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Collaborative validation of decision-making supporting tools in Public Health users in Brazil

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Abstract

The creation of the Unified Health System (SUS) in Brazil in 1988 represented advances from standpoint of care guarantees, systemic organization and decentralization of the unified management; however, with fragile performance governance. The New Public Management has demanded from health managers efforts to monitor results, control and accountability. This study involved 220 managers and professionals (stakeholders) in capturing and validating relevant dimensions and performance indicators in the SUS context. Inferential analysis validated macrodimensions and indicators. In addition, 195 specialists and professionals (stakeholders) were involved, as well as 506 users for the cross-cultural translation and validation of the Servqual scale constructs for the SUS context.

Keywords

Governance; Evaluation of Processes and Results; Health Assessment; Indicators and Basic Data; Monitoring

Resumo

A criação do Sistema Único de Saúde (SUS) no Brasil em 1988 representou avanços do ponto de vista das garantias de cuidado, organização sistêmica e descentralização da gestão unificada; no entanto, com um governo de desempenho frágil. A Nova Administração Pública exigiu dos gestores de saúde os esforços para monitorar resultados, controle e responsabilidade. Este estudo envolveu 220 gestores e profissionais (stakeholders) na captação e validação de dimensões e indicadores de desempenho relevantes no contexto do SUS. Análises inferenciais validaram as macrodimensões e indicadores. Além disso, participaram 195 especialistas e profissionais (stakeholders), 506 usuários de tradução intercultural e a validação das construções da escala Servqual para o contexto do SUS.

Palavras chave

Governança; Avaliação de Processos e Resultados; Avaliação em Saúde; Indicadores e Dados Básicos; Monitoramento

Resumen

La creación del Sistema Único de Salud (SUS) en Brasil en 1988 representó avances desde el punto de vista de las garantías de atención, la organización sistémica y la descentralización de la gestión unificada; sin embargo, con un gobierno de desempeño frágil. La Nueva Administración Pública ha exigido a los gerentes de salud los esfuerzos para monitorear los resultados, el control y la responsabilidad. Este estudio involucró a 220 gerentes y profesionales (partes interesadas) en la captura y validación de dimensiones relevantes e indicadores de desempeño en el contexto del SUS. Análisis inferenciales validaron las macrodimensiones e indicadores. Además, participaron 195 especialistas y profesionales (partes interesadas), así como 506 usuarios para la traducción intercultural y la validación de las construcciones a escala Servqual para el contexto SUS.

Palabras clave

Gobernanza; Evaluación de Procesos y Resultados; Evaluación de la Salud; Indicadores y Datos Básicos; Monitoreo

Introduction

The demands of society in relation to health have been increasing, although the health system of Brazil has presented a significant evolution in the structural and organizational levels. The main advances are related to the legal guarantees (Brasil, 1988, 1990a, 1990b), of care, the systemic organization and the decentralization of health management to the state and municipal levels; however, few advances are observed in the governance of health organizations and units.

The importance of monitoring and evaluation is reaffirmed by the economic factors, the need for access, the requirement of quality of health care, in search of the efficiency, effectiveness and satisfaction of users of the Unified Health System (SUS).

Considering that there is no consensus in the literature on the scope and extent of evaluation and monitoring, the integrated vision was the one advocated by the United Nations Development Program (UNDP) for deci-

sion making and results-based management (UNDP, 2009). It also assumes the instrumental aspect of monitoring results defined within the OECD, which treats monitoring as the continuous function that uses the systematic collection of data, to provide management and stakeholders with parameters for an intervention, through of specific indicators on the extent of progress, the achievement of objectives and results obtained in the use of allocated resources (Morra Imas & Rist, 2009; OECD, 2002).

To delimit the field of this study and allow the structuring of a conceptual framework (framework), the construct of "services" was considered for the contextualization of the functional space. In this way, we enclose the field where the interrelationships in the delivery of services are processed. This scope will be the basis for the elaboration of a theoretical-logical model of health assessment, including the instruments for evaluating the satisfaction/dissatisfaction of users within the scope of services offered.

This study was based on the need to prospect and validate macrodimensions and key indicators of performance measurement of health organizations. To that end, the objective was to structure instruments that involve managers and professionals in the selection and validation of macro dimensions, dimensions and key indicators for the performance measurement of health organizations and services in the SUS context.

Aware of the complexity of the theme, the purpose of this research is to elaborate a methodological proposal and a panel proxy of multidimensional indicators (Qualitative, Quantitative, Effects, Satisfaction and Systemic/Strategic), duly validated by key decision agents in a selected sample multicentric.

In a complementary way, it addresses the measurement of satisfaction of the user of health services in Brazil, in which there is a historical shortage of initiatives in this field evidenced in the bibliographic research. In order to address the scarcity of standardized and validated instruments for measuring quality and satisfaction, a proposal was prepared for a measurement strategy for the evaluation of users' satisfaction, based on scientific principles, validated by key SUS decision-makers and users (Volpato, 2014). In addition, it is noted that there are patients' dissatisfactions with services received, but little explained in the research results, possibly due to failures in measurement methodologies, being of greater interest to health decision makers (Aharony & Strasser, 1993 apud Esperidião e Trad , 2005: 304).

Thus, the proposal of translation and cross-cultural adaptation of the SERVQUAL scale in a new instrument (QUALITY HEALTH) is based on the field of knowledge translation in which the consolidated theories are targets of transliteration in the light of the experiences of the social actors involved (Barbosa & Neto, 2017; apud Clavier et al, 2011; Hartz et al, 2008), aiming at improving services to fill knowledge gaps and instruments to transform policies and practices (Barbosa & Neto, 2017 apud CIHR, 2004, p.2; WHO, 2006, p.1) for SUS service management.

The structuring of the field of health evaluation and the theoretical-logical model

In the search for the beginnings of the health evaluation process, Dos Reis, Dos Santos et al (Dos Reis et al., 1990) recall the work of Flexner (Flexner, 1910) and the Codman report (Porterfield, 1976). The last one presents a methodology for the routine evaluation of patients' health status to establish the final results of in-hospital medical interventions.

Alkin (Alkin & Christie, 2004) *apud* SAMICO, I. *et al.* (Samico, Felisberto, Figueiró, & Frias, 2010) establishes the origins of the field of evaluation from two needs: accountability and program control.

In another point of view, from the initial proposal of Avendis Donabedian (Donabedian, 1980) - Evaluation of Structure, Processes and Results - there is a search for integrative models, in the relations between health status, quality of care and resource expenditures. The Brook & Lohr model (Brook & Lohr, 1985) proposes the evaluation of the dimensions: care efficacy, care effectiveness, variations in population characteristics and levels of quality of care.

One of the first operational steps of the evaluation process is the design of the theoretical-logical model (ML) - logic model or logic framework - that is conceived within the framework of the theory-driven evaluation born in the decade of the 1970s in the context of methodologies applied by the United States Agency for International Development (USAID) and World Bank, according to Hartz and Vieira-da-Silva (2005) (Souza, Vieira-Da-Silva, & Hartz, 2005).

On the other hand, the logical model in the field of evaluation is the idea that operationalizes the model object, as a set of elements in an interrelated scheme. For Hartz and Vieira-da-Silva (2005) (Souza et al., 2005) to construct the logical design of a program is to scrutinize it in terms of the constitution of its components and its form of operationalization, to discriminate all the necessary steps to the transformation of their goals into goals, abstracting their contextual determinations here.

In this regard, in a synthetic way, an evaluation process should be devised for decision-making, through the choice of methodologies, indicators and parameters that contemplate this diversity of points of view, based on the formulation of the best strategy, in the and the selection of criteria, indicators and standards (Vieira-Da-Silva, 2005 *apud* Tanaka e Tamaki, 2012) (Souza et al., 2005).

The inclusion of the various actors in the evaluation modeling decision is also required by the variety of measurable dimensions in health services, and by the need for prioritization by future users. In this regard, Uchimura and Bosi (2002) efer authors and lists of possible evaluation dimensions: Gattinara et al. (1995) indicate several factors that determine the quality of health services: professional competence; [...] user-user satisfaction; [...] accessibility; [...] efficiency; [...] efficiency. On the other hand, Vuori (1991), also cited by Acurcio et al. (1991), Akerman & Nadanovsky (1992); Santos, (1995) points out: [...] effectiveness; [...] efficiency [...].

As the purpose of this study is to propose the artifacts for decision making, the evaluation approach called "focused assessment for use" was selected. Patton (1997) includes in its definition the method or method of making evaluating program outcomes and making judgments about the programs and/or to support the decision-making process on future programming. Regarding the value judgment aspect in the evaluation process, this depends on the prior definition of the stakeholders in the evaluation, since these actors act to impact the actions resulting from the decision applied in the management of the health services.

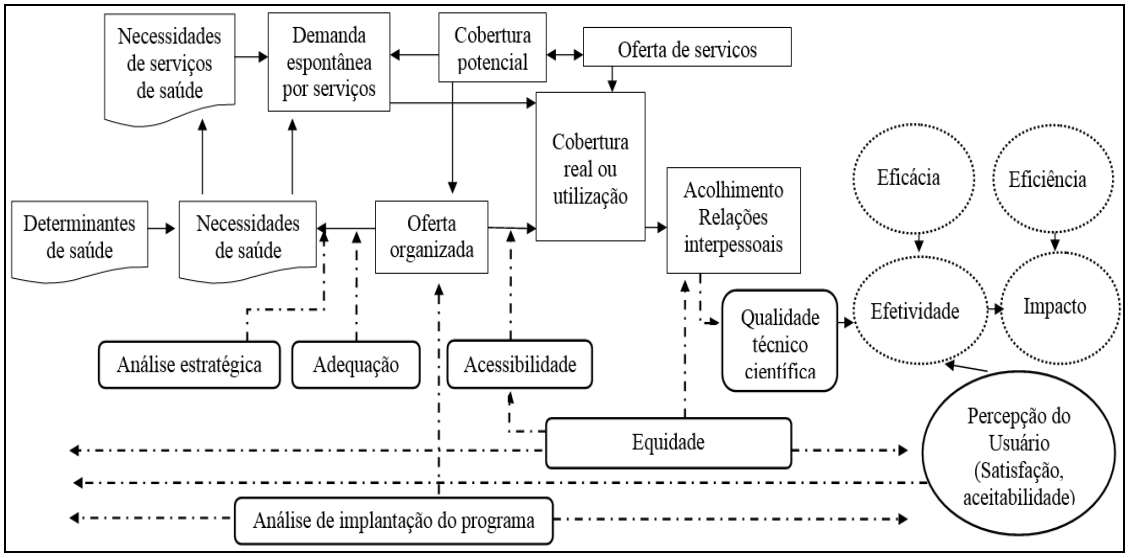
Therefore, it is part of the evaluator/investigator's arsenal of activities to devise an evaluation process for decision making, based on the choice of methodologies, indicators and parameters that contemplate this diversity of points of view, through the formulation of the best strategy, selection of approach, definition of levels and attributes, as well as the selection of criteria, indicators and standards (Hartz & Vieira-da-Silva, 2005; Tanaka & Tamaki, 2012).

Method

The research is observational, transversal, by mixed method of evaluation. It was supported by a multiple case study (Minayo, Assis, & Sousa, 2010) selected for convenience and participation availability, in a sample of informants under the PhD of the University of Coimbra (CAAE: 54972816.9.0000.5051). The scope of this research is health organizations within the scope of hospitals, polyclinics, Dental Specialties Centers (CEO), Emergency Care Units (UPA), Psychosocial Care Centers (CAPS), and other specialized units of the SUS health network. Included in the sample are the units in this profile, in which the top managers signed the authorization form, and the managers and informants who signed a participation term (Free and Informed Consent Term - TCLE).

In addition to the literature review (Acurcio et al., 1991; Akerman & Nadanovsky, 1992; Gattinara et al., 1995; Santos, 1995; Viacava et al., 2004; Vieira-Da-Silva, 2005; Vuori, 1991), in this paper, we present a logical model to guide the initial proposal for the collection of qualitative data for structuring the global vision, based on the scheme proposed by Hartz and Vieira-da-Silva (Souza et al., 2005) prevalent in the literature. The proposal from the point of view of theoretical framework was based on two different prisms. A logical framework for the organization of services and another logical framework centered on the equalization of supply, demand and measurement of results (Figure 1).

Figure 1. Diagram of the Logical Model - attributes or characteristics for health assessment



Source: prepared by the author

The study was delineated in 2 stages and 4 phases. The first stage includes phases 1 to 3, which, from the knowledge of managers and health professionals, consolidates an instrument that was applied in the second stage, phase 4 (Figure 2). Based on the results obtained in the first stage, descriptive analyzes were performed, and the results obtained in the second stage, descriptive and inferential analysis. The results of the analyzes were equalized by the current literature and generated instruments containing indicators and performance dimensions to be used in later phases.

In a pragmatic way, key decision makers interested in the evaluation for decision making at the governmental/systemic, organizational and managerial/sectorial levels of the health services were mapped. In the next step, the preferences of key decision makers were consulted in two rounds. In order to carry out the consultation process in the structuring of the problem and ordering the preferences of methodologies and indicators,

the qualitative techniques of expert panels were used to propose and initial validation of content followed by Delphi groups of semi-structured interviews, which consisted of seeking consensus by successive consultations to the group of decision-makers in a written and structured way (Minayo, Assis, & Sousa, 2010).

The selected key informants were asked about the degree of relevance and preference of macro domains (macrodimensions) and domains (indicators) of performance evaluation in health units and services by proposing and weighing new performance measurement items according to their degree of personal knowledge, based on models that emerged from the literature review. We have also been asked to classify the degree of usability (importance/relevance), macrodimensions and performance indicators by governmental/systemic, organizational and managerial/sectoral levels.

In the scope of this study, this logic model (Souza et al., 2005) proposes some categories of factors for health assessment, in which the following stand out: effectiveness, efficiency, impact, technical-scientific quality, user perception (satisfaction and acceptability), among others. It became the basis of consultation of the perception of the key decision makers for the participatory structuring of the global vision (phase 1, n = 11), specific vision (phase 2, n = 42), besides the adjusted specific vision (n= 55), consolidated by the field application (phase 4, n = 112), based on the weight of items by a 5-level Likert scale. It should be emphasized that each item could have different amounts of answers, since the informants could choose not to answer all the items, but comparability was guaranteed by the analysis of the weighted averages of all the answers obtained.

Thus, the initial application of the research addressed a focus group of 11 specialists in health assessment and management (phase 1), with subsequent validation by four pilot groups of 42 managers and professionals (phase 2), to identify the main domains and macrodomains (dimensions of performance) considered to be the most relevant in the measurement of performance in health organizations, by the Nominal Group Technique (TGN).

Phase 3 retained the fundamentals of the proposed logical model with aggregations of all performance evaluation domains and macro domains that received above-average rating (greater than 3, relevant/important) in phases 1 and 2, and captured responses from three pilot groups (55 managers and public health management professionals). In order to consolidate the levels of final specific knowledge on the domains and macro domains of evaluation in health systems and services, could add new evaluation items (domains and / or macrodomains) that judged relevant information.

The results obtained in the responses of phases 1 to 3 were evaluated, categorized and re-adjusted according to the macrodimensions of performance defined by the most relevant literature (Acurcio et al., 1991; Akerman & Nadanovsky, 1992; Gattinara et al., 1995; Santos, 1995; Viacava et al., 2004; Vieira-Da-Silva, 2005; Vuori, 1991) in order to support the adjustment of a semi-structured questionnaire to be validated in the field research phase, in planning (phase 4).

Finally, in the phase 4, he/she organized other three pilot groups of key informers, managers and professionals of health, for the application of an adjusted instrument, in a sample of 112 managers and professionals, that emerged of the obtained results of the phase 3.

In each phase, the answers were consolidated with the software Excel 2016, graphic plans of values and applied descriptive analysis and inferencial with the software R (version 3.3.2), both with versions of free licenses.

The descriptive analysis of the obtained results was applied and, in a way, integrated in the validation of the questionnaire (phases 1 the 3: proxy A+B) and, later, in the field research (phase 4: proxy C). In a complementary way, an analysis to measure the levels of statistical significance as for the possible influence of three variables outstanding (level of attention at the health, level of complexity of the attendance and level of occupied position/function) mediator as for the assessment of the four evaluation (Quantitative, Qualitative, Effects and Satisfaction) macrodomains, still tends the addition of the Systemic/Strategic, in the phase 4.

The final analysis and modelling of the definitive instrument of this study left of the valuations attributed to the domains and evaluation macrodomains by a sample of 112 managers and professionals, having been structured on the results obtained in the field application (phase 4: proxy C). After the descriptive analysis, the inferential analysis began, applied exclusively in the answers of the phase 4 (n =112), that were separated in four analyses of results: Study of the factorial loads of the domains versus evaluation macrodomains; Validation for quality criteria and validity of the evaluation macrodomains; Analysis of the quality (adjustment) of the resulting final model; and Analysis of the correlations between the variables and their influences in the Noticed Global Performance.

Search results (1)

Finally, in the phase 4, he/she organized other three pilot groups of key informers, managers and professionals of health, for the application of an adjusted instrument, in a sample of 112 managers and professionals, that emerged of the obtained results of the phase 3.

The Table 1 presents the descriptive analysis of the relative variables to the medium valuations of the domains of evaluation of the sample phases 1 and 2 (proxy THE, n =53) and phases 1 to 3 (proxy A+B, n =108). The global analysis allows to affirm that the wide majority of the 20 domains of analyzed evaluation obtained high (superior or about 4, very important/relevant) medium valuation. In that way, all these 20 evaluation domains were considered relevant/important for analysis in the next investigation phases, in the structuring of a new instrument with domains and evaluation macrodomains properly aligned for the relevant literature of dimensions and performance indicators and, later, applied in the sample of the following phase (phase 4).

It is stood out that the respondents increased four new evaluation (D5W_IndICSAP, D5X_AtendVincReg, D5Y_AtendDesVincReg and D5V_ExtrapTetoOrç) domains, added in a new evaluation (Systemic / Strategic) macrodomain, that didn't have answers individualized in this analysis (they were distributed in the Other domains), but they were incorporated in the new investigation phase (phase 4) of consolidation of the instrument.

In the final stage (phase 4) they stand out the field results as for the respondents' knowledge on possible macrodimensions and acting indicators in units of health, maintained the macrodomains nomenclatures and evaluation domains, respectively. The wide majority of the 24 domains obtained high (superior or about 4, very important/relevant) medium valuations. In that way, all these 24 evaluation domains were considered relevant/important (Table 1) for analysis in the next investigation phases, in the structuring of a new instrument with domains and evaluation macrodomains properly aligned with the literature (Illustration 2).

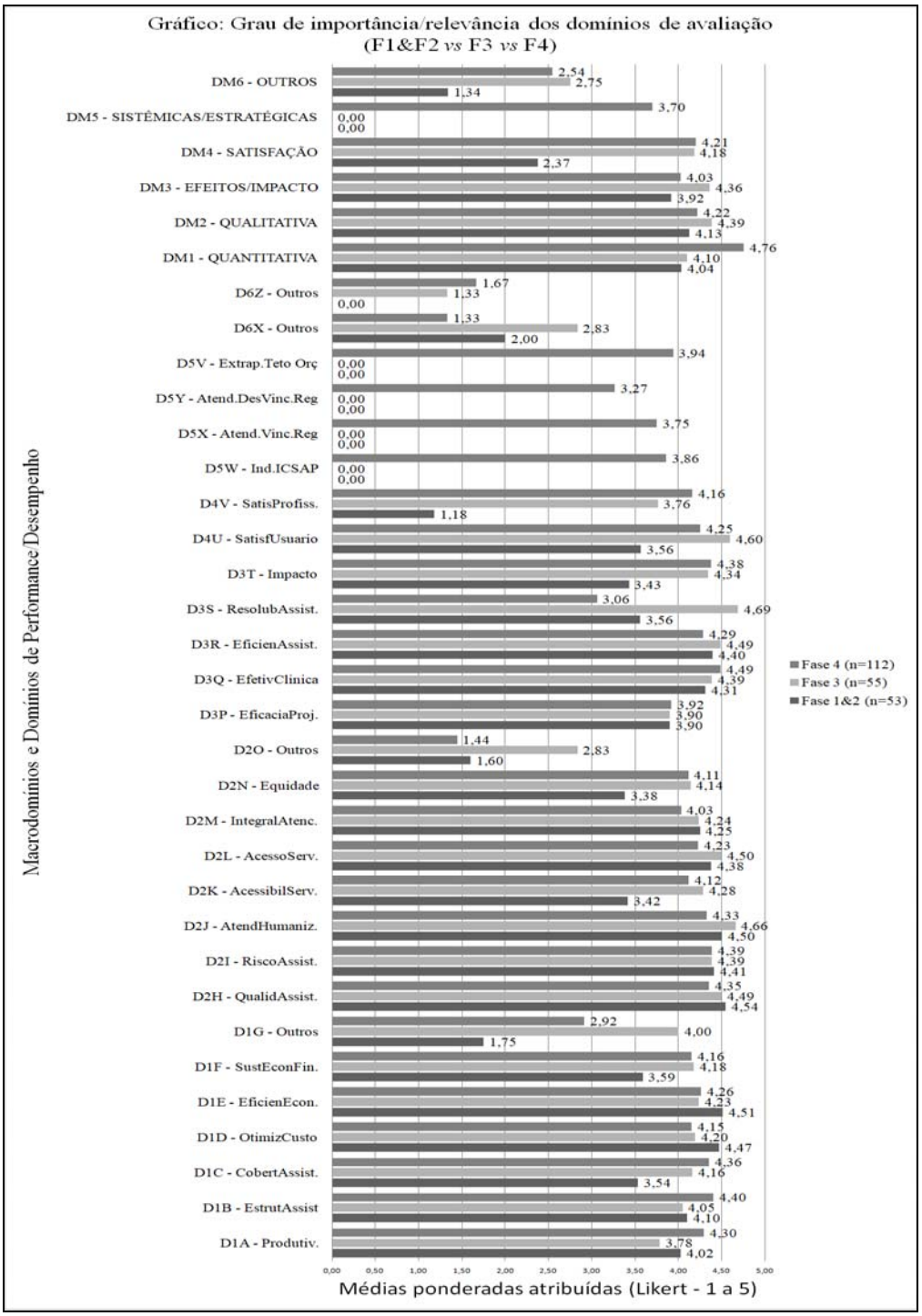
Table 1. Valuation of Evaluation Domains by study phase

Macrodomains	Domains	Fases 1 a 3 (ciclo 1)				Fase 4 (ciclo 2)			
		N	Média	D.P.	I.C-95%	N	Média	D.P.	I.C-95%
Quantitative	D1A_Produtiv	108	3,85	0,90	[3,69; 4,03]	111	4,28	0,86	[4,12; 4,42]
	D1B_EstrutAssist	107	4,00	0,9	[3,84; 4,16]	111	4,40	0,79	[4,25; 4,54]
	D1C_CobertAssit	95	4,23	0,8	[4,06; 4,38]	102	4,36	0,81	[4,20; 4,51]
	D1D_OtimizCusto	108	4,23	0,8	[4,07; 4,36]	111	4,14	0,82	[3,99; 4,28]
	D1E_EficienEcon	108	4,30	0,9	[4,15; 4,45]	111	4,27	0,82	[4,13; 4,42]
	D1F_SustEconFin	81	4,24	0,8	[4,06; 4,40]	111	4,15	0,88	[4,00; 4,31]
	D1G_Outros	11	4,18	0,87	[3,64; 4,64]	6	4,50	0,84	[3,83; 5,00]
Qualitative	D2H_QualidAssist	108	4,46	0,79	[4,30; 4,61]	111	4,38	0,78	[4,23; 4,51]
	D2I_RiscoAssist	107	4,38	0,75	[4,24; 4,52]	110	4,40	0,68	[4,27; 4,53]
	D2J_AtendHumaniz	108	4,58	0,60	[4,46; 4,70]	109	4,35	0,77	[4,20; 4,49]
	D2K_AcessibilServ	88	4,25	0,73	[4,10; 4,41]	112	4,12	0,81	[3,97; 4,27]
	D2L_AcessoServ	106	4,36	0,72	[4,21; 4,50]	112	4,26	0,83	[4,10; 4,42]
	D2M_IntegralAtenc	107	4,24	0,80	[4,09; 4,39]	110	4,04	0,92	[3,85; 4,20]
	D2N_Equidade	96	4,20	0,85	[4,02; 4,35]	55	3,84	1,05	[3,56; 4,11]
	D2O_Outros	6	3,83	0,98	[3,17; 4,50]	3	4,33	0,58	[4,00; 5,00]
Effects	D3P_EficaciaProj	106	3,90	0,85	[3,73; 4,08]	112	3,89	1,00	[3,71; 4,08]
	D3Q_EfetivClinica	107	4,33	0,7	[4,20; 4,45]	112	4,48	0,74	[4,35; 4,61]
	D3R_EficienAssist	105	4,36	0,70	[4,24; 4,50]	112	4,29	0,81	[4,13; 4,44]
	D3S_ResolubAssist	94	4,48	0,6	[4,35; 4,61]	110	4,50	0,75	[4,35; 4,64]
	D3T_Impacto	94	4,30	0,8	[4,14; 4,45]	111	4,38	0,74	[4,24; 4,52]
Satisfaction	D4U_SatisfUsuario	95	4,54	0,70	[4,40; 4,67]	111	4,26	0,84	[4,11; 4,41]
	D4V_SatisfProfiss	37	3,78	1,6	[3,24; 4,24]	112	4,19	0,89	[4,02; 4,35]
Systemic / Strategic	D5W_IndICSAP					111	3,87	1,14	[3,67; 4,07]
	D5X_AtendVincReg					112	3,76	0,87	[3,59; 3,92]
	D5Y_AtendDesVincReg					111	3,26	1,01	[3,08; 3,45]
	D5V_ExtrapTetoOrç					111	3,92	1,00	[3,73; 4,11]
Others	D6X_Outros	5	4,40	0,9	[3,60; 5,00]	1	4,00	-	[1,50; 3,75]
	D6Z_Outros	1	4,00	-	-	1	5,00	-	[1,80; 4,20]

The figure 2 presents the comparative graph of the medium valuations obtained by the evaluation macrodomains among the phases 1 to 4. The global analysis allows us to affirm that all of the evaluation macrodomains (Quantitative, Qualitative, Effects, Satisfaction and Systemic/Strategic, increased in the phase 4) also presented high (superior or about 4, very important/relevant) averages. In that way, all these five evaluation macrodomains were considered relevant/important in the structuring of a new instrument with Domains and evaluation macrodomains properly aligned with the literature (phases 2 and 3).

The evaluation macrodomains in the phases 2 and 3 don't present significant difference among the degree of importance/relevance of all of the macrodomains, once all their trust intervals were put upon. On average, the individuals tended to give valuations (importance/relevance) inside of the same margins of values in the wide majority of Domains and in all of the evaluation macrodomains that they presented high (he/she surrounds or superior to 4, very important / relevant) averages. Of that form, 20 Domains and the four evaluation macrodomains were considered relevant/important for analysis in the next investigation stage (phase 4).

Figure 2. Average importance / relevance score of Macrodomains and Evaluation Domains in Phases 1 to 4.



Source: authored by the author

In the phase 4, the wide majority of evaluation Domains has trust intervals inside of the same margins of values obtained for evaluation Domains. Also, the evaluation macrodomains don't present significant difference among the degree of importance/relevance of all of the macrodomains, once all their trust intervals were put upon. On average, the individuals tended to give valuations (importance/relevance) inside of the same margins of values in the wide majority of Domains and in all of the evaluation macrodomains that they presented high (he/she surrounds or superior to 4, very important/ relevant) averages. 24 Domains and the five evaluation macrodomains were considered relevant/important for analysis in the next investigation (stage 2 - proxy D, in planning) stages.

In order to measure the factorial loads of each one of the 24 evaluation domains and their distributions on the five evaluation macrodomains for later to build and to measure their contributions for the formation of the variable latent Noticed (PGP) Global Performance, a Confirmatory Factorial Analysis (AFC) was made to validate the evaluation macrodomains studied (Quantitative, Qualitative, Effects, Satisfaction and Systemic/Strategic), coming from the proxy C (112 informers). Hair, et. al. (2009). AFC supposes that the latent variables present normal distribution. By definition, the variables in study didn't present normal distribution, once they presented an ordinal, discreet and limited scale (Likert's 5 levels). Therefore, robust estimators were used for covariance structure in the Factorial Analysis Confirmatory with the statistics of test rescaling for the method of Satorra e Bentler (1994), suggested in the literature for correction of the chi-square test (Marôco, 2014).

In agreement with Hair, et al. (2009) the components with smaller factorial loads than 0,50 should be eliminated. Since they contribute not in a relevant way to formation of the latent variable, they do not reach the basic suppositions for the validity and quality of the final model that involve the dimensionality, reliability and convergent validity. There were also excluded of the analytical model, any variables that their permanencies impeded the convergence of the confirmatory factorial analysis (AFC).

Thus, the AFC of the medium valuations obtained for the evaluation macrodomains in the proxy C (phase 4) highlights that in the final model, after analysis and exclusion of seven Domains of evaluation (D1A_Produtiv, D1B_EstrutAssist, D1C_CobertAssit, D2H_QualidAssist, D2M_IntegralAtenc, D2N_Equidade and D3P_EficaciaProj), all the other 17 Domains that stayed in the analysis, presented superior factorial load to 0,50 (or their permanencies didn't impede the convergence of AFC) (figure 3).

In the analysis of the measurement model, the convergent validity, discriminant validity and reliability of the constructs analyzed in each study are verified. Convergent validity ensures that the indicators of a construct are correlated enough to measure the latent concept. The discriminant validity verifies whether the constructs effectively measure different aspects of the phenomenon of interest. Reliability reveals the consistency of the measures used to measure the intended concept. In order to test the convergent validity of the constructs, the criteria proposed by Fornell and Larcker (1981) which proposed that at least 50% of the variability in each item under analysis should be explained by the underlying factor, it guarantees such validity in case the Average Extracted Variance (AVE), which indicates the average percentage of shared variance between the latent construct and its indicators and ranges from 0% to 100% (Hair, William, Babin, & Anderson, 2009), is greater than 50% (Henseler et al., 2009) or 40% in the case of exploratory research (AVE > 0,40) (Nunnally & Bernstein, 1994). For discriminant validity, the criterion used by Fornell and Larcker (1981), which guarantee discriminant validity when the mean extracted variance (AVE) of a construct is not less than the shared variance of that construct with the others. In order to measure the reliability of the constructs, Cronbach's Alpha

(A.C.) and Compound Reliability (C.C.) were used. According to Tenenhaus et al. (2005), the A.C. and C.C. indices should be greater than 0.70 for an indication of construct reliability or greater than 0.60 in the case of exploratory surveys. To verify the dimensionality, the eigenvalue criterion was used greater than 1,0 or criterion of Guttman-Kaiser (Guttman, 1954; Kaiser, 1960 apud Yeomans & Golder, 1982). The eigenvalue corresponds to the amount of the variance explained by a component, and an eigenvalue equal to 1.0 represents the totality of the percentage of the variance explained by a single variable. The sum of the number of eigenvalues corresponds to the number of analyzed variables. The Guttman-Kaiser criterion is based on the consideration that a factor must explain at least the amount of variance that is explained by a single variable. For a good measurement model, factorial loads above 0.70 or commonalities above 0.40 are expected, but items with factor loads of less than 0.50 should be eliminated (Hair et al., 2009), because, by not contributing in a relevant way to the formation of the latent variable, they undermine the scope of the basic assumptions for the validity and quality of the indicators created to represent the concept of interest.

The validity measures and quality of the evaluation macrodomains in the proxy C (phase 4) demonstrated that the quality and validity of the macrodomains were insured, once all presented convergent validation (Extracted Medium Variance - AVE > 040), appropriate reliability (Alpha of Cronbach - A.C. > 0,60 or Composed Reliability - C.C. > 060), unidimensionality and validation discriminante (Variance Shared Maxim - VCM < AVE) (Table 2).

Table 2. Validation for quality criteria and validity of the evaluation macrodomains - Proxy C (phase 4) (managers' vision and professionals).

Macrodomains	Domains	A.C[1]	C.C.[2]	Dim.[3]	AVE[4]	VCM[5]
Quantitativos	3	0,76	0,76	1	0,52	0,13
Qualitativos	4	0,71	0,73	1	0,41	0,24
Efeitos	5	0,75	0,75	1	0,44	0,24
Satisfação	2	0,73	0,74	1	0,59	0,24
Sistêmico/Estratégia	4	0,72	0,75	1	0,44	0,14

[1]Cronbach's alpha; [2]Composite Reliability; [3]Dimensionality; [4]Variance Extraction; [5]Shared Maximum Variance

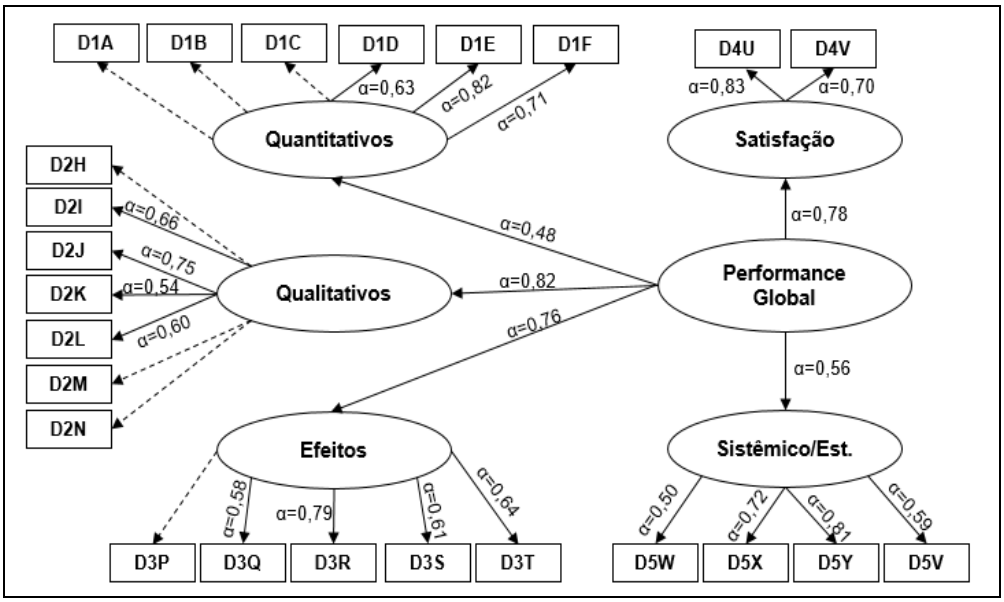
As AFC for the variable latent Noticed Global Performance, in the proxy C (phase 4) it presented the following results:

- The macrodomain of larger weight was Satisfaction (27%) and the one of smaller weight was Quantitative (15%). The macrodomain of Quantitative evaluation presented factorial load same to 0,48, marginally eligible for the exclusion of the model. However, this macrodomain in the analysis was maintained, once it didn't impede the validation of the variable latent Noticed Global Performance;
- In the final model, all the five macrodomains (Quantitative, Qualitative, Effects, Satisfaction and Systemic/Strategic) stayed in the analysis and they presented superior factorial load to 0,50 (or their permanences didn't impede the convergence of AFC).

There are a diversity of parameters and adjustment indexes and quality of the models of structural equations (Bollen & Long, 1993). It was decided the use of a group of indexes thoroughly applied in the relevant literature (X^2/G.L. – chi-square test by degree of freedom, CFI – comparative fit index, TLI – Tucker-Lewis índex or no normalized adjustment index and the index RMSEA – root mean square error of approximation). These selected quality (adjustment) parameters of the model prescribe adequacy when the p-value and RMSEA are statistically lower than 0.050. In addition, it is expected that X^2 / G.L. is less than 3 (Arbuckle, 2008; Wheaton, 1987), CFI is larger than 0,80 (Bentler, 1990), TLI is larger than 0,80 (Bentler & Bonnet, 1980) and that RMSEA (Steiger, Shapiro, & Browne, 1985) is smaller than 0,10, being the ideal below 005.

Considering these results, Figure 3 summarizes the AFC adjustment and the modeling for the latent variable Perceived Global Performance.

Figure 3. Perceived Global Performance Confirmatory Factorial Analysis - Proxy C (phase 4) (Manager and professional view).



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On the other hand, correlation analysis showed that the domains of evaluation showed higher correlations with their respective macrodomains, in the proxy C (phase 4) (Table 4).

Table 4. Correlations between domains and evaluation domains - Proxy C (cycle 2, study 1) (Manager and professional view).

Domínios/ Macrodomínios	Quantitativos	Qualitativos	Efeitos	Satisfação	Sistêmico/ Estratégia
D1A_Produtiv	0,28	0,25	0,30	0,23	0,09
D1B_EstrutAssist	0,23	0,23	0,15	0,11	0,04
D1C_CobertAssit	0,20	0,32	0,37	0,38	0,09
D1D_OtimizCusto	0,75	0,17	0,27	0,40	0,13
D1E_EficienEcon	0,87	0,23	0,26	0,25	0,19
D1F_SustEconFin	0,83	0,27	0,34	0,18	0,16
D2H_QualidAssist	0,18	0,34	0,28	0,30	0,21
D2I_RiscoAssist	0,11	0,72	0,30	0,40	0,25
D2J_AtendHumaniz	0,19	0,82	0,37	0,41	0,29
D2K_AcessibilServ	0,24	0,65	0,45	0,26	0,39
D2L_AcessoServ	0,25	0,75	0,32	0,36	0,19
D2M_IntegralAtenc	0,30	0,47	0,49	0,31	0,19
D2N_Equidade	0,34	0,36	0,39	0,34	0,26
D3P_EficaciaProj	0,28	0,23	0,44	0,15	0,33
D3Q_EfetivClinica	0,26	0,34	0,68	0,30	0,23
D3R_EficienAssist	0,40	0,45	0,86	0,35	0,39
D3S_ResolubAssist	0,18	0,37	0,71	0,39	0,31
D3T_Impacto	0,18	0,30	0,76	0,31	0,18
D4U_SatisfUsuario	0,25	0,32	0,44	0,85	0,28
D4V_SatisfProfiss	0,32	0,51	0,36	0,92	0,30
D5W_IndICSAP	0,19	0,31	0,33	0,21	0,65
D5X_AtendVincReg	0,13	0,40	0,30	0,28	0,76
D5Y_AtendDesVincReg	0,11	0,28	0,25	0,28	0,88
D5V_ExtrapTetoOrç	0,17	0,15	0,27	0,22	0,68

Source: authored by the author

In a complementary way, the correlations between the studied variables (domains and macrodomains of evaluation) and their possible influences on the latent variable Perceived Global Performance were analyzed. Thus, the inferential analysis of phase 4 responses, proxy C (112 informants), was concluded. A descriptive analysis of the Perceived Global Performance variable was also explored, including the possible influences of variables health care level and position/function level.

Finally, the comparison of the Perceived Global Performance in relation to the characterization variables selected health care and function/function levels - Proxy C, while possible mediating variables of the latent variable PGP showed that the average Perceived Global Performance was 4.16 and the median of 4.18; 75% of the responses attributed resulted in an assessment higher than 3.88 (about 4, very important/relevant) for the average PGP; the Primary level of attention showed the highest variability (0.34) in the Perceived Global Performance and the lowest average valuation (3.88), while the Other level obtained the highest average valuation (4.28). The other function level presented the greatest variability (0.12) in the Perceived Global Performance, while the Organizational level obtained the lowest mean value (4.01) and the Systemic level the highest average value (4.25). There was no significant difference (p-value = 0.221) in PGF between health care levels nor between job / function levels (0.332). There was no significant difference (p-value <0.05) to consider the variables health care or position/ function variables as mediators of Perceived Global Performance, in proxy C (phase 4). It is possible to observe a variability in the average valuation of the Latent Perceived Global Performance latent variable, depending on health care levels or job/function level. However, there was no

significant difference (p-value <0.05) to consider variables health care or position/function variables as mediators of Perceived Global Performance, in proxy C (phase 4).

Discussion (1)

To guarantee the appropriate administration of the performance of organizations of health they must build an outline of information and indicators capable to guide the managers as for the monitoring and evaluation of the effectiveness, quality and problem solving of the services, and also of the nets of health for subsequent decision-making, besides the analysis of the positive impacts in the attendance of health of the population, as well as the acceptance for the involved stake holders.

In this purpose, this investigation chose three priorities fully reached: 1) to identify and to guarantee the approval and stake holders participation in a selected sample of units of public health SUS-Brazil; 2) to validate a semi-structured, participatory, literature-based instrument to collect the main macro dimensions and indicators in the perception of professionals and managers at the government, organizational and managerial levels in the context of public health organizations and services SUS-Brasil; and 3) to investigate, through interviews in panel delphi, the validation of the macrodimensions in four different phases: phases 1 to 3 (specialist n=108) and phase 4 (n = 112 decision makers).

Besides, a relevant causal relationship of the levels of attention in health, of the complexity of the attendance and of position/function with the evaluation (Quantitative, Qualitative, Effects, Satisfaction and Strategic/Systemic) macrodomains was not identified, being suggested new studies with enlarged samples. The study demonstrated that the quality analyses and validity of the macrodomains were insured, as well as of the Perceived global performance, a latent variable (not directly observable, built in this study).

Search Results (2)

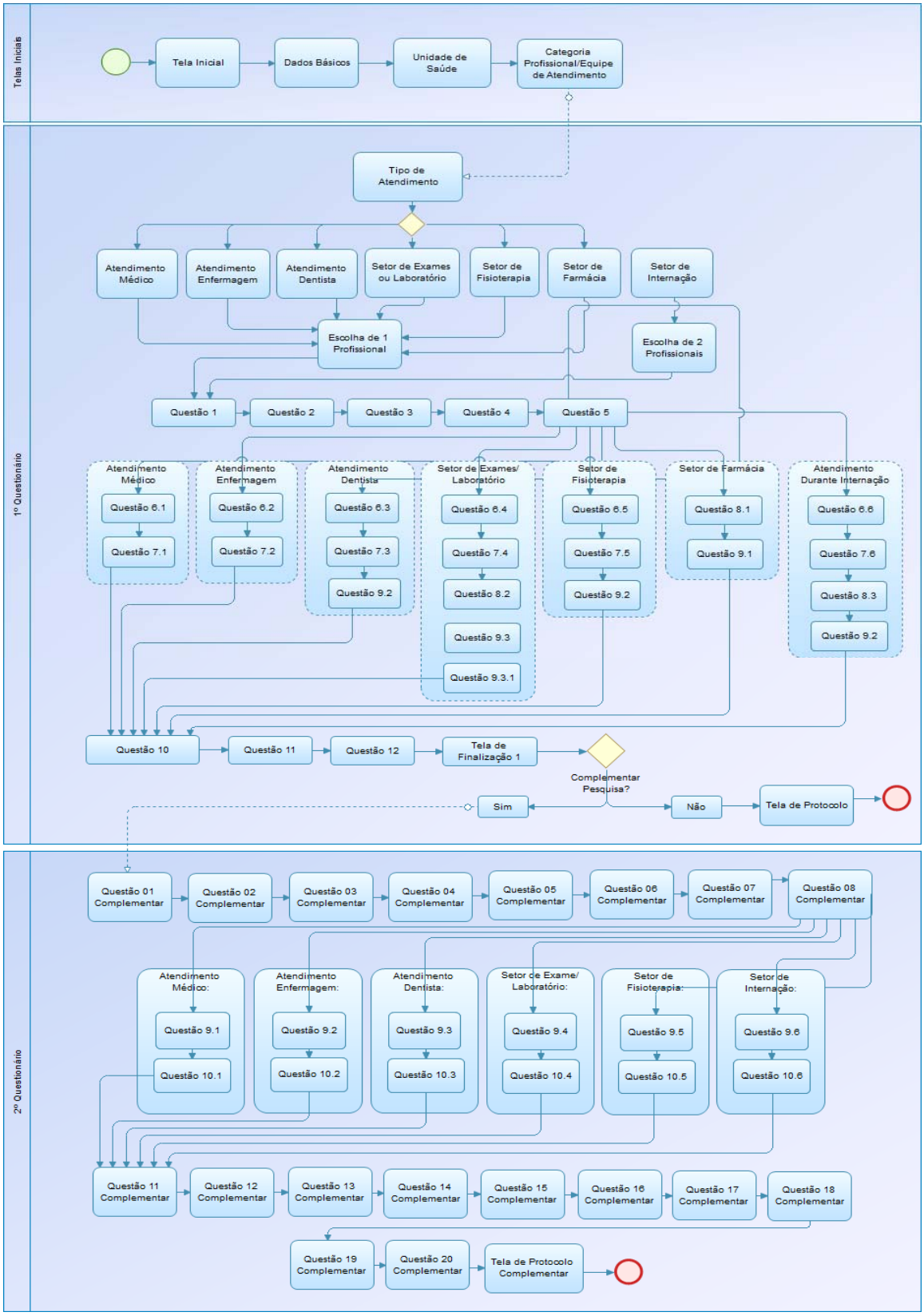
Moita et al. (G. F Moita, 2017; Galba Freire Moita, Barbosa, & Raposo, 2019; G. F Moita, Bernardo, Costa, & Azevedo, 2018) concluded that the evaluation of services provided in the Brazilian public health, with validation of the questionnaire by scientific methods is practically non-existent, which makes it difficult to define strategies to implement improvements in health services. In this scope, the authors (G. F. Moita, 2019; G. F Moita et al., 2018; Galba Freire Moita, Raposo, & Barbosa, 2018) presented an adaptation study of the Servqual Scale in which the application resulted in the valuation of original constructs, validated and adapted to the SUS, aiming at the validation of issues on an innovative scale appropriate to SUS (QualitySaude). The treatment and analysis of the data collected from this study were used as technological support for the application of the proposed models and subsequent systematization of the results.

In one of the most widely used forms of client satisfaction measurement, it is assumed that clients create a level of expectation regarding products and services and that disconfirmation (positive or negative) can generate satisfaction (positive disconfirmation) or dissatisfaction (Zeithaml, Parasuraman, & Berry, 1985), known as the "gap model".

Guided by the "gap model", it is attributed to Parasuraman et al. (Parasuraman, Berry, & Zeithaml, 1991) the development of a satisfaction measurement instrument called Service Quality Scale - Servqual. On this scale, they proposed measuring service quality, based on Oliver's satisfaction model (Oliver, 1980), which states that customer satisfaction is a function of the difference between expectation and performance. The position

of the customer's perception about the perceived quality of service depends on the nature and extent of the discrepancy between the service expectation and the performance perceived by the user.

Figure 3 -Flowchart of modelling of functionalities of the screens of QualitySaude



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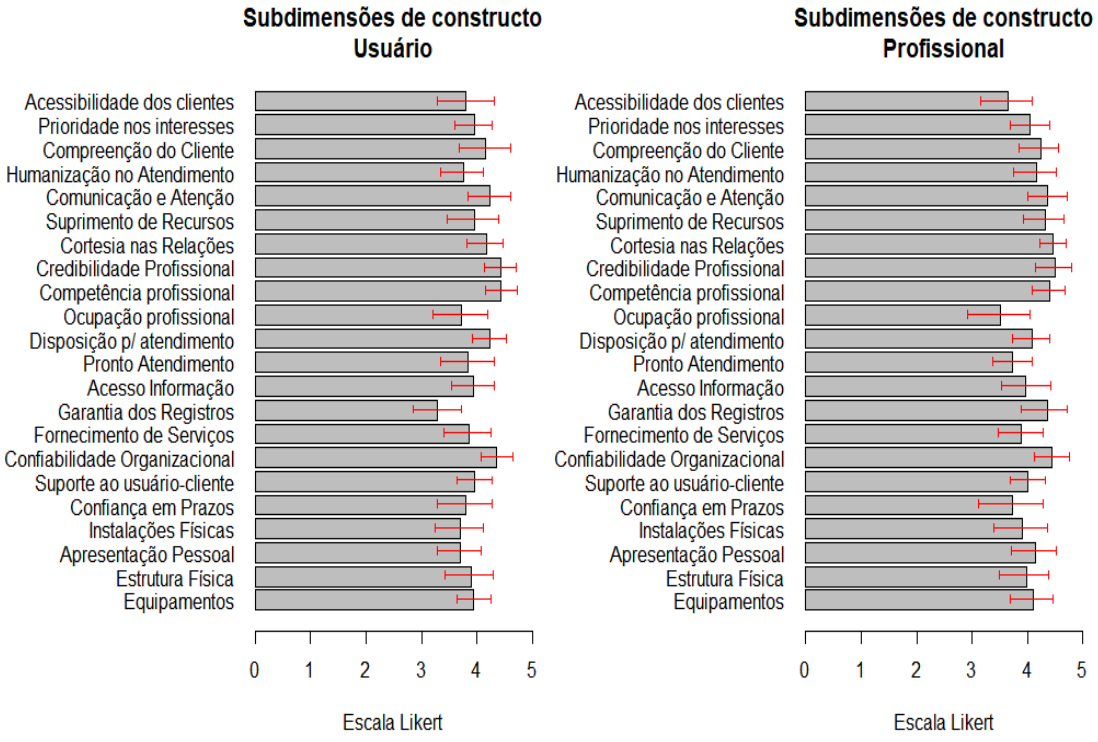
In the perspective of quality evaluation in the methodology of the gap model by the algebraic comparison between user-consumer expectation and perceived satisfaction in service organizations (Babakus & Mangold, 1992), which then became the Servqual Scale (Martin et al., 2003) with subsequent adaptation for application in health services (Parasuraman, Berry, & Zeithaml, 1985) through reliability and validity analyzes, as well as through correlation and exploratory factorial analysis, it can be concluded that the Servqual Scale is reliable and valid in the hospital environment and in a variety of other health services.

Figure 3 presents the flowchart after modelling the functionalities of the screens of QualitySaude. It presents the virtual platform of collection of data, that synthesizes the logic and diagram of the application web developed for interface with users. In the descriptive analysis of the variables of the 195 specialists' characterization, the high technical capacity is observed as well as the experience in the area of quality administration and satisfaction of the same ones and the 506 SUS users.

The 40 proposed constructs were validated with a high average (> 3) (Likert from 1 to 5), despite a slightly higher valuation of Professionals than of Users. The 22 sub-dimensions and the five original macro dimensions (Tangibility, Reliability, Stability, Safety and Empathy) were validated (average ~ 4) by Professionals and Users. There was a tendency (p-value ≤ 0.005) for mediation of the variables level of attention and level of complexity, in the valuation of the 22 subdimensions and of the five macrodimensions by the Users, but only regarding the level of attention of the Professionals. Figure 5 shows the bar chart with confidence intervals for the subdimensions of the proposed constructs (n = 195).

Figure 5: Bar chart with confidence intervals for the subdimensions of the proposed constructs (n = 195 specialists)



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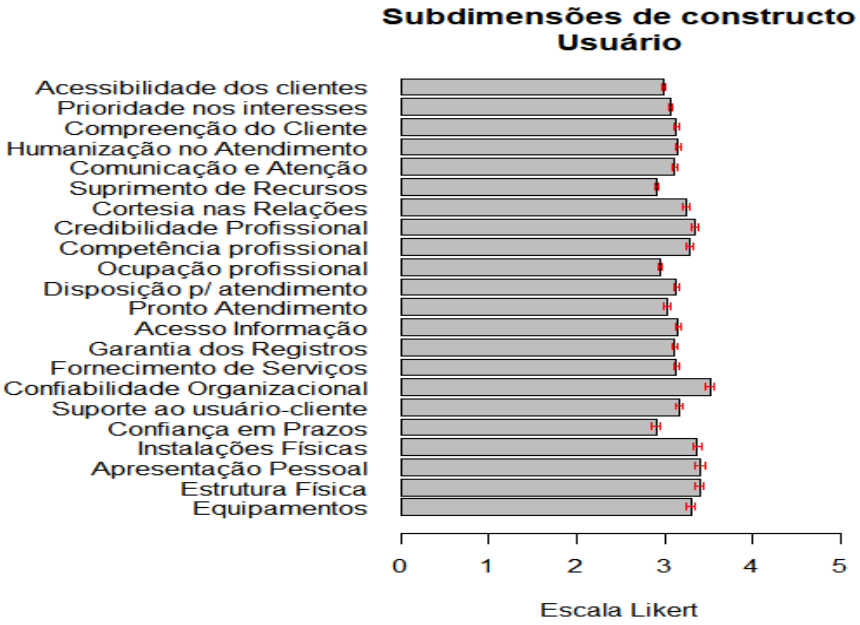
On the other hand, Figure 6 shows the bar chart with confidence intervals for the subdimensions of the proposed constructs.

Figure 6: Bar chart with confidence intervals for subdimensions of proposed constructs (n = 506 SUS users)



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Discussion (2)

In Brazil, the existence of a validated methodology in use to assess user satisfaction has not been verified. The contribution of the present work resides in the validation of possible constructs (ideas-forces) for the cross-cultural adaptation of the Servqual scale as a mechanism for evaluating users' satisfaction regarding Brazilian public health. This opens up new perspectives for the management of health services in order to obtain scientifically valid information about the perception of the people assisted. There is also the potential to boost the actions carried out by some SUS ombudsmen.

The overall analysis of the responses of the 506 Users allows us to state that all 40 constructs, 22 subdimensions and 5 macrodimensions obtained high average valuation (> 3, important/relevant) and were therefore considered relevant/important to structure the issues and the construction of a prototype developed in computer platforms, used as technological support for application of the validated instrument.

There were significant differences in the mean values attributed by the 195 specialists and by the 506 Users, in the vast majority of the 22 sub-dimensions and in all five macrodimensions mediated by the health care levels. However, there is no statistical evidence that the levels of complexity, assistance and of position/function occupied by these informants are moderating factors of these subdimensions.

In this case, the proposed innovation involves the QualitySaude scale, derived from this process of cross-cultural adaptation of the Servqual scale, as well as a prototype, in development, of an instrument to support the application of the adapted scale within SUS.

Finally, reliability and validity analysis steps are planned through correlation and factorial analysis of the results obtained in the field, including how much the factorial loads (amount of variance that is explained by a single variable) on a Latent Global Quality Perceived variable besides the construction and validation of a final model. It is also intended to apply usability testing of the QualitySaude platform.

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