Revista Internacional de Educação Superior
International Journal of Higher Education

Development and Validation of an Instrument for the Assessment of Knowledge and Educational Attitudes of Teaching Pharmacists Towards Clinical Services Performed by Pharmacists*

Juscelino Alves[1] https://orcid.org/0000-0002-7370-5648
Lunara Tele Silva[2] https://orcid.org/0000-0002-8358-8908
Flavio Marques Lopes[3] https://orcid.org/0000-0002-0718-3992

[1,2,3] Universidade Federal de Goiás

ABSTRACT

Over the years, health education has undergone curricular changes through specific legislation that guide higher education in Brazil. Pharmaceutical education has approached the health care axis, especially with the regulation of its clinical assignments defined by Resolution nº 585 of 2013 of the Federal Council of Pharmacy and the approval of the National Curriculum Guidelines of pharmacy courses in 2017 stimulated by the international policies promoted by the International Pharmacy Federation, World Health Organization and United Nations Educational, Scientific and Cultural Organization. Faced with these transformations, the evaluations are presented as an important strategy to measure the advances and barriers to be overcome, for the promotion of a clinical teaching based on competencies. having regard to the context of educational and professional transformations in the pharmaceutical profession, this study aims to develop and validate an instrument for evaluating the educational knowledge and attitudes of teaching pharmacists, related to clinical services. To this end, we opted for a descriptive study of the quali-quantitative approach, structured in three parts: 1) development of the instrument; 2) content validation through the Delphi method and; 3) evaluation of the internal consistency of the questionnaire. The study sample was obtained by applying the snowball technique, involving 55 participants. The questionnaire was validated after four Delphi rounds to obtain consensus among the panelists. The instrument version was completed with 59 items, divided into three domains: "Profissiographic profile", "knowledge" and "attitudes". The application of the instrument, in a pilot test, presented reliability of 0.78 in the "knowledge" section, and 0.71 in the "attitudes" section. Thus, it is concluded that the instrument developed was considered valid in terms of its content and reliable in relation to the degree to which the measurements are free of random errors.

KEYWORDS

Pharmacy teachers. Clinical services. Clinical teaching. Evaluation of knowledge and attitudes.

Corresponding to Author
Juscelino Alves
E-mail: alvespereirajuscelino293@gmail.com
Universidade Federal de Goiás
Goiania, GO, Brasil
CV Lattes
http://lattes.cnpq.br/5906735248081718

Submmited: 21 nov. 2019
Accepted: 23 oct. 2021
Published: 24 feb. 2022

doi: 10.20396/riesup.v8i0.8657604
e-location: e022037
ISSN 2446-9424

*Translation: Silvia Iacovacci.Graduada em: Secretariado Bilíngue e Tradução/Inglês Comercial – Istituto Roberto Schumann - Roma, Itália. E-mail de contato: siacovacci@gmail.com. Orcid: https://orcid.org/0000-0003-4499-0766

Desenvolvimento e Validação de um Instrumento para Avaliação dos Conhecimentos e Atitudes Educacionais de Farmacêuticos Docentes Frente aos Serviços Clínicos Realizados por Farmacêuticos

RESUMO

Ao longo dos anos, a educação em saúde tem passado por alterações curriculares por meio de legislações específicas que norteiam o ensino superior no Brasil. O ensino farmacêutico tem se aproximado do eixo cuidado em saúde, especialmente com a regulamentação de suas atribuições clínicas definidas pela Resolução nº 585 de 2013 do Conselho Federal de Farmácia e pela aprovação das Diretrizes Curriculares Nacionais dos cursos de farmácia no ano de 2017 estimuladas pelas políticas internacionais promovidas pela Federação Internacional de Farmácia, Organização Mundial de Saúde e Organização das Nações Unidas para a Educação, Ciência e Cultura. Frente estas transformações, as avaliações se apresentam como importante estratégia de aferição dos avanços e das barreiras a serem superadas, para a promoção de um ensino clínico baseado em competências. Considerando o contexto das transformações educacionais e profissionais na profissão farmacêutica**,** este estudo tem o objetivo de desenvolver e validar um instrumento para avaliação dos conhecimentos e atitudes educacionais dos farmacêuticos docentes, relacionados aos serviços clínicos. Para tanto, optou-se por um estudo descritivo de abordagem quali-quantitativa, estruturado em três partes: 1) desenvolvimento do instrumento; 2) validação de conteúdo por meio do método Delphi e; 3) avaliação da consistência interna do questionário. A amostra do estudo foi obtida pela aplicação da técnica bola de neve, envolvendo 55 participantes. O questionário foi validado após quatro rodadas Delphi, para obtenção de consenso entre os painelistas. A versão do instrumento foi finalizada com 59 itens, divididos em três domínios: “perfil profissiográfico”, “conhecimentos” e “atitudes”. A aplicação do instrumento, em um teste piloto, apresentou confiabilidade de 0,78 na seção “conhecimentos”, e 0,71 na seção “atitudes”. Conclui-se, assim, que o instrumento desenvolvido foi considerado válido quanto ao seu conteúdo e confiável em relação ao grau com que as medições estão isentas de erros aleatórios.

PALAVRAS-CHAVE

Docentes de Farmácia. Serviços clínicos. Ensino clínico. Avaliação dos conhecimentos e atitudes.

Desarrollo y validación de un instrumento para la evaluación de conocimientos y actitudes educativas de los farmacéuticos docentes hacia los servicios clínicos realizados por los farmacéuticos

RESUMEN

A lo largo de los años, la educación para la salud ha experimentado cambios curriculares a través de una legislación específica que orienta la educación superior en Brasil. La educación farmacéutica se ha acercado al eje asistencial, especialmente con la regulación de sus asignaciones clínicas definidas por la Resolución nº 585 de 2013 del Consejo Federal de Farmacia y la aprobación de los Lineamientos Curriculares Nacionales de los cursos de farmacia en 2017 impulsados por las políticas internacionales impulsadas por la Federación Internacional de Farmacia, la Organización Mundial de la Salud y la Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura. Ante estas transformaciones, las evaluaciones se presentan como una estrategia importante para medir los avances y barreras a superar, para la promoción de una enseñanza clínica basada en competencias. Teniendo en cuenta el contexto de las transformaciones educativas y profesionales en la profesión farmacéutica, este estudio tiene como objetivo desarrollar y validar un instrumento para evaluar los conocimientos y actitudes educativas de los farmacéuticos docentes, relacionados con los servicios clínicos. Para ello, se optó por un estudio descriptivo del enfoque cuali-cuantitativo, estructurado en tres partes: 1) desarrollo del instrumento; 2) validación de contenido a través del método Delphi y; 3) evaluación de la consistencia interna del cuestionario. La muestra de estudio se obtuvo aplicando la técnica de bola de nieve, involucrando a 55 participantes. El cuestionario fue validado después de cuatro rondas Delphi para obtener consenso entre los panelistas. La versión del instrumento se completó con 59 ítems, divididos en tres dominios: "Perfil profesional", "conocimientos" y "actitudes". La aplicación del instrumento, en una prueba piloto, presentó confiabilidad de 0,78 en el apartado de "conocimientos" y de 0,71 en el apartado de "actitudes". Así, se concluye que el instrumento desarrollado fue considerado válido en cuanto a su contenido y confiable en relación al grado en que las mediciones están libres de errores aleatorios.

PALABRAS CLAVE

Profesores de farmacia. Servicios clínicos. Enseñanza clínica. Evaluación de conocimientos y actitudes.

Introduction[1]

In the global context, health systems have registered an increase in life expectancy and the prevalence of chronic diseases in their populations, factors that require the adequate mobilization of resources capable of meeting the growing health demands of the population. Moreover, in developing countries, such as Brazil, the high prevalence of infectious diseases has a direct impact on morbidity and mortality rates, besides consuming resources allocated to the health sector (MCCRACKEN; PHILLIPS, 2017; WALDMAN; SATO, 2016). In this scenario, the establishment of a supportive environment, capable of providing infrastructure and essential inputs to improve the health conditions of the population, is considered a fundamental condition for the provision of quality and accessible health care to society. Another important condition is determined by the qualification of the professionals providing care. (WORLD HEALTH ORGANIZATION, 2018; BIGDELI, MARYAM; PETERS; WAGNER, 2014).

Care, as a practice model of health professionals, is understood as an ordered process adapted to the needs of individuals, such as individualized treatment and follow-up (HEALTH FOUNDATION, 2016). For care to be properly exercised, access to health services and inputs are predominant factors (BIGDELI, MARYAM; PETERS; WAGNER, 2014). Among the inputs, medications are important therapeutic strategies, and even though they are an essential input, they are not without risks to patients. Medication-Related Problems (MRP) are situations or elements of the medication process that may increase the risk of a Negative Medication Outcome (NMO), defined as a health outcome not appropriate to the goal of pharmacotherapy (CONSENSUS COMMITTEE, 2007). MRPs may involve noncompliance with treatment, treatment failures, adverse reactions, poisoning, drug interactions, self-medication, and medication errors (CONSENSUS COMMITTEE, 2002).

Among the risks mentioned above, for example, medication errors can occur during the process of medication use, resulting from inadequate prescriptions, dispensing of incorrect dosages, monitoring errors, and incorrect administration of the product. The errors associated with the incorrect use of medicines burden the health sector, with estimated expenditures of around 42 billion dollars in the year 2011, which corresponds to almost 1% of global health expenditures (AITKEN; GOROKHOVICH, 2012). Another important risk is related to non-adherence to the treatment recommended for the patient, with non-adherence being responsible for an estimated cost of $100 million in the United States of America (USA) alone, the country with the highest consumption of medicines in the world in the year 2018 (IQVIA, 2019).

In Brazil, the overall prevalence of medication use, in the year 2014 was estimated to be around 50.7%, and access to medicines was unequal among the different regions of the country, with lower rates in the North and Northeast regions (BERTOLDI *et al.*, 2016). In

[1] We thank the team of experts for their contributions in the validation stage and the pharmaceutical educators who participated in the pilot testing stage of this survey instrument.

addition to basic problems related to unequal access to medicines, the increase in the number of poisonings and adverse reactions resulting from exposure to medicines by the population has been recorded by the Mortality Information System (MIS) and the Hospital Information System of the Unified Health System (UHS) (HIS-UHS). Between the years 2000 and 2014, the number of drug-related deaths in Brazil varied from 2.8 deaths/1 million inhabitants to 5.5 deaths/1 million and the hospitalization rate varied from 14.4 hospitalizations/100,000 inhabitants to 23.8 hospitalizations/100,000 inhabitants (SANTOS; BOING, 2018).

Faced with the growing negative clinical impact around medication, the services developed by health professionals can contribute to the process of identification, prevention, and resolution of MRPs. Among these professionals, pharmacists who work in care occupy a strategic role in health systems, as they are responsible for the provision of drug therapy, in the search for results that improve the patient's quality of life (HEPLER; STRAND, 1990). Being on the frontline of promoting the rational use of medicines and in the provision of health services, through clinical services, pharmacists have expanded their participation in the provision of care in health systems (FEDERAL COUNCIL OF PHARMACY, 2016b).

Evaluations of pharmaceutical interventions developed in countries where this professional practice is offered to the population subsidize the diagnosis of the impact of these services. In the United States of America, for example, pharmaceutical services performed in the Fairview Health Services health system (a non-profit organization in the state of Minnesota) contributed to the improvement of clinical outcomes for 9,000 patients, generating savings for the health system of approximately three million dollars in ten years (OLIVEIRA; BRUMMEL; MILLER, 2010). In Saudi Arabia, the economic outcomes of pharmaceutical services provided in a large hospital showed an average savings of $28.76 for every dollar invested in the pharmacist (ALOMI; AL-JARALLAH; BAHADIG, 2019).

To evaluate the impact of pharmaceutical interventions on patient care, research developed in the Brazilian context corroborates the importance of this professional in health services. Among this evidence, the detection and prevention of MRPs performed by pharmacists, in an oncology hospital, resulted in savings of R$33,217.65 in a two-month period of analysis. Each pharmacist intervention represented a savings of R$126.78, with 98% acceptance by the hospital's healthcare team (AGUIAR *et al*., 2018).

In addition to the savings generated for the health system, the pharmacotherapy follow-up service developed in an Intensive Care Unit (ICU) of a large hospital in China, enabled the identification of approximately 124.7 MRP per 1000 patients. In this same study, it was reported the good acceptance by the health team to the interventions proposed by clinical pharmacists of the hospital, which contributed to the resolution of 83.2% of the MRP (JIANG, 2014).

The positive impacts of clinical services performed by a pharmacist, both on patient health and resource savings, attest to the importance of this professional in their various practice settings (AGUIAR et al., 2018; ALOMI; AL-JARALLAH; BAHADIG, 2019;

OLIVEIRA; BRUMMEL; MILLER, 2010; PHATAK *et al*., 2016; QUINONES *et al*., 2016; ONATADE *et al*., 2018). However, the pharmacist clinical attributions in Brazil had not been regulated until the first decade of the 21st century, limiting the performance of this professional in the provision of care to the population. The movement for structuring clinical attributions was structured from the global action plan of Pharmaceutical Education (2008-2010), promoted by the International Federation of Pharmacy (IFP), World Health Organization (WHO) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) (ANDERSON, 2008).

In this sense, important actions have been taken in Brazil, among them the regulation of clinical attributions by pharmacists, through Resolution no. 585 of the Federal Pharmacy Council (FPC); the pharmaceutical prescription, through Resolution no. 586 also of the FCP FEDERAL COUNCIL OF PHARMACY, 2013a; FEDERAL COUNCIL OF PHARMACY, 2013b; ALMEIDA; MENDES; DALPZZZOL, 2014), and the publication of Law no. 13. 021 in the year 2014, which defined pharmaceutical establishments (pharmacies and drugstores) as places of health service provision, bringing the pharmaceutical professional activity closer to the care provided to patients by clinical services (BRASIL, 2014). Until then, these places were considered, by Law no. 5.991 of 1973, commercial establishments for the sale of medicines, pharmaceutical inputs and correlatives (BRASIL, 1973).

In addition to the resolutions, the Federal Council of Pharmacy (FCP) published, in 2016, the document entitled Pharmaceutical Services Directly Intended for the Patient, Family and Community: contextualization and conceptual framework. This document aims to guide and stimulate the practice of clinical services, presenting among its proposals the alignment of concepts, the search for standardization of work processes and the delimitation of professional skills in the provision of each of the services (FEDERAL COUNCIL OF PHARMACY, 2016b).

In the educational area, important actions were also developed. Among these actions, we highlight the publication, in 2017, of the matrix of competencies for the clinical training of the pharmacist, an instrument responsible for articulating the knowledge, skills and attitudes for professional training in this area of knowledge (FEDERAL COUNCIL OF PHARMACY, 2017). In the year 2017, the National Curricular Guidelines (NCG) were approved to be applied to undergraduate courses in pharmacy. These guidelines establish 50% of the workload of pharmacy degrees to the Health Care axis, bringing pharmaceutical education closer to its clinical attributions (BRASIL, 2017).

The advances in the regulation of clinical services and professional training demonstrate the efforts of the entities involved in this process and in the coordination of pharmaceutical education to the new professional reality (MELO *et al*., 2017). In contrast to this scenario, Alcântara and collaborators (2018) highlight the stagnation of clinical services performed by pharmacists in Brazil, even after their regulation and the approval of NCGs in the year 2017. Among the barriers described is the educational process used by educational institutions and the concentration of professional activities on logistical aspects, with a focus

on stock checking activities, "if medicines are missing or leftover". As for the educational process, it is possible to verify that most higher education institutions in Pharmacy have not yet adapted to the recommendations of the NCG of 2017, remaining in a traditional teaching centered on the teacher, without developing the competencies that allow solving the needs of society (FEDERAL COUNCIL OF PHARMACY, 2019; CHINIL; OSIS; AMARAL, 2018).

The NCG highlight the need for change in the educational process, addressing two main aspects: "development of competencies to identify and analyze the health needs of the individual, family and community, as well as to plan, execute and monitor health actions" and "have a pedagogical project focused on student learning and based on the teacher as a facilitator and mediator of the process, with a view to comprehensive training" (BRASIL, 2017). In the health area, the concept of competencies goes beyond the transmission of content, it is related to the mobilization and integration of knowledge, skills and attitudes, as well as social and affective aspects, necessary to act satisfactorily and responsibly in problem-solving and prevention, promoting the transformation of society (AGUIAR, RIBEIRO, 2010), going beyond the teaching of content, promoting the development of future professionals (SANTOS, 2011).

Thus, teaching by competence requires from the teacher broad structured planning of teaching strategies, creating situations that bring the student closer to the professional practice, in order to add values, aiming at harmonizing technical-scientific and socio-affective actions (LOPES *et al*., 2020). It is worth mentioning that in this new scenario, the teacher needs to assume his role as mediator, use interdisciplinary aspects to promote different knowledge and keep up with the speed of discoveries to promote efficient communication with his students (LIBÂNIO, 2003). In contradiction to the competences necessary for the performance of the teacher, currently, an unsatisfactory profile of these professionals can be found in the HEIs, since it is difficult to identify the qualification of the pharmacist-teacher with the curricular component taught by the teachers (FEDERAL COUNCIL OF PHARMACY, 2019).

These represent some of the main challenges related to the effective implementation of services and clinical training of the pharmacist. To overcome these challenges, the use of tools capable of evaluating the advances promoted and the barriers to be overcome, present themselves as an important strategy, by enabling the realization of a situational diagnosis (BRASIL, 2017). In this context, the construction of instruments to evaluate the knowledge regarding the clinical attributions of teaching pharmacists and the ability to perform the reception, identify the patient's needs and health problems, prepare care plans, perform interventions, evaluate the results of interventions and management of clinical processes (FEDERAL COUNCIL OF PHARMACY, 2017) are fundamental for the advancement of teaching focused on clinical services.

The use of questionnaires is the most widely used strategy in research by being able to provide data with scientific validity (KRISHNAPPA; PIDDENNAVAR; MOHAN, 2011). The measures obtained by valid and reliable instruments allow detecting possible points to be

improved in order to achieve the goal of promoting competency-based teaching, through the implementation of actions to be adopted by pharmaceutical education institutions and other members involved in their training process (MELO *et al*., 2017; FEDERAL COUNCIL OF PHARMACY, 2017; BOLARINWA, 2015). Thus, the objective of this research was to construct and validate an instrument to evaluate the knowledge and attitudes of teaching pharmacists regarding clinical services performed by pharmacists in Brazil.

Methods

The current study is about the process of development and validation of a survey instrument designed to assess the knowledge and attitudes of teaching pharmacists towards clinical pharmaceutical services in Brazil. The study was developed in three stages (Figure 1), called development, validation and evaluation of the reliability of the instrument (COOK; BECKMAN, 2006; BOLARINWA, 2015). In the first stage, the development of the initial instrument was performed based on the results of the exploratory literature review regarding clinical pharmaceutical services. The second stage was responsible for the consolidation and validation of the research instrument by applying the e-Delphi method (TORONTO, 2017). Finally, in the last stage, the reliability of the instrument was evaluated, in order to obtain its internal consistency, based on the results obtained by applying it to a sample of the target population, indicating whether the subparts of the instrument assess the same characteristics (STREINER, 2003).

Step 1: Preparation of the Research Instrument

The research instrument was developed taking into account two axes (knowledge and attitudes) of the competence matrix of pharmaceutical training in Brazil, related to clinical services (FEDERAL COUNCIL OF PHARMACY, 2017). Initially, the selection of materials that regulate the pharmaceutical profession was carried out, to identify the clinical pharmaceutical services instituted in Brazil and defined by the FCP. The two materials retrieved and used by the researchers were: Pharmaceutical Services Directly Intended for the Patient, Family and Community (FEDERAL COUNCIL OF PHARMACY, 2016b) and FCP Resolution no. 585 of 2013 (FEDERAL COUNCIL OF PHARMACY, 2013a).

Subsequently, an exploratory search was conducted in the Medical Literature Analysis and Retrieval System Online (MEDLINE; via PubMed), Latin American and Caribbean Literature in Health Sciences (LILACS) and Scientific Electronic Library Online (SciELO) databases, using Descriptors in Health Sciences (DeSC) and Medical Subject Headings (MeSH), for articles referring to the clinical services raised previously, as presented in the first stage of Figure 1.

The inclusion criteria for the articles considered full texts available between the years 2002 and 2018, published in Portuguese, English, or Spanish, whose theme of the study was related to the concept of one of the clinical services provided by pharmacists. The exclusion criteria considered the publications in editorial format, letter to the editor and duplicates, in

addition to publications that did not bring the definition of the clinical service researched. After this step, a new literature search was performed for publications focused on the concepts of pharmacovigilance actions, considering the importance of the attitude of the teaching pharmacist in the development of these actions for the provision of clinical services. Pharmacovigilance actions are understood as the "prevention, detection and evaluation" of adverse events throughout the post-marketing drug cycle (LAVEN; SCHMITZ; FRANZEN, 2018). Pharmacists working in care, by performing pharmacovigilance actions, contribute directly to patient safety, a determining factor for obtaining positive clinical outcomes. From the selected publications, the concepts and applications of each of the clinical services and pharmacovigilance actions related to these services were extracted.

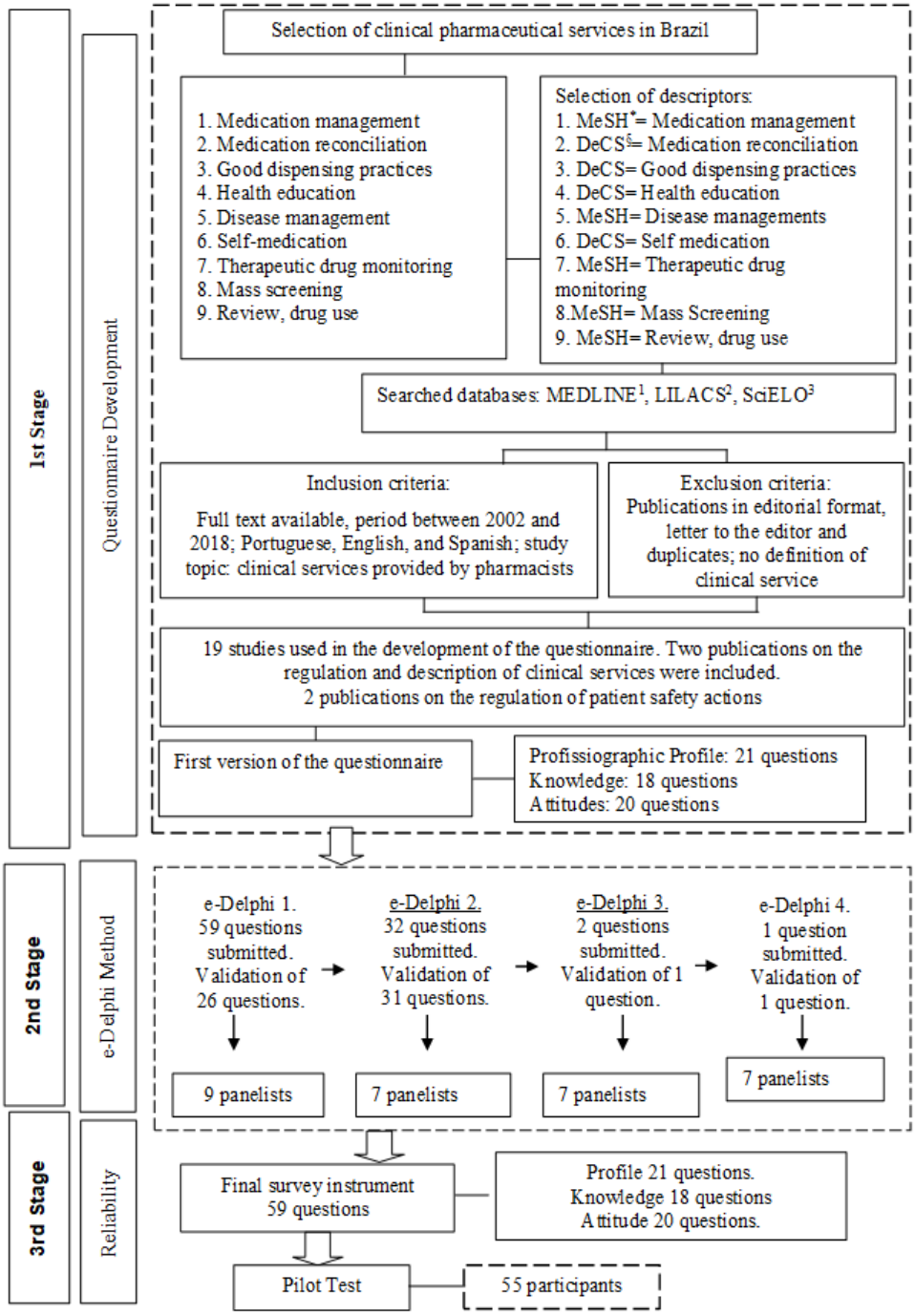
The questions related to the teachers' knowledge about clinical services provided by pharmacists were prepared based on the "Guide for the Preparation and Review of Items", published by the National Institute of Educational Studies and Research Anísio Teixeira (INEP). INEP is the institution responsible for the preparation and application of large-scale national assessments of Brazilian education (BRASIL, 2010).

The items were elaborated in the format of objective questions with four options each, with only one alternative considered correct. The construction of the questions took into account the structure composed of a basic text, statement, and alternatives. The base text aims to report the test participant to a reflective context so that he/she can take a position, choosing the plausible alternative for the service addressed in the statement (of the question). These components articulated together define a problem situation, established by identifying the objective, characteristic, or concept of the clinical service addressed in the question (BRASIL, 2010).

The questions related to attitudes were prepared based on what considers to be positive attitudes or negative attitudes of the teaching pharmacist towards the teaching-learning process related to clinical services. Two questions related to pharmacovigilance actions were included in this section, considering the importance of these actions for patient safety during the provision of clinical services. The positive attitudes were expressed through favorable propositions and the negative attitudes were expressed through unfavorable propositions to the teaching-learning process of the clinical service evaluated, characterizing the indirect method of attitude measurement. For this, a four-point Likert scale was established as a response option as presented below: strongly agree; agree; disagree; and strongly disagree (LIKERT, 1932; BILAL *et al*., 2016).

The initial instrument included a total of 59 questions. These were divided into three major groups: (1) 21 questions were directed to the teacher's profissiographic profile, important for characterizing the basic training and contextualizing the professional performance; (2) 18 questions were aimed at the knowledge applied to clinical services and; (3) 20 questions were aimed at the teacher's attitudes towards the teaching-learning process of clinical pharmaceutical services and the pharmacovigilance actions related to these services.

Figure 1. Schematic representation of the development stages of the study.



*MeSH: *Medical Subject Headings*; §DeCS: Descritores em Ciências da Saúde; [1]MEDLINE (via PubMed): *Medical Literature Analysis and Retrieval System Online;*[2]LILACS: Literatura Latino-americana e do Caribe em Ciências da Saúde; [3]SciELO: *Scientific Electronic Library Online*

Source: the authors.

Step 2: Content Validation of the Research Instrument

The present stage assessed the content validity of the instrument and was conducted by applying the e-Delphi method in four rounds. The initial version of the research instrument was evaluated by pharmacists who teach pharmacy courses at both public and private institutions, working in the area of clinical pharmacy, with at least a doctoral degree. The participants in this method were called panelists. The e-Delphi method is used in research in which the panelists are in different locations (a determining factor for its online application), with no contact between the participants. Through this method, the panelists were initially asked questions and the results were compared to the literature. Based on the data obtained, the research conductors evaluated the need to make adjustments to the instrument in each round. At this stage, rounds were proposed until consensus was obtained, which was determined by statistical analysis of the Content Validation Index (CVI) (ALEXANDRE; COLUCI, 2011; LINSTONE; TUROFF, 2002; TORONTO, 2017).

The selection of the panelists was carried out through research on the Lattes Platform (platform for the deposit of curricula of Brazilian academics and researchers), in addition to the recommendation of professionals working in the teaching area focused on clinical pharmacy. The keywords used in the selection of panelists were: pharmacists, teachers, and clinical pharmacy. The research for the selection of panelists took into consideration only pharmacists who work in the area of clinical pharmacy teaching. To obtain a representative sample of panelists, professionals were selected from all over the country, aiming to include at least seven professionals (VARELA-RUIZ; DÍAZ-BRAVO; GARCÍA-DURÁN, 2012; THANGARATINAM; REDMAN, 2005).

In the survey conducted in the Lattes Platform, 22 undergraduate professors in Pharmacy were selected and invited, online, to compose the group of panelists through an invitation letter in which contained the link to access the survey instrument on the Google Forms platform. In this invitation, the research objectives were explained and the teacher's participation was requested. The teacher's confirmation as a member of the expert panel occurred through his/her consent, expressed in the Informed Consent Form (ICF), present in the first section of the form in the Google Forms platform. The instructions for completing the questionnaire were inserted in sections preceding the three domains evaluated.

The items of the three parts of the instrument were evaluated according to criteria of cohesion, clarity, and relevance to the objective of the study. For knowledge and attitude, it was also evaluated if the content addressed is current. All 59 items of the instrument were evaluated according to the specific criteria to be answered on a Likert scale of four points, which mean respectively: score 1 - strongly disagree, score 2 - disagree, score 3 - agree, and score 4 - strongly agree. (REIS *et al*., 2018; CASE; SWANSON, 2002). In each of the criteria, in addition to the rating scale judgment, panelists were asked to make suggestions that could assist in improving the item.

The panelists' answers were analyzed according to the Content Validity Index (CVI), which is the method designed to evaluate the content of the items and the instrument, using the proportion of judges who agree on the fundamental aspects of the instrument. The CVI calculation consists in dividing the number of answers 3 or 4, obtained in the Likert scale, by the total number of answers. Items with CVI> 0.80 were considered approved and items with lower scores were reviewed by the researchers and subsequently sent for another e-Delphi round. Modifications of the questions were made according to the panelists' suggestions in face of the clinical services definitions until a CVI > 0.80 was obtained for all the established criteria, totaling four e-Delphi rounds (ALEXANDRE; COLUCI, 2011; POLIT; BECK; OWEN, 2007). Thus, the research instrument resulting from this stage followed the same arrangement in number of items of the first stage (59 questions), however, reformulated and validated.

Step 3: Reliability Assessment

In the third stage of the study, the pilot test was applied to evaluate the internal consistency of the research instrument (RAYKOV; MARCOULIDES, 2019; HANAFI *et al*., 2013). In this step, the instrument was sent to teaching pharmacists of Pharmacy courses in Brazil, according to the sampling technique called *"bola de neve*" (snowball sampling technique). In this technique, the initial participants of the research invite or indicate other likely participants among their professional circle, according to the inclusion and exclusion criteria established for defining the sample, expanding the group that makes it up, as in a rolling snowball (HECKATHORN, 2011). The link to the research instrument on the online platform Google Forms was sent to groups of teachers and passed on in digital media groups. For statistical purposes, a minimum sample size for this stage of 50 participants was stipulated (HAIR *et al*., 2014; SAPNAS; ZELLER, 2002).

Statistical Analysis for Reliability Assessment

Descriptive statistics were used to analyze data obtained in the pilot test application. Analyses were performed in 7 Stata Software version 12.0 (StataCorp. 2011. Stata Statistical Software: Release 12. College Station, TX: StataCorp LP). Regarding the profissiographic profile, categorical variables were expressed as absolute (n) and relative (%) frequency and numerical variables expressed in terms of mean and standard deviation (normal distribution) or median and interquartile ranges (non-normal distribution). The normality of the variables was assessed by applying the Kolmogorov-Smirnov test.

The internal consistency of the research instrument was measured by determining Cronbach's alpha, which is a measure of the degree to which the items in a questionnaire are related. Cronbach's Alpha is an important indicator of reliability, applied to a set of construct indicators. Items with Cronbach's Alpha value equal to 0.7 or higher were considered to have acceptable internal consistency for the constructs (TABER, 2018).

For the analysis of the answers obtained in the knowledge section, scores of one (1) were assigned for correct answers, and zero (0) for wrong answers, totaling a maximum of 18 points to be obtained in this section. In addition, the absolute and relative frequency of teachers who got each question right was calculated. As for the questions referring to attitudes, values were assigned to the items on a Likert scale of five points, so that for favorable propositions, the score one (1) represents the total disagreement and the score five (5) represents the total agreement of the participant. For the unfavorable propositions, a score of one (1) represents total agreement and a score of five (5) represents the participant's total disagreement with the question.

In the last stage of the research, we performed analyses of the participants' performance in the knowledge dimension, using the interquartile range, and in the attitudes, using the mean and standard deviation. These analyses were performed after verifying the normality tests applied to the sample in the two dimensions evaluated. In this step, we initially prepared the graph shown in figure 3, in which the ordinate axis presented the result of the participant's performance in the knowledge section, expressed in relative percentages. In the abscissa axis, the results of the participant in the attitudes section were presented, expressed through the average of points obtained by the teacher, according to the score assigned to the Likert scale described earlier in this section (MCHUGH, 2003).

The elaboration of the graph made it possible to identify the position of the participants' results in relation to the centrality measures, and then the quartiles and the interquartile range were defined in the knowledge dimension and the average and standard deviation in attitudes (MCHUGH, 2003). From these definitions, the participants' performances in the dimensions expressed in the graph were analyzed. The best performance in the knowledge dimension was called high performance and was obtained by the participants with results distributed from the third quartile on. The results distributed in the interquartile range (between the first and the third quartile) were called moderate performance. The worst-case scenario presented for the knowledge dimension, termed low performance, was determined by the results of participants who were distributed below the first quartile. For the attitudes dimension, teaching pharmacists with scores above the Mean (M) and Standard Deviation (SD) were considered high performers. Participants with scores between the M and SD were considered moderate performers. The worst-case scenario presented for the knowledge dimension, termed low performance, was presented by participants with scores below the M and SD.

Ethical Aspects

The study was approved by the Research Ethics Committee of the Federal University of Goiás (REC/FUG) under protocol number 2,495,460, CAAE: 79748917.4.0000.5083/2018. The teaching pharmacists invited to participate in the research in the stages of validation and reliability assessment of the instrument were informed about the study and, upon their agreement, asked to sign the ICF.

Results

Elaboration of the Research Instrument

The initial literature search identified nine clinical services provided by pharmacists (Figure 1), which were used to construct the first version of the survey instrument.

Three domains of analysis were established, totaling 59 questions distributed among items related to the teachers' professional profile, knowledge and educational attitudes, facing the concepts and situations involving the role of the professional pharmacist during the performance of clinical services. The first version of the questionnaire was prepared by a group of five pharmacists: three PhD professors with teaching experience in Clinical Pharmacy, a master professor with professional experience in primary health care and a master student with experience in community pharmacy.

Content Validity

Four e-Delphi rounds were held in this stage. The panelists were all pharmacists and professors in the area of Clinical Pharmacy, with performance and publications related to clinical services, who graduated from public higher education institutions with a master's or doctorate as the highest academic degree. Nine panelists participated in the first round, and the other rounds were attended by seven panelists.

Of the 59 questions initially proposed, the panelists approved 26 in the first round, 31 in the second, one in the third, and finally, in the fourth round, the last question obtained the consensus of all participants. In the first round, 32 questions (10 from the profissiographic profile, nine from knowledge, and 12 from attitudes) did not reach CVI $\geq$ 0.80 in at least one of the analysis items and therefore were adjusted according to suggestions made by the panelists. In the knowledge domain, adjustments were made to the questions in the aspects: base texts (questions 2.9; 2.16; 2.17), assertions (questions 2.2; 2.5; 2.12; 2.17), terms used (2.1), response options (2.1; 2.2; 2.7; 2.8; 2.9; 2.16), and clinical service addressed (question 2.9 - from health condition management to management of self-limited health problems). In the attitudes domain, the main change was the change from a four-point Likert scale to a five-point Likert scale with the insertion of the option "neutral" among the response alternatives. In addition, 10 questions (3.2; 3.6; 3.8; 3.10; 3.11; 3.12; 3.13; 3.14; 3.17; 3.18) had changes directed to the adequacy of the terms and two (3.15; 3.16) on the therapeutic drug monitoring service were reworded, being directed to the objective of this service and the role of the teacher in the teaching-learning process.

In the second round, of the 32 questions submitted for analysis, only two (1.9 and 2.5) did not obtain CVI $\geq$ 0.80 (question 1.9 in the criteria: the item presents clarity and adequacy of language and; the item is pertinent to the objective of the study, question 2.5 in the criteria: the item presents textual cohesion; the item presents clarity and adequacy of language (all with CVI value= 0.71)). The terms present in this last question were readjusted given the

understanding of the dispensing service. In the third round, only one question (2.5) was not approved (the item presents clarity and appropriateness of language (CVI = 0.43); the options presented as answers meet the objectives of the question (CVI = 0.71). The suggestions provided by the panelists were directed to the terms present in the question, which were again readjusted and submitted to the fourth round, in which the question obtained consensus.

The final research instrument was named "Instrument to Evaluate the Knowledge and Attitudes of Professors towards Clinical Services Performed by Pharmacists".

Reliability Assessment

The pilot test of the survey instrument included 55 teaching pharmacists from undergraduate pharmacy courses in the five regions of Brazil. The median age of the participants was 38 years (q1-q3: 35-45; minimum 26 years and maximum 64 years) and the median time of experience in teaching was 8.5 years (q1-q3: 5-18 years; minimum 0.5 year and maximum 39 years). Of the respondents, 21.8% (n=12) declared they had the highest degree in Clinical Pharmacy. Data regarding the domain of the profissiographic profile of the pilot test participants are presented in Table 1. The mean number of subjects taught by professors was 2.98 (SD±1.66) and the three most mentioned subjects were related to: Pharmaceutical Deontology and Legislation (n=11, 20%), Pharmacology (n=11, 20%) and Introduction to Pharmaceutical Sciences (n=8, 14.5%).

Table 1. Profissiographic profiles of the 55 teachers who participated in the pilot test.

Teachers' characteristics	**Absolute frequency (n)**	**Relative frequency (%)**
Age (in years)1		
26 - 35	17	34,0%
36 - 45	21	42,0%
46 - 55	5	10,0%
56 – 65	7	14,0%
Gender		
Woman	34	61,8%
Man	21	38,2%
Time of experience as a teacher (in years)2		
0 - 5	16	29,6%
6 - 10	14	21,9%
11 - 15	8	14,8%
16 - 20	5	9,2%
21 - 25	4	7,4%
26 - 30	3	5,5%
31 - 35	3	5,5%
36 – 40	1	1,8%
Type of educational institution where the teacher graduated		
Public	39	70,9%
Private	16	29,1%

Title received upon graduation		
Pharmacist	17	30,9%
Pharmacist qualified in biochemistry: clinical analyses	18	32,7%
Industrial Pharmacist	6	10,9%
Generalist Pharmacist	8	14,5%
Biochemist qualified pharmacist: food biochemistry	2	3,6%
Other	4	7,3%
Highest academic degree		
Bachelor's degree	1	1,8%
Specialization	6	10,9%
Master's Degree	17	30,9%
Doctorate	31	56,4%
Academic Area with highest degree		
Clinical Pharmacy	12	21,8%
Drugs and Medicines	8	14,5%
Pharmacology	5	9,1%
Molecular Biology	3	5,5%
Toxicology	2	3,6%
Clinical Analyses	2	3,6%
Other	23	41,82%
The teacher has a post-doctoral degree		
Yes	11	20,0%
No	44	80,0%
Postdoctoral fellowship completion areas3		
Clinical Pharmacy	3	27,3%
Drugs and Medicines	3	27,3%
Parasitology	1	9,1%
Molecular Biology	1	9,1%
Other	3	27,3%
Educational institution where you are currently working		
Public Institution	27	49,1%
Private institution	24	43,6%
Public and private institution	4	7,3%
Region of country of operation4		
North	4	5,5%
Northeast	8	14,5%
Center-West	30	54,5%
Southeast	7	12,7%
South	7	12,7%
Activities performed by faculty members at the higher education institution(s) where they work, other than undergraduate teaching4		
Extension	31	56,4%
Research	29	52,7%
Graduate Teaching	26	47,3%
Administrative activities	22	40,0%
Patient assistance	15	27,3%
Other Activities	6	10,9%
Weekly workload in teaching activities		
Exclusive dedication	18	32,7%
40 hours weekly, without exclusive dedication	11	20,0%
From 30 to 39 hours weekly	5	9,1%
From 20 to 29 weekly hours	5	9,1%
From 10 to 19 hours weekly	13	23,6
Less than 10 hours weekly	3	5,5%
Do you have other activities besides teaching graduate courses?		
Yes	18	32,7%
No	37	67,3%

Other activity(ies) performed by teachers5		
Acting in Pharmacy of the Public Health Network	4	7,2%
Research	2	3,6%
Criminal Expert	1	1,8%
Acting in the Regional Pharmacy Council in commission	1	1,8%
Clinical and Administrative Pharmacist	1	1,8%
Hospital Pharmacist	1	1,8%
Biochemist Pharmacist in a clinical analysis laboratory	1	1,8%
Civil servant (activity not specified)	2	3,6%
Online tutor	1	1,8%
Entrepreneurship	1	1,8%
Teaches qualification courses	1	1,8%
Integrated manager of quality, safety, environment and health (QHSE)	1	1,8%
Scientific advisor in laboratory equipment trading and consulting company	1	1,8%
Did the teacher participate in any training/update course on teaching methodologies during professional training?		
Yes	38	69,1%
No	17	30,9%
Teaching methodologies that the teacher knows4		
TBL (Team-Based Learning)	36	65,5%
PBL (Problem-Based Learning)	43	78,2%
Collaborative Learning	15	27,3%
Peer Learning	14	25,5%
Group Discussions	48	87,3%
Case Study	50	90,9%
OSCE (Objective Structured Clinical Examination)	27	49,1%
Games	38	69,1%
Seminars	52	94,5%
Simulation	34	61,8%
Other	10	18,2%
Teaching methodologies that the teacher knows4		
TBL (Team-Based Learning)	22	40,0%
PBL (Problem-Based Learning)	22	40,0%
Collaborative Learning	10	18,2%
Peer Learning	8	14,5%
Group Discussions	45	81,8%
Case Study	43	78,2%
OSCE (Objective Structured Clinical Examination)	6	10,9%
Games	21	38,2%
Seminars	45	81,8%
Simulation	20	36,4%
Other	10	18,2%

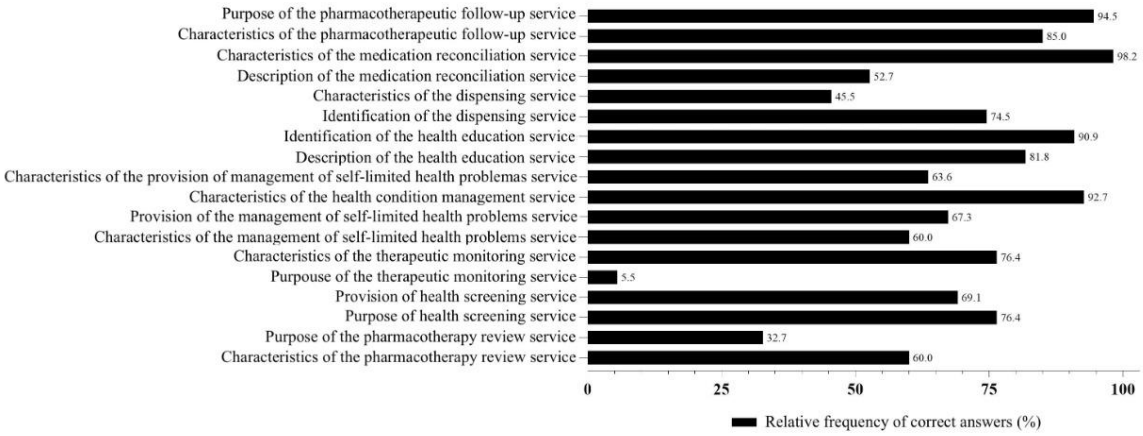
[1]Five participants did not answer their age.
[2]One participant did not answer his or her length of time working as a professor.
[3] Question answered only by faculty members with post-doctoral degrees.
[4]Teachers could put more than one option as an answer.
[5]This question was answered only by faculty members who perform other activities besides teaching undergraduate courses.

Source: the authors.

Figure 2 presents the results obtained in the knowledge of teaching pharmacists regarding clinical services. The question about the "Characteristics of the medication reconciliation service" had the best hit rate among teachers (98.2%). The questions about the "Purpose of the pharmacotherapy follow-up service" (94.5%) and "Characteristics of the health condition management service" (92.7%) had high hit rates. The lowest hit rates were found in the questions regarding "Characteristics of the pharmacotherapy review service" (32.7%) and "Objective of the therapeutic drug monitoring service" (5.5%).

Regarding the individual scores of the pilot study participants in the knowledge section, of the 55 faculty members, one faculty member got all the questions right, obtaining 18 points. The minimum score for this section was three points, obtained by one participant. The average score was 12.27 points, with standard deviation equal + 3.62.

Figure 2. Teachers' knowledge regarding clinical services provided by pharmacists.



Source: the authors.

The results obtained in the faculty attitude section, regarding clinical services provided by pharmacists are presented in Table 2. The highest values for the teachers' appropriate attitudes were found in questions 3.6 about "Dispensing" (score 96.4%) and in questions 3.1 (score 94.5%) and 3.2 (score 94.6%), both related to "Pharmacotherapy follow-up". These questions affirm positive attitudes of the teachers, regarding the conduct addressed in the questionnaire.

The lowest values for the teachers' appropriate attitudes were found in question 3.4 related to "Medication reconciliation" (14.6%) and in question 3.7 related to "Adverse reactions" (25.4%). These questions state negative attitudes of the faculty members, so that the most appropriate answer should be "strongly disagree".

Internal Consistency

The internal consistency of the knowledge and attitudes domains were considered adequate, showing Cronbach's Coefficient Alpha of 0.78 and 0.71, respectively. It is assumed that Cronbach's Coefficient Alpha values ≥ 0.7 are considered acceptable (TABER, 2018).

Table 2. Teachers' attitudes towards clinical services provided by pharmacists.

Subset	Question	Average ± SD	Percentage of participants with scores		
			<3	3	3>
Pharmacotherapy monitoring	3.1*	4,71 ± 0,57	0,0	5,5	94,5
	3.2*	4,78 ± 0,656	3,6	1,8	94,6
Medication reconciliation	3.3*	4,45 ± 0,90	3,6	10,9	85,5
	3.4§	2,09± 1,22	72,7	12,7	14,6
Dispensing	3.5§	2,56± 1,33	54,5	16,4	29,1
	3.6*	4,84 ± 0,46	0,0	3,6	96,4
Adverse reactions	3.7§	2,25±1,35	67,3	7,3	25,4
	3.8*	4,64 ± 0,68	1,8	5,5	92,7
Health education	3.9*	4,33 ± 0,90	5,4	7,3	87,3
	3.10§	2,54± 1,41	54,6	14,5	30,9
Health condition management	3.11§	3,93± 1,33	20,0	3,6	76,4
	3.12*	3,33 ± 1,70	30,9	14,5	54,6
Management of minor disorders	3.13§	3,09± 1,22	38,2	18,2	43,6
	3.14*	4,53 ± 0,69	1,8	5,5	92,7
Therapeutic monitoring of medications	3.15*	4,49 ± 0,79	3,6	7,3	89,1
	3.16§	3,53± 1,27	23,6	10,9	65,5
Health screening	3.17*	4,04 ± 1,00	7,3	14,5	78,2
	3.18*	4,25 ± 0,97	10,9	3,6	85,5
Pharmacotherapy review	3.19*	4,29 ± 0,78	1,8	9,1	89,1
	3.20§	2,58± 1,31	54,5	16,4	29,1

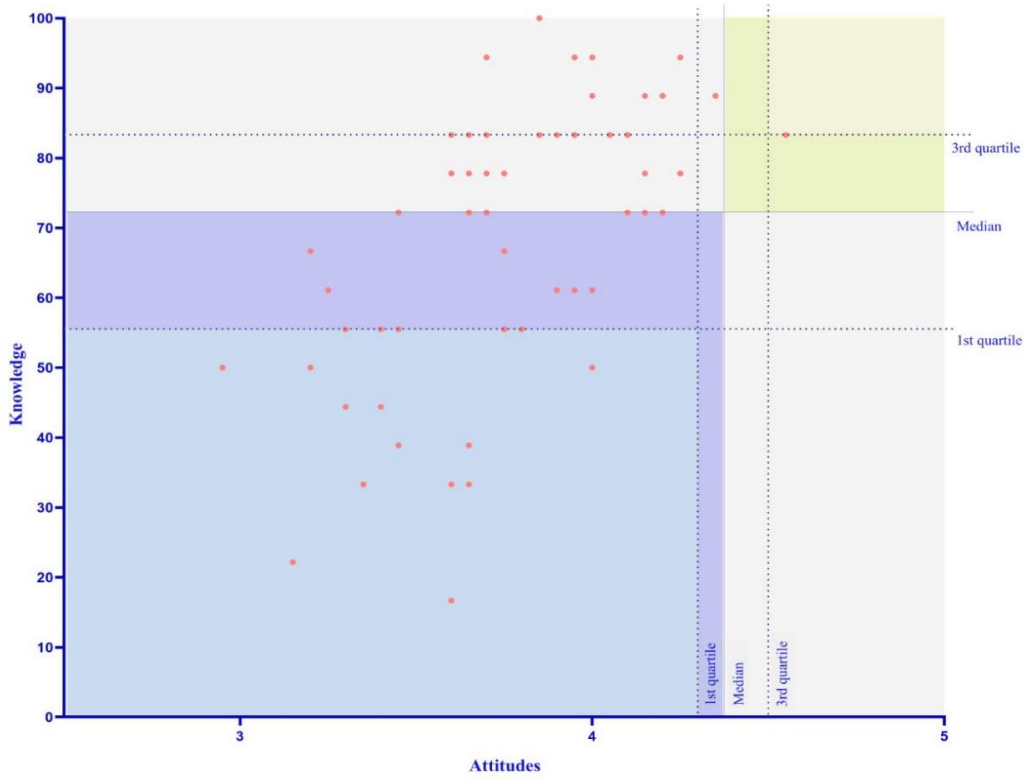
*Questions that express positive attitudes through favorable propositions.
§Questions expressing negative attitudes through unfavorable propositions.
Source: the authors.

Participants' Performance in the Reliability Test

In graph 1 it can be observed that the participants with "low performance" in the knowledge section, did not show high performance in the "attitudes section". In total, 18.18% (n=10) of the teachers showed a "high performance" in the attitudes section, by getting average scores above the values found for the mean (M=3.77) and standard deviation (SD+0.34) of the sample, in this dimension evaluated. Also in the attitudes dimension, the "low performance" was obtained by 18.18% (n=10) of the teachers with mean scores below the mean and standard deviation of the sample.

.

Figure 3. Teaching pharmacists' performance on educational knowledge and attitudes towards clinical services.



Pharmacists participating in the pilot study.

Source: the authors.

In knowledge, 34.54% of the teachers (n=19) showed "high performance" by obtaining relative frequencies equal to or greater than the third quartile (q3=83.3%) calculated for the sample in this section. The "low performance" was presented by 29.09% (n=16) of the teachers, who obtained relative frequency values equal to or below the first quartile (q1= 55.50%) of the sample in the knowledge section.

Discussion

The study developed a valid and reliable research instrument, based on scientific evidence, to assess the knowledge and educational attitudes of teaching pharmacists towards clinical pharmaceutical services. The application of the instrument aims to obtain a score to perform a situational diagnosis of the dimensions assessed in teaching pharmacists working in undergraduate pharmacy courses in Brazil. The methodological procedures employed in this study (questionnaire design, validity and reliability) are widely used for the validation of questionnaires in the educational area and are adequate to evaluate clinical pharmaceutical services (BOLARINWA, 2015; KRISHNAPPA; PIDDENNAVAR; MOHAN, 2011; ARTINO *et al*., 2014).

As for clinical services, in the context of Brazil, the regulation of pharmaceutical clinical attributions was a milestone for pharmaceutical performance in the provision of care. In the literature, many types of researches had been conducted before this regulation, which presented the positive impacts of clinical services on patient health and on the economy of health system resources. (FERRACINI *et al*., 2011; REIS *et al*., 2013). This scenario highlighted the need for regulation of clinical services provided by pharmacists and fostered the debate around the development of legislations that subsidize this professional practice (FEDERAL COUNCIL OF PHARMACY, 2013a; FEDERAL COUNCIL OF PHARMACY, 2013b).

With the approval of the clinical pharmacist attributions and other legislations that regulate this practice, institutional actions aimed at the implementation of clinical services were carried out by several entities. Among these actions are the training for the implementation of services in the Unified Health System (UHS), promoted by the Ministry of Health in 2014, and the educational actions promoted by the FCP (BRASIL. MINISTRY OF HEALTH, 2014; SOUZA *et al*., 2015; FEDERAL COUNCIL OF PHARMACY, 2016). Studies on the implementation of clinical services provided by pharmacists in the health system report the good acceptance of the health team, facing the interventions proposed by pharmacists and their positive impacts on the patient's health (AGUIAR *et al*., 2018; HAGA *et al*., 2014). However, it is described in the literature the existence of barriers to the implementation of these services, related to the disarticulated training of the professional pharmacist, generating the lack of clinical knowledge and the low acquisition of skills in communication (ALCÂNTARA *et al*., 2018; FREITAS, G. R. M. *et al*., 2016). The advances in legislation, with the regulation of pharmaceutical clinical services and the larger workload of undergraduate courses in pharmacy to the axis health care, represent an important step, which needs articulation of all involved in the pharmaceutical education process.

In the historical context of pharmaceutical education, pharmacists who work as teachers are influenced by the historical process of transformations in the educational and professional guidelines that guide their training. These scenarios have undergone profound changes, starting in 2013, with resolutions no. 585 and no. 586, added to the NCG for pharmacy courses approved in 2017. As a reflection of this configuration, the clinical attributions of the pharmaceutical professional have been gaining space in their curriculum. However, the professors who work in pharmaceutical education were not trained according to these new guidelines, which may represent a challenge for the alignment of pharmaceutical education to this new professional reality, as well as the need for specialization courses to act in the areas under study (LIBÂNIO, 2003).

Based on the definitions of clinical services provided by pharmacists, the questions of the research instrument developed in this study were submitted to the validation process. Performed using the e-Delphi method, only the first round obtained a number greater than the minimum of seven panelists. The content validation sought to assess whether the research instrument measures the content it was created to measure (BOLARINWA, 2015). The main difficulty presented in the validation was determined by the low rate of return from panelists,

with an abstention rate of 59.1% in the first round, higher than the range of 30% to 50% estimated in the literature (VASCONCELOS; GUEDES, 2007; WRIGHT; GIOVINAZZO, 2000). However, in the other rounds, only the second round showed abstentions, with a value of 22.22%, within the parameters of 20 to 30%. According to Vasconcelos and Guedes (2007), the low adherence of teachers to electronic questionnaires is not associated with their technical knowledge or access to the internet, and this behavior is a factor to be investigated.

The changes suggested by the panelists in the validation stage of the research instrument were relevant to the adequacy of the questions. The largest number of changes was promoted after the first round of e-Delphi, with 32 questions not approved. For example, in the assertion of the question "2.2 Pharmacotherapy follow-up is a pharmaceutical service provided during two or more meetings with the patient". Based on the suggestions provided by the panelists, this assertion was redirected to the pharmacist's practice areas and modified, becoming a negative assertion. Thus, the final version of the first assertion of question 2.2 was "Pharmacotherapy follow-up is provided only in hospital settings" (BRASIL, 2017).

Important changes were also promoted in the structure of the questions after the first round, such as, for example, question 2.7 was reformulated with replacement of the assertions focused on the characteristics of the health education service. The validated version of question 2.7 was "Which pharmaceutical service aims at developing the autonomy and co-responsibility of individuals for daily decisions involving their health care (empowerment)?". This question sought the identification of the clinical service of health education, facing the context presented (BRASIL, 2017).

In the questions focused on attitudes, changes were also made in the first round. For example, the question "3.17 When teaching the health screening service, the teacher should teach the student to identify individuals with diseases that have not yet been diagnosed". Based on the suggestions provided by the panelists the term teaching was replaced by the term "stimulate the student to develop skills", taking into consideration the role of the teacher as facilitator and mediator of the teaching-learning process, and not only as the provider of all knowledge (BRASIL, 2017).

After the validation, the stage of reliability assessment was performed, with the application of the instrument, allowing the evaluation of the internal consistency of the questionnaire, from the calculation of Cronbach's alpha. The questions in the "knowledge" domain obtained higher alpha values, which indicates greater consistency of the results of the assessment of the items in this dimension compared to the items in the "attitudes" dimension. However, both obtained acceptable alpha values (BOLARINWA, 2015; TABER, 2018). The larger number of questions in the evaluated dimensions usually decreases the sampling error, influencing the increase in Cronbach's alpha value. However, even though the attitudes dimension presents a higher number of questions, in this dimension a lower alpha value was obtained (0.71), compared to the knowledge dimension (0.78) indicating a lower relationship between the subparts of this dimension (FREITAS; RODRIGUES, 2005).

The characterization of the sample participating in the reliability assessment test was performed through the survey of the teachers' professional profile. The sample size obtained in this step was compatible with that recommended in the literature for statistical purposes focused on the analysis of questionnaire reliability (SAPNAS; ZELLER, 2002). It was observed that more than half of the participants in the reliability assessment test lived in the Midwest of Brazil, the region where the state of Goiás is located, the Federative Unit where the research was conducted, which may have influenced the dissemination of the study and consequently the largest number of participants.

The good performance of the participants in the reliability assessment test, in one of the criteria evaluated, did not necessarily determine good performance in the other criterion. However, it can be observed that teachers with low performance in the knowledge section did not show high performance in the attitudes section. Evaluative studies conducted in other contexts indicate the direct relationship between teachers' knowledge and attitudes, in which teachers with better performance in the items referring to knowledge showed better attitudes (ALUFOHAI; AKINLOSOTU, 2016; WAHONO; CHANG, 2019). The association between theory and practice in the training of professionals is an important factor for the success of the teaching-learning process of students (SOARES; CHASE; MONCAIO, 2019).

As for the teachers' performance regarding the items elaborated in the knowledge section, the low score in item 2.17 related to the characteristics of the pharmacotherapy review service may be related to the different proposals in the literature for the provision of this service and the different impacts on patient health. Another factor is that this service can be confused with the act of the professional to keep up to date about the medications and the actions related to the review of their records (FEDERAL COUNCIL OF PHARMACY, 2016b). The pharmacist when providing the pharmacotherapy review service must perform an individual critical analysis of the patient's medication, evaluating drug-related problems, such as inadequate dose, physician's therapeutic choice, side effects, drug interactions, prescription errors, and contraindications (BÜLOW *et al*., 2018). Faced with these problems related to pharmacotherapy, the pharmacist acts in promoting the necessary adjustments for the optimization of the patient's treatment and may have laboratory tests as support, although it is not a prerequisite for its provision.

Still, in the knowledge section, the teachers obtained the lowest hit rate in item 3.13, about the objective of the therapeutic drug monitoring service. The combined approach, through pharmaceutical, pharmacokinetic, and pharmacodynamic techniques, makes this a complex and decisive pharmaceutical service for obtaining effective and safe plasma concentrations in patient pharmacotherapy (FEDERAL COUNCIL OF PHARMACY, 2016b). Moreover, the provision of this service is focused on hospital settings, a factor that may influence the low knowledge of professionals who work in other environments (DEVANEY, 2014; IBRAHIM; ABDELRAHIM; AB RAHMAN, 2014; WIEGEL; OLYAEI, 2016).

In the questions regarding faculty educational attitudes, the worst performance of faculty was in question 3.4 focused on medication reconciliation. In this question, a negative assertion was made about the provision of the medication reconciliation service when the patient transits through the same health service. During classes focused on this service, the teacher should guide students to provide the medication reconciliation service when the patient transits through different health services (FEDERAL COUNCIL OF PHARMACY, 2016b). This service aims to prevent medication errors that can occur due to discrepancies in the prescription, such as omission, duplicity, dose, frequency, interval and route (LOMBARDI *et al*., 2016).

In question 3.7 focused on adverse reactions, the teachers obtained a low performance. Adverse reactions are inserted in the context of pharmacovigilance and are part of pharmaceutical care, to qualilfy the use of medicines, being a tool of integrality of care to users of health systems (FEDERAL COUNCIL OF PHARMACY, 2016b). Studies report the problem of pharmacovigilance related to underreporting of adverse reactions in Brazil and low investigation of causality between drugs and adverse reactions (MOTA; VIGO; KUCHENBECKER, 2019). Faced with the difficulties related to the knowledge and attitudes of health professionals in reporting adverse drug reactions, Modesto and colleagues (2016) emphasize the importance of educational actions in order to promote patient safety (MODESTO *et al*., 2016).

The results of the teachers, obtained in the evaluation of the reliability of the questionnaire, highlight the need for educational actions aimed at the training of teachers in clinical services provided by pharmacists. It is important to emphasize the transition period experienced by the pharmaceutical profession, especially with the regulation of pharmaceutical clinical attributions in the year 2013 and the approval of the NCG of pharmaceutical undergraduate courses in the year 2017 (FEDERAL COUNCIL OF PHARMACY, 2013a; BRAZIL, 2017). According to Alcântara and collaborators (2018), Brazilian pharmacists are distant from their clinical role, focused on the logistical aspects in which medical supplies, medications, and other hospital materials are inserted. Added to this factor, in the scenario prior to the NCG of the year 2017, the inadequacies in the pharmaceutical academic educational process generated a lack of mastery of competencies in pharmaceutical training. For changes in this scenario, adequate adjustments are necessary for the formation of a faculty prepared to act in the challenge of redirecting pharmaceutical education (ALMEIDA; MENDES; DALPIZZOL, 2014).

The profile of the faculty members participating in the reliability assessment stage of the questionnaire is composed of professionals with varied titles received upon graduation. These pharmacists had professional training governed by guidelines that did not recommend care and clinical activity as the axis of pharmaceutical training with the largest workload. This factor may represent a challenge for the mastery of knowledge and educational attitudes of these professionals, facing pharmaceutical clinical services. However, it is important, in this process, that teachers master the competencies inherent to the clinical field, through knowledge, skills, and attitudes, as well as the methods that improve the teaching-learning

process, such as the active teaching methods, centered on the students' learning (BRASIL, 2017). In this sense, assessments can play a central role in the search for strategies that promote the actions related to the improvement of teaching pharmacists. (KRISHNAPPA; PIDDENNAVAR; MOHAN, 2011).

The other correlations and statistical analyses may be performed in further studies, with the application of this instrument in a larger sample universe, ensuring statistical significance to the results. Due to this limitation, statistical inferences related to the education of the teaching pharmacist and the number of questions answered with higher scores in each service evaluated were not performed (HAIR *et al*., 2014).

Final Considerations

The attributions of pharmacists in Brazil have been transforming, whether they are mediated by the demand of international institutions that aim at the expansion and professional qualification to promote the integral well-being of the individual, family, and community; or by the regional needs of the society. In view of these changes, the educational process requires adjustments to reach the goals expected from the pharmaceutical professional. However, such changes make teachers in the pharmaceutical area seek for "emergency" qualifications to provide the competencies expected in the training of future professionals.

The NCG itself (2017) brings the need for permanent evaluation of the teaching-learning process to involve all actors related to educational training, as well as to the profession, and it should be in line with Sinaes - National System for Evaluation of Higher Education. Another topic to be highlighted in NCG (2017) reports that "the teachers of the undergraduate course in pharmacy should have academic qualification and professional experience, proven in their specific areas of expertise" which in practice is not achieved as reported by the Federal Pharmacy Council itself (2019), since the lack of instruments to identify the knowledge and qualification of the teaching pharmacist.

Given these variables, which directly affect the teaching-learning process in the training of pharmacists, the present study was thought and developed from the concepts of the clinical attributions aimed at a teaching pharmacist, in order to promote the measurement of knowledge and attitudes, facing clinical services.

The study shows the several phases in the development of the instrument, starting with an exhaustive reading of the documents that guide and ground the clinical services, to elaborate the questionnaires involving the aspects related to the knowledge of the clinical area, as well as their attitudes. Tto align the information with the specialists in the area in Brazil, four cycles of analysis were performed in order to obtain consensus on all the items addressed. The e-Delphi method is considered by several researchers as a valid method to obtain consensus in very specific topics, as was the case in this study.

Thus, the instrument developed can go beyond the initial objectives that would be the evaluation of the knowledge and attitudes of teaching pharmacists involved in clinical services. The instrument can be widely used for the diagnosis of the professionals in the area, involved or not with higher education, to identify the need for continued education courses in the area, enabling them for clinical practice. The instrument, in turn, can also help in the situational diagnosis of clinical teaching obtained by pharmacy course students, providing subsidies for the implementation of measures that contribute to the acquisition of clinical attributions.

It is worth mentioning that this work was only possible to be carried out due to the commitment of several players from those who helped us in the research design, such as Prof. Dr. Tiago Marques dos Reis from the Federal University of Alfenas, and Prof. Dr. Nathalie de Lourdes Souza Dewulf from the Federal University of Goiás, to those directly involved in the Expert Panel. We count on all those involved for the realization of the next stages of the project, being the application of the instrument at the regional and/or national level, as well as a diagnostic tool in the formation of new professionals, serving as parameters and indicators of the quality of pharmaceutical teaching in the clinical area.

Bibliographic Reference

AGUIAR, A. C.; RIBEIRO, E. C. O. Conceito e avaliação de habilidades e competência na educação médica: percepções atuais dos especialistas. **Revista Brasileira de Educação Médica,** v. 34, n. 3, p. 371-378, 2010.

AGUIAR, K. DA S. *et al.* Segurança do paciente e o valor da intervenção farmacêutica em um hospital oncológico. **Einstein (São Paulo, Brasil**), v. 16, n. 1, p. 1-7, 2018.

AITKEN, M.; GOROKHOVICH, L. ***Advancing the Responsible Use of Medicines:*** *Applying Levers for Change*. [S.l: s.n.], 2012. 216 p. Avaliable on:http://pharmanalyses.fr/wp-content/uploads/2012/10/Advancing-Responsible-Use-of-Meds-Report-01-10-12.pdf. Access on: 12 jul. 2019.

ALCÂNTARA, T. DOS S. *et al.* **Perceptions of a group of hospital pharmacists and other professionals of the implementation of clinical pharmacy at a high complexity public hospital in Brazil**. **BMC Health Services Research**, v. 18, n. 1, p. 1–11, 2018.

ALEXANDRE, N. M. C.; COLUCI, M. Z. O. Validade de conteúdo nos processos de construção e adaptação de instrumentos de medidas. **Ciência & Saúde coletiva**,v. 16, n. 7, p. 3061-3068, 2011

ALMEIDA, R. B.; MENDES, D. H. C.; DALPIZZOL, P. A. Ensino farmacêutico no Brasil na perspectiva de uma formação clínica. **Revista de Ciências Farmacêuticas Básica e Aplicada**, v. 35, n. 3, p. 347-354, 2014.

ALOMI, Y. A.; AL-JARALLAH, S. M.; BAHADIG, F. A. Cost-efficiency of Clinical Pharmacy Services at Ministry of Health Hospital, Riyadh City, Saudi Arabia. **Pharmacology, Toxicology and Biomedical Reports**, v. 5, n. 3s, p. S20–S22, 2019.

ALUFOHAI, P. J.; AKINLOSOTU, T. N. Knowledge and Attitude of Public Secondary School Teachers Towards Continuous Assessment Practices in Edo Central Senatorial District. **African Research Review**, v. 10, n. 4, p. 72-79, 2016.

ARTINO, A. R. *et al.* Developing questionnaires for educational research: AMEE Guide No. 87. **Medical Teacher**, v. 36, n. 6, p. 463–474, 2014.

ANDERSON, C *et al*. The WHO UNESCO FIP Pharmacy Education Taskforce: enabling concerted and collective global action. **American Journal of Pharmaceutical Education,** v. 72, n. 6, p. 127, 2008.

BERTOLDI, A. D. *et al.* Perfil sociodemográfico dos usuários de medicamentos no Brasil: resultados da PNAUM 2014. **Revista de Saúde Pública**, v. 50, n. supl. 2, 5s, 2016.

BIGDELI, M; PETERS, D. H.; WAGNER, A. K. **Medicines in Health Systems: Advancing access, affordability and appropriate use.** Geneva: World Health Organization, 2014. Avaliable on: https://apps.who.int/iris/handle/10665/179197. Access on: 15 jul. 2019.

BILAL, A. I. *et al.* Attitude and satisfaction of health care providers towards clinical pharmacy services in ethiopia: A post-deployment survey**. Journal of Pharmaceutical Policy and Practice**, v. 9, n. 1, p. 1–14, 2016.

BOLARINWA, O. A. Principles and methods of validity and reliability testing of questionnaires used in social and health science researchers. **Nigerian Postgraduate Medical Journal**, v. 22, n. 4, p. 195–201, 2015.

BOYNTON, P M; GREENHALGH, T. Selecting, designing, and developing your questionnaire. **BMJ**, v. 328, n. 7452, p. 1312-1315, 2004.

BRASIL. Lei nº 5.991, de 17 de dezembro de 1973. **Dispõe sobre o controle sanitário do comércio de drogas, medicamentos, insumos farmacêuticos e correlatos, e dá outras providências**. *Diário Oficial da União*, v. 53, n. 9, p. 1689–1699, 1973. Avaliable on: http://www.planalto.gov.br/ccivil_03/leis/l5991.htm. Access on: 26 abr. 2019.

BRASIL. MINISTÉRIO DA SAÚDE. **Capacitação para implantação dos serviços de clínica farmacêutica** / Ministério da Saúde, Secretaria de Ciência, Tecnologia e Insumos Estratégicos. Departamento de Assistência Farmacêutica e Insumos Estratégicos. Brasília: DF, 2014.

BRASIL. **Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (Inep)**. Guia de Elaboração e Revisão de Itens. Brasília: DF, 2010. v. 1. Avaliable on: http://darnassus.if.ufrj.br/~marta/enem/docs_enem/guia_elaboracao_revisao_itens_2012.pdf. Access on: 14 mar. 2018.

BRASIL**. Lei nº 13.021, de 8 de agosto de 2014**: Dispõe sobre o exercício e a fiscalização das atividades farmacêuticas. Brasília, DF: Diário Oficial da União, 2014. Avaliable on: https://www.cff.org.br/pagina.php?id=714. Access on: 15 mar. 2019.

BRASIL. Ministério da Educação. Resolução CNE/CES nº 6, de 19 de outubro de 2017. I**nstitui Diretrizes Curriculares Nacionais do Curso de Graduação em Farmácia**. Brasília, DF: Diário Oficial da União, 2017. Avaliable on: http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=74371-rces006-17-pdf&category_slug=outubro-2017-pdf&Itemid=30192. Access on: 21 maio 2019.

BÜLOW, C. *et al*. Important Aspects of Pharmacist-led Medication Reviews in an Acute Medical Ward. **Basic and Clinical Pharmacology and Toxicology**, v. 122, n. 2, p. 253–261, 2018.

CASE, S. M.; SWANSON, D. B. **Constructing Written Test Questions for the Basic and Clinical Sciences**. 3 ed. 180 p. 2001. Avaliable on: https://www.researchgate.net/publication/242759434_Constructing_Written_Test_Questions_For_the_Basic_and_Clinical_Sciences. Access on: 3 set. 2018.

CHINIL, H.; OSIS, M. J. D.; AMARAL, E. A Aprendizagem Baseada em Casos da Atenção Primária à Saúde nas Escolas Médicas Brasileiras. **REBEM, Rio de Janeiro-RJ**, v. 42, n. 2, p. 44-53, 2018.

COMITÉ DE CONSENSO. Segundo Consenso de Granada sobre Problemas Relacionados con Medicamentos. **Ars Pharmaceutica**, v. 43, n. 3-4, p. 179-187, 2002.

COMITÉ DE CONSENSO. Tercer Consenso de Granada sobre problemas relacionados com medicamentos (PRM) y resultados negativos associados a lá medicacíon (RNM). **Ars Pharmaceutica**, v. 48, n. 1, p. 5-17, 2007.

CONSELHO FEDERAL DE FARMÁCIA. **Matriz de Competências para a Formação do Farmacêutico na Área de Farmácia Clínica**. Avaliable on: https://www.cff.org.br/userfiles/Matriz%20final%2018_11_2016%20(site)(3).pdf. Access on: 19 maio 2019a.

CONSELHO FEDERAL DE FARMÁCIA. **Serviços farmacêuticos diretamente direcionados ao paciente, à família e à comunidade - contextualização e arcabouço conceitual**. Brasília: Conselho Federal de Farmácia, 2016b. Avaliable on: http://www.cff.org.br/userfiles/Profar_Arcabouco_TELA_FINAL.pdf. Access on: 19 mar. 2019.

CONSELHO FEDERAL DE FARMÁCIA. **Competências para a atuação clínica do farmacêutico: Relatório do I Encontro Nacional de Educadores em Farmácia Clínica e Matriz de Competências para a Atuação Clínica** / Conselho Federal de Farmácia. Brasília: Conselho Federal de Farmácia, 2017. Avaliable on: https://www.cff.org.br/userfiles/file/Relat%c3%b3rio%20Enefar06jun2017_bx.pdf. Access on: 8 abr. 2019.

CONSELHO FEDERAL DE FARMÁCIA. **Programa de Suporte ao Cuidado Farmacêutico na Atenção à Saúde** - *PROFAR*. Brasília - DF: Conselho Federal de Farmácia, 2016. Avaliable on: http://www.cff.org.br/userfiles/file/_PROFAR_kit_Livro_TELA-SIMPLES.pdf. Access on: 10 mar. 2019.

CONSELHO FEDERAL DE FARMÁCIA. **Resolução nº 585, de 29 de agosto de 2013**. Regulamenta as atribuições clínicas do farmacêutico e dá outras providências. Brasília, DF: Diário Oficial da União, 2013a. Avaliable on: www.cff.org.br/userfiles/file/resolucoes/585.pdf. Access on: 17 out. 2018.

CONSELHO FEDERAL DE FARMÁCIA. **Resolução nº 586, de 29 de agosto de 2013**. Regula a prescrição farmacêutica e dá outras providências. Brasília, DF: Diário Oficial da União, 2013b. Avaliable on: https://www.cff.org.br/userfiles/file/noticias/Resolu%c3%a7%c3%a3o586_13.pdf. Access on: 3 jun. 2019.

COOK, D. A.; BECKMAN, T. J. Current concepts in validity and reliability for psychometric instruments: Theory and application. **American Journal of Medicine**, v. 119, n. 2, p. 166.e7-166.e16, 2006.

CROFT, H. *et al.* Current Trends and Opportunities for Competency Assessment in Pharmacy Education–A Literature Review. **Pharmacy**, v. 7, n. 2, p. 67, 2019.

DALKEY, N. The Delphi method: experimental study of group opinion. v. 1, n. 5, p. 408–426, 1969. Avaliable on:https://www.rand.org/content/dam/rand/pubs/research_memoranda/2005/RM5888.pdf. Access on: 4 mar. 2019

DEVANEY, A. Role of hospital clinical pharmacist in transplantation, and generic immunosuppressive therapies. **GaBI Journal**, v. 3, n. 2, p. 95–98, 2014.

FERRACINI, F. T. *et al.* Implantação e evolução da farmácia clínica no uso racional de medicamentos em hospital terciário de grande porte. **Einstein (São Paulo)**, v. 9, n. 11, p. 456–460, 2011.

FREITAS, A. L. P.; RODRIGUES, S. G. **Avaliação de Confiabilidade do Questionário**: uma análise utilizando o coeficiente alfa de Cronbach. Xii Simpósio De Engenharia De Produção, v. 12, 2005. Avaliable on: https://www.researchgate.net/publication/236036099_A_avaliacao_da_confiabilidade_de_questionarios_uma_analise_utilizando_o_coeficiente_alfa_de_Cronbach. Access on: 9 jul. 2019.

FREITAS, G. R. M. *et al.* Principais Dificuldades Enfrentadas por Farmacêuticos para Exercerem suas Atribuições Clínicas no Brasil. **Revista Brasileira Farmácia Hospitalar e Serviços de Saúde**, v.7, n. 3, p. 35–41, 2016.

HAGA, C. S. ETSUK. *et al.* Implementation of vertical clinical pharmacist service on venous thromboembolism prophylaxis in hospitalized medical patients. **Einstein (São Paulo)**, v. 12, n. 1, p. 27–30, 2014.

HAIR, J. F. *et al.* **Multivariate Data Analysis.** Upper Saddle River: Prentice Hall. 17th. ed., 2014. p. 69–75.

HANAFI, S. *et al.* Evaluation of Community Pharmacists' Knowledge, Attitude and Practice towards Good Pharmacy Practice in Iran. **Journal of Pharmaceutical Care**, v. 1, n. 1, p. 19–24, 2013.

HEALTH FOUNDATION. **Person-centred care made simple: What everyone should know about person-centred care**. London: Health Foundation, 2016. Avaliable on: https://www.health.org.uk/sites/default/files/PersonCentredCareMadeSimple.pdf. Access on: 25 mar. 2019.

HECKATHORN, D. D. Snowball Versus Respondent-Driven Sampling. **Sociological methodology**, v. 41, n. 1, p. 355–366, 2011.

HEPLER, C. D.; STRAND, L. M. Opportunities and responsibilities in pharmaceutical care. **American Journal of Hospital Pharmacy**. Bethesda, v. 47, n. 3, p. 533-543, 1990.

IBRAHIM, M. I. M.; ABDELRAHIM, H. E. A.; AB RAHMAN, A. F. Cost evaluation of therapeutic drug monitoring of gentamicin at a teaching hospital in Malaysia. **Pharmacy Practice**, v. 12, n. 1, p. 372, 2014.

IQVIA. **The Global Use of Medicine in 2019 and Outlook to 2023**. IQVIA Institute for Human Data Science, , p. 75, 2019. Avaliable on: https://www.iqvia.com/insights/the-iqvia-institute/reports/the-global-use-of-medicine-in-2019-and-outlook-to-2023. Access on: 6 set. 2019.

JIANG, S. P. *et al*. Implementation of pharmacists' interventions and assessment of medication errors in an intensive care unit of a Chinese tertiary hospital. **Therapeutics and clinical risk management**, v. 10, p. 861-6, 2014.

KRISHNAPPA, P.; PIDDENNAVAR, R.; MOHAN, M. **Art and Science of Questionnaire Development. Journal of the Indian Association of Public Health Dentistry**, p. 154–158, 2011. Avaliable on: https://www.researchgate.net/publication/235663502_Art_and_Science_of_Questionnaire_Development. Access on: 6 ago. 2019.

LAVEN, A.; SCHMITZ, K.; FRANZEN, W. H. Reporting adverse drug reactions: contribution, knowledge and perception of German pharmacy professionals. **International Journal of Clinical Pharmacy**, v. 40, n. 4, p. 842–851, 2018.

LIBÂNIO, J. C. **Adeus Professor, Adeus Professora? Novas exigências educacionais e profissão docente.** Coleção Questão da Nossa Época, v. 67. 7ª ed. São Paulo: Cortez, 2003.

LIKERT, R. A technique for the measurement of attitudes. **Archives of Psychology**, v. 22, n. 140, p. 55, 1932.

LINSTONE, H. A.; TUROFF, M. **The Delphi Method: techniques and applications**. p. 3-12, 2002. Avaliable on: http://is.njit.edu/pubs/delphibook. Access on: 13 nov. 2018.

LOMBARDI, N. F. *et al.* Análise das discrepâncias encontradas durante a conciliação medicamentosa na admissão de pacientes em unidades de cardiologia: Um estudo descritivo. **Revista Latino-Americana de Enfermagem**, v. 24, p. e2760, 2016.

LOPES F. M. *et al*. **Aprendizagem baseada em casos no ensino por competências: uma introdução às Ciências Farmacêuticas.** In: KOCHHANN, Andréa. Educação: diálogos avançados e caminhos traçados. Goiânia: Scotti, 2020. p. 185

MCCRACKEN, K.; PHILLIPS, D. R. Demographic and Epidemiological Transition. **The International Encyclopedia of Geography: People, the Earth, Environment and Technology**, p. 1–8, 2017.

MCHUGH, M. L. Descriptive statistics, Part II: Most commonly used descriptive statistics. Journal for specialists in pediatric nursing. **Journal for Specialists in Pediatric Nursing**, v. 8, n. 3, p. 111–116, 2003.

MELO, A. C. *et al.* Pharmacy in Brazil: Progress and challenges on the road to expanding clinical practice. **Canadian Journal of Hospital Pharmacy**, v. 70, n. 5, p. 381–390, 2017.

MODESTO, A. C. F. *et al.* Reações adversas a medicamentos e Farmacovigilância: Conhecimentos e Condutas de Profissionais de Saúde de um Hospital da rede Sentinela. **Revista Brasileira de Educação Médica**, v. 40, n. 3, p. 401–410, 2016.

MOTA, D. M.; VIGO, Á.; KUCHENBECKER, R. DE S. Reações adversas a medicamentos no sistema de farmacovigilância do Brasil, 2008 a 2013: estudo descritivo. **Cadernos de Saúde Pública**, v. 35, n. 8, p. 1–14, 2019.

OBRELI-NETO, P. R. *et al.* Evaluation of the effectiveness of an internet-based continuing education program on pharmacy-based minor ailment management: A randomized controlled clinical trial. **Brazilian Journal of Pharmaceutical Sciences**, v. 52, n. 1, p. 15–26., 2016.

OLIVEIRA, D.; BRUMMEL, A.; MILLER, D. Medication Therapy Management: 10 Years of Experience in a Large Integrated Health Care System. **Journal of Managed Care Pharmacy**, v. 16, n. 3, p. 185–95, 2010.

ONATADE, R. *et al.* Evidence for the outcomes and impact of clinical pharmacy: context of UK hospital pharmacy practice. **European Journal of Hospital Pharmacy**, v. 25, n. 1, p. 21–28, 2018.

PEETERS, M. J. Targeting assessment for learning within pharmacy education. **American Journal of Pharmaceutical Education**, v. 81, n. 8, p. 5–9, 2017.

PHATAK, A. *et al.* Impact of pharmacist involvement in the transitional care of high-risk patients through medication reconciliation, medication education, and postdischarge call-backs (IPITCH Study**). Journal of Hospital Medicine**, v. 11, n. 1, p. 39–44, 2016.

POLIT, D. F.; BECK, C. T.; OWEN, V. O. The Content Validity Index: Are You Sure You Know What's Being Reported? Critique and Recommendations. **Research in nursing & health**, v. 31, n. 4, p. 341–354, 2007.

QUINONES, M. E. *et al.* Impact of clinical pharmacy services on outcomes and costs for indigent patients with diabetes. **American Journal of Managed Care**, v. 22, n. 4, p. e147–e152, 2016.

RAYKOV, T.; MARCOULIDES, G. A. Thanks Coefficient Alpha, We Still Need You! **Educational and Psychological Measurement**, v. 79, n. 1, p. 200–210, 2019.

REIS, T. M. DOS *et al.* Pharmacists in Dispensing Drugs (Pharmadisp): Construction and Validation of a Questionnaire Assess the Knowledge for Dispensing Drug Before and After a Training Course. **Revista Eletrônica de Farmácia**, v. 14, n. 4, p. 28–40, 2018.

REIS, W. C. T. *et al.* Análise das intervenções de farmacêuticos clínicos em um hospital de ensino terciário do Brasil. **Einstein (São Paulo***)*, v. 11, n. 2, p. 190–196, 2013.

SANTOS, G. A. S.; BOING, A. C. Hospitalizations and deaths from drug poisoning and adverse reactions in Brazil: An analysis from 2000 to 2014. **Cadernos de Saúde Pública**, v. 34, n. 6, p. 1–14, 2018.

SANTOS, W. S. **Organização curricular baseada em competência na educação médica.** REBEM, Rio de Janeiro, v. 35, n. 1, p. 86-92. 2011.

SAPNAS, K. G.; ZELLER, R. A. Minimizing sample size when using exploratory factor analysis for measurement. **Journal of Nursing Measurement**, v. 10, n. 2, p. 135–154, 2002.

SOARES, L. DOS S.; CHASE, S. N.; MONCAIO, A. C. S. Metodologias Ativas No Ensino Superior: Opiniões, Conhecimentos E Atitudes Docentes. **Revista de Enfermagem UFPE online**, v. 13, n. 3, p. 783–795, 2019.

SOUZA, TT. et al**. Curso online: prescrição farmacêutica no manejo de problemas de saúde autolimitados**. Módulo 2, Unidade 1: semiologia farmacêutica e raciocínio clínico. Brasília: CFF; 2015.

STREINER, D. L. Starting at the beginning: An introduction to coefficient alpha and internal consistency. **Journal of Personality Assessment**, v. 80, n. 1, p. 99–103, 2003.

TABER, K. S. The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. **Research in Science Education**, v. 48, n. 6, p. 1273–1296, 2018.

THANGARATINAM, S.; REDMAN, C. W. The Delphi technique. **The Obstetrician & Gynaecologist**, v, 7, n. 2, p. 120–125, 2005.

TORONTO, C. Considerations when conducting e-Delphi research: a case study. **Nurse researcher**, v. 22, n. 1, p. 10-15, 2017.

VARELA-RUIZ, M.; DÍAZ-BRAVO, L.; GARCÍA-DURÁN, R. Descripción y usos del método Delphi en investigaciones del área de la salud. **Investigación en Educación Médica,** v. 1, n. 2, p. 90–95, 2012.

VASCONCELOS, L. L.; GUEDES, L. F. A. E-surveys: **Vantagens e Limitações dos Questionários Eletrônicos Via Internet no Contexto da Pesquisa Científica**. Apresentação realizada na X SEMEAD, FEA-USP, 2007. Avaliable on: http://sistema.semead.com.br/10semead/sistema/resultado/trabalhosPDF/420.pdf. Access on: 20 jul. 2019.

WAHONO, B.; CHANG, C. Y. Assessing Teacher's Attitude, Knowledge, and Application (AKA) on STEM: An Effort to Foster the Sustainable Development of STEM Education. **Sustainability (Switzerland)**, v. 11, n. 4, p. 1–18, 2019.

WALDMAN, E. A.; SATO, A. P. S. Trajetória das doenças infecciosas no Brasil nos últimos 50 anos: um contínuo desafio. **Revista de Saúde Pública**, São Paulo, v. 50, p. 1–18, 2016.

WIEGEL, J. J.; OLYAEI, A. J. **The role of the pharmacist in the management of kidney transplant recipients**. Avaliable on: https://www.indianjurol.com/printarticle.asp?issn=0970-1591;year=2016;volume=32;issue=3;spage=192;epage=198;aulast=Wiegel. Access on: 10 ago. 2019.

WORLD HEALTH ORGANIZATION. **Continuity and coordination of care: A practice brief to support implementation of the WHO Framework on integrated people-centred health services.** Geneva: World Health Organization: [s.n.], 2018. Avaliable on: https://apps.who.int/iris/bitstream/handle/10665/274628/9789241514033-eng.pdf?ua=1. Access on: 10 ago. 2019.

WRIGHT, J. T. C.; GIOVINAZZO, R. A. Delphi - Uma ferramenta de apoio ao planejamento prospectivo. **Caderno de Pesquisas em Administração**, v. 12, p. 54-65, 2000.