Y.; PARK, J-Y.; LEE, B-J. Patient safety competence for final-year health professional students: Perceptions of effectiveness of an interprofessional education course. *Journal of Interprofessional Care*, v. 30, n. 6, p. 732-738, 2016. DOI: 10.1080/13561820.2016.1218446. Disponível em: http://dx.doi.org/10.1080/13561820.2016.1218446.

22. KESHMIRI, F.; REZAI, M.; MOSADDEGH, R.; MORADI, K.; HAFEZIMOGHADAM, P.; ZARE, M. A. *et al*. Effectiveness of an interprofessional education model based on the transtheoretical model of behaviour change to improve interprofessional collaboration. *Journal of Interprofessional Care*, v. 31, n. 3, p. 307-316, 2017. DOI: 10.1080/13561820.2016.1276051. Disponível em: http://dx.doi.org/10.1080/13561820.2016.1276051.

23. KURURI, N.; TOZATO, F.; LEE, B.; KAZAMA, H.; KATSUYAMA, S.; TAKAHASHI, M. *et al.* Professional identity acquisition process model in interprofessional education using structural equation modelling: 10-year initiative survey. *Journal of Interprofessional Care*, v. 30, n. 2, p.175-183, 2016. DOI: 10.3109/13561820.2015.1092117. Disponível em: http://dx.doi.org/10.3109/13561820.2015.1092117

24. LOVERSIDGE, J.; DEMB, A. Faculty perceptions of key factors in interprofessional education. *Journal of Interprofessional Care*, v. 29, n. 4, p. 298-304, 2015. DOI: 10.3109/13561820.2014.991912.

25. LUTFIYYA, M. N.; BRANDT, B.; DELANEY, C.; PECHACEK, J.; CERRA, F. Setting a research agenda for interprofessional education and collaborative practice in the context of United States health system reform. *Journal of Interprofessional Care*, v. 30, n. 1, p. 7-14, 2016. DOI:10.3109/13561820.2015.1040875. Disponível em: https://doi.org/10.3109/13561820.2015.1040875.

26. MAHLER, C.; SCHWARZBECK, V.; MINK, J.; GOETZ, K. Students´ perception of interprofessional education in the bachelor programme “Interprofessional Health Care” in Heidelberg, Germany: an exploratory case study. *BMC Medical Education*, v. 18, n. 1, p. 19, 2018. DOI 10.1186/s12909-018-1124-3.

27. MELLOR, R.; COTTRELL, N.; MORAN, M. “Just working in a team was a great experience…” - Student perspectives on the learning experiences of an interprofessional education program. *Journal of Interprofessional Care*, v. 27, n. 4, p. 292-297, 2013. DOI: 10.3109/13561820.2013.769093. Disponível em: http://dx.doi.org/10.3109/13561820.2013.769093

28. MISSEN, K.; JACOB, E. R.; BARNETT, T.; WALKER, L.; CROSS, M. Interprofessional clinical education: Clinicians’ views on the importance of leadership. *Collegian*, v. 19, p. 189-195, 2012.

29. MOHER, D. *et al.* Preferred reporting items for systematic review and meta-analysis protocols (Prisma-P) 2015 statement. *Systematic Reviews*, v. 4, n. 1, 2015. DOI: 10.1186/2046-4053-4-1.

30. OLSON, R.; BIDEWELL, J.; DUNE, T.; LESSEY, N. Developing cultural competence through self-reflection in interprofessional education: Findings from an Australian university. *Journal of Interprofessional Care*, v. 30, n. 3, p. 347-354, 2016. DOI: 10.3109/13561820.2016.1144583. Disponível em: http://dx.doi.org/10.3109/13561820.2016.1144583

31. PARDUE, K. T. Not left to chance: Introducing an undergraduate interprofessional education curriculum. *Journal of Interprofessional Care*, v. 27, p. 98-100, 2013. DOI: 10.3109/13561820.2012.721815.

32. REEVES, S. Porqué necesitamos la educación interprofesional para mejorar la prestación de una atención segura y eficaz. *Interface (Botucatu)*, v. 20, 56, p. 185-96, 2016. DOI: 10.1590/1807-57622014.0092. Disponível em: https://doi.org/10.1590/1807-57622014.0092.

33. REEVES, S.; PERRIER, L.; GOLDMAN, J.; FREETH, D.; ZWARENSTEIN, M. Interprofessional education: effects on professional practice and healthcare outcomes (update) (Review). *The Cochrane Library,* n. 3, p. CD002213, 2013. DOI: 10.1002/14651858.CD002213.pub3.

34. REEVES, S. Réplica. *Interface (Botucatu)* [online], v. 20, n. 56, p. 205-206, 2013. DOI: 10.1590/1807-57622013.0789. Disponível em: https://doi.org/10.1590/1807-57622013.0789.

35. ROBERTS, L. D.; DAVIS, M. C.; RADLEY-CRABB, H. G.; BROUGHTON, M. Perceived relevance mediates the relationship between professional identity and attitudes towards interprofessional education in first-year university students. *Journal of Interprofessional Care*, v. 32, n. 1, p. 33-40, 2018. DOI: 10.1080/13561820.2017.1366896. Disponível em: https://doi.org/10.1080/13561820.2017.1366896.

36. ROBERTS, L. D.; FORMAN, D. Interprofessional education for first year psychology students: career plans, perceived relevance and attitudes. *Journal of Interprofessional Care*, v. 29, n. 3, p. 188-194, 2015. DOI: 10.3109/13561820.2014.967754. Disponível em: https://pubmed.ncbi.nlm.nih.gov/25295735/

37. SAMPAIO, R. F.; MANCINI, M. C. Estudos de revisão sistemática: um guia para síntese criteriosa da evidência científica. *Revista Brasileira de Fisioterapia*, v. 11, n. 1, p. 83-89, 2007. DOI: 10.1590/S1413-35552007000100013. Disponível em: http://www.scielo.br/scielo.php? script=sci_arttext&pid=S1413-35552007000100013 &lng=en&nrm=iso. Acesso em: 11 Apr. 2017.

38. SHRADER, S.; HODGKINS, R.; LAVERENTZ, D.; ZAUDKE, J.; WAXMAN, M.; JOHNSTON, K.; JERNIGAN, S. Interprofessional Education and Practice Guide No. 7: Development, implementation, and evaluation of a large-scale required interprofessional education foundational programme. *Journal of Interprofessional Care*, v. 30, n. 5, p. 615-619, 2016: DOI: 10.1080/13561820.2016.1189889. Disponível em: http://dx.doi.org/10.1080/13561820.2016.1189889

39. WHO - World Health Organization. Learning together to work together for health. Report of a WHO study group on multiprofessional education for health personnel: The team approach. *Technical report series 769*: 1-72. Geneva: WHO, 1988.

40. WHO - World Health Organization. *Framework for action on interprofessional education & collaborative practice*. Geneva: WHO, 2010.

41. WILLIAMS, B.; LEWIS, B.; BOYLE, M.; BROWN, T. The impact of wireless keypads in an interprofessional education context with health science students. *British Journal of Educational Technology*, v. 42, n. 2, p. 337-350, 2011.

42. WILLGERODT, M. A.; BLAKENEY, E. A-R.; BROCK, D. M.; LINER, D.; MURPHY, N.; ZIERLER, B. Interprofessional education and practice guide No. 4: Developing and sustaining interprofessional education at an academic health center. *Journal of Interprofessional Care*, v. 29, n. 5, p. 421-425, 2015. DOI: 10.3109/13561820.2015.1039117. Disponível em: http://dx.doi.org/10.3109/13561820.2015.1039117