



ISSN: 2230-9926

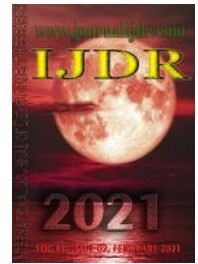
Available online at <http://www.journalijdr.com>

IJDR

International Journal of Development Research

Vol. 11, Issue, 02, pp.44909-44915, February, 2021

<https://doi.org/10.37118/ijdr.21189.02.2021>



RESEARCH ARTICLE

OPEN ACCESS

VALIDITY AND RELIABILITY OF THE BRAZILIAN PUBLIC SERVICE VACCINATION ROOM EVALUATION SCALE ACCORDING TO USERS

*Priscilla Durães de Carvalho, Leila das Graças Siqueira, Marise Fagundes Silveira, Izabella Nascimento Arcanjo, Nayra Suze Souza e Silva, Andréa Maria Eleutério de Barros Lima Martins

Postgraduate Program in Health Sciences - PPGCS, State University of Montes Claros, UNIMONTES, Montes Claros - MG, Brazil

ARTICLE INFO

Article History:

Received 24th December, 2020
Received in revised form
20th December, 2020
Accepted 24th January, 2021
Published online 28th February, 2021

Key Words:

Health Services Assessment, Patient Satisfaction, Health Care Quality Indicators, Scales, Validation Studies.

*Corresponding author:

Priscilla Durães de Carvalho,

ABSTRACT

The objective was to evaluate the quality of the Vaccine Room Evaluation Scale according to Users - EASV-U. A methodological study was conducted, using data from a cross-sectional study to validate the construct, estimation of internal consistency and interpretability of the EASV-U. In the 2015-2016 period, 1,300 users of the vaccine rooms were interviewed. The procedures used for construct validation were: exploratory and confirmatory factor analyses. Internal consistency was estimated using Cronbach's Alpha Coefficient. The interpretability was presented after estimating the mean and minimum and maximum values of the EASV-U, followed by the categorization of the different factors identified, considering the lower limit of the confidence interval as the cutoff point. The EASV-U presented KMO=0.94 and Bartlett $p=0.000$, with grouping of 11 items into 3 factors. The EASV-U showed satisfactory internal consistency, with global Cronbach's alpha equal to 0.949 and 0.876, 0.920 and 0.867 for factors I, II and III, respectively. The EFA legitimized the tri-factorial model of the EASV-U with the indices indicative of the adjusted model: $\chi^2/df=4.33$; RMSEA=0.05 (90% CI=0.042-0.60); CFI=0.991; TLI=0.984; GFI=0.981. The EASV-U presented good performance, with adequate psychometric properties, construct validity, internal consistency, easy application and interpretability.

Copyright © 2021, Priscilla Durães de Carvalho, Leila das Graças Siqueira, Marise Fagundes Silveira, Izabella Nascimento Arcanjo, Nayra Suze Souza e Silva, Andréa Maria Eleutério de Barros Lima Martins. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Priscilla Durães de Carvalho, Leila das Graças Siqueira, Marise Fagundes Silveira, Izabella Nascimento Arcanjo, Nayra Suze Souza e Silva, Andréa Maria Eleutério de Barros Lima Martins, 2021. "Validity and reliability of the Brazilian public service vaccination room evaluation scale according to users", *International Journal of Development Research*, 11, (02), 44909-44915.

INTRODUCTION

Since 1988, the evaluation of health care services has been a priority in the implementation of the Unified Health System – UHS, as there is a need to monitor the quality of this care, as well as to identify the achievement of institutional goals, aiming to support the resizing of the activities of those services (Alfradique *et al.*, 2009). The evaluation of the quality of health services has been based on Donabedian's proposal, which presupposes three dimensions: structure, process and results. The first refers to physical, material, financial and human resources; organization and political support. The second refers to the relationship between professionals and users of those services; as well as the dynamics of this interrelationship. The third comprises the effects or products of the actions of health services, aiming at improving the level of health and the degree of satisfaction of users regarding the care offered in those services (Donabedian, 1983). The structure and process dimensions of "satisfaction with health care" have been studied and evidenced (Brandão, Giovanella & Campos, 2013; Ferreira & Raposo, 2006). Regarding the evaluation of health services from the perspective of its users, there are different methods, techniques and instruments with

methodology. The distinction between public and private health services and their particular characteristics should also be considered. In the public, the pressure power of users is low, because there is no need to acquire clients as in the private sector. Public service user satisfaction assessments can work around this issue, as those assessments can give users a voice. Users have the opportunity to express thus providing the monitoring and control of the activities of public health services, enabling social control in the health area. Finally, there is a need to improve research instruments and methods in the context of user satisfaction, with a view to improving health services, as well as advances in the management of those services (Esperidião & Trad, 2005). The evaluation of satisfaction from the users' perspective concerns a subjective evaluation. Reasons were listed for not considering such evaluation in the management of health services: users do not have sufficient scientific and technical knowledge to evaluate health services, may have physical or mental impairment to achieve the objective of evaluations or judgments; the speeds of nursing actions compromises the broad look of patients; the views of health professionals and patients may be different for care; it is difficult to classify what the patient care "quality" means, hindering the classification of satisfaction (Vuori, 1987). There is a

growing interest in and appreciation of this theme (Ferreira & Raposo, 2006; Institute of Medicine [IOM], 2001). Some studies in the various health areas have considered only one or two questions to evaluate health care (Rodrigues *et al.*, 2013; Souza *et al.*, 2019). In a more comprehensive way, others have considered questionnaires that allow estimating the construct “evaluation of health services” from users’ perspective, as well as the identification of its dimensions (Martins *et al.*, 2015; Martins *et al.*, 2016; Hannings, 2019). An instrument called Vaccine Room Evaluation Scale according to Users, EASV-U, was designed to evaluate vaccination assistance from the perspective of vaccine room users. Therefore, it was necessary to understand the theoretical construct that supports the health care offered in the vaccine rooms. The EASV-U was approved regarding the items researched concerning the content validation process. Its reliability measures regarding internal consistency and reproducibility were satisfactory. It is noteworthy that it can be used in the construction of health indicators and in monitoring the quality of care offered in the vaccine rooms of the Brazilian government service (Siqueira, Versiani, Carvalho, Ferreira & Martins, 2018).

The assessment of satisfaction from the perspective of health service users aims to know the reality of those services and understand a dynamic process influenced by factors, such as the perception of health status and disease, beliefs, sociodemographic conditions, also involving other aspects of the care offered to the user (Dietz, 1998). A study conducted in Guatemala evaluated immunization services user satisfaction, from the point of view of parents of children under five years of age, including variables such as attitudes, preferences and immunization practices of parents; the impact of immunization, marketing campaigns and strategies, and factors that start immunization. However, the purpose of the study was to identify the reasons why Guatemala does not reach the immunization goal, comparing the sites with low and high population coverage. Although users often approved the immunization service, some problems in the quality of service were identified (Barrera, Trumbo, Bravo-Alcántara, Velandia-González & Danovaro-Holliday, 2014). Another user survey was conducted in Australia to determine the satisfaction of users of health services with influenza vaccination, administered by pharmacists, and to identify factors associated with opinions to extend the service and to include other vaccines. There was high satisfaction among users, as they found the service convenient, comfortable and professional, and most supported the expansion of vaccination administered by pharmacists in pharmacies (Burt, Hattingh & Czarniak, 2018). A similar study also addressed the satisfaction of users who were vaccinated against influenza by pharmacy students in mobile immunization clinics.

They mentioned Satisfaction, comfort, comparison with other experiences and the opinions of pharmacists as responsible for immunizations. Users reported high satisfaction, and the experience seemed to have positively affected opinions regarding pharmacists as vaccine applicators (Hannings, 2019). A previous study (Siqueira *et al.*, 2017) evaluated the physical structure, organization and functioning of vaccine rooms, as well as the approximation or distancing of technical standards recommended by the Ministry of Health (MS) (Domingues & Teixeira, 2013). However, the evaluation of the satisfaction of care, specifically, regarding the services provided in the vaccine rooms from the perspective of the users of those services, considering a questionnaire that allows identifying the construct(s), was not found in the literature. The studies found address the theme ‘user satisfaction’ and ‘immunization’, but do not make clear the use of validated instruments (Hannings, 2019; Barrera *et al.*, 2014; Burt *et al.*, 2018). The evaluation of health services requires instruments methodologically accepted by the scientific community (Alexandre & Guirardello, 2002; Alexandre & Coluci, 2011; Coluci, Alexandre & Milani, 2015), which consider social control in the management of public services according to curricular teaching guidelines (Pires, Silva, Fonseca, Vendramini & Coelho, 2014).

In this scenario, the EASV-U (Siqueira *et al.*, 2018) is the object of this study, which aims to estimate the construct validity and its

internal consistency, and to present how its interpretability should be done.

MATERIALS AND METHODS

This is a methodological study that used data from a cross-sectional survey conducted in 2015 in the municipality of Montes Claros, which is located in Northern Minas Gerais, Brazil. According to the 2010 census, this municipality had a population of 361,915 inhabitants (Brazilian Institute of Geography and Statistics [IBGE], 2010). Information regarding health care in the municipality was collected from the Municipal Health Department. For the sampling planning, parents or guardians of children under one year of age were considered as users of the vaccination service, who sought assistance for them in the past months consecutively. On the day of the interview, the user should be seeking this assistance, at least, for the third time in that same vaccine room, which is the inclusion criterion for participation in the research. This study population was chosen because it is in the first year of life that there is a higher frequency of live births accompanied by their parents or guardians in the vaccination rooms to comply with the vaccination schedule, which is a priority issue of public health in the country (Domingues & Teixeira, 2013). The estimate of the sample for finite population considered the following parameters: a confidence level of 95% ($Z=1.96$), margin of error of 3%, prevalence of the phenomenon (Satisfaction) of 50% and increase of 20% for the sample in order to mitigate losses. The finite population was identified from data from the Live Birth Information System (SINASC) and considered the number of children under one year of age born in the municipality in 2013, which corresponded to: $N=5770$ (Information System on Live Births [SINASC], 2013).

The 18 vaccine rooms of the municipality were considered and the sample was distributed proportionally to the number of doses of vaccines applied to children under one year in each of the rooms in the previous year, according to data from the Information System of the National Immunization Program SI-PNI obtained from the health managers of the municipality. The estimated sample was 901 children, 20% were added in order to mitigate the losses resulting from non-response rates. Thus, the estimated sample was 1081 parents or guardians who were invited to participate in the study. The sample size, established for the cross-sectional study, met the minimum requirement for construct validation, which varies from 10:1 between the number of participants in the sample and the number of variables to be analyzed. Some authors even propose a minimum ratio of 20 cases for each item of the instrument (Polidoro, Alves, Oliveira & Guirardello, 2014). The approximate time of one year to reach the sample “n” was estimated and data collection occurred from July 2015 to May 2016. Users who met the inclusion criteria of the study were invited to participate voluntarily. The interviews were conducted by previously trained interviewers, after signing the Informed Consent Forms (ICF) authorizing their participation in the research. Parents or guardians of vaccinated children answered the structured questionnaire regarding EASV-U.

The data were processed using the Statistical Package for the Social Sciences (SPSS®), version 24.0. For confirmatory factor analysis, the statistical program AMOS (Analysis of Moment Structures), contained in the SPSS, was used by the estimator of maximum likelihood. The missing values were imputed through means, since the statistical analysis, indicated for this type of study, does not accept missing data in the database. This estimation or imputation of raw data is necessary for the covariance or correlations of the matrix to be calculated with a homogeneous number of information (Pilati & Laros, 2007). Thus, this form of imputation was chosen to complement the database and the missing data represented less than 1% of the cases observed (0.92%).

Descriptive analysis of the items of the scale was estimated through measures of central tendency, dispersion, asymmetry and kurtosis. Content validity, internal consistency and reliability/reproducibility of the EASV-U were tested in a previous study ($n=60$), verifying high

reliability: internal consistency or Cronbach's Alpha=0.93 and reproducibility with satisfactory Kappa values ranging from 0.79 to 0.97 (Siqueira *et al.*, 2017). The answers of the EASV-U were recorded in Likert scales with five possibilities of answers, ranging from (1) "strongly dissatisfied" to (5) "strongly satisfied". Construct validity was estimated by exploratory factor analysis - EFA, followed by Confirmatory Factor Analysis - CFA aiming to identify the components of the EASV-U, thus allowing determining the relationship between this scale and theoretical concepts that underlie it, that is, whether it is actually able to represent the construct to be measured. The items of the EASV-U were submitted to the EFA to evaluate their factorial structure. Initially, the correlation matrix was performed. The presence of this among the variables was measured considering $p < 0.05$ (Marôco, 2010). To verify the measurement of adequacy to the method, compatibility of the data to indicate the EFA, the Kaiser-Meyer-Olkin (KMO) and Bartlett's sphericity tests were performed. The values of the KMO criterion range from 0 to 1, being above 0.80, admirable and < 0.50 , indicate the inadequacy of the method (Polidoro *et al.*, 2014; Marôco, 2010). For Bartlett, values with significance level < 0.05 indicate that the matrix is factorable (Polidoro *et al.*, 2014; Figueiredo-Filho & Silva-Junior, 2010). Subsequently, the commonalities were identified for each item, observing whether it met the acceptable levels of explanation (>0.5) and its contribution to the research. Values below this level indicate that the item should be deleted (Marôco, 2010).

The factor loadings of each item were performed in relation to the extracted components. The adopted acceptable limit of the item's contribution to the creation of the factor was 0.40 in order to avoid the problem of non-determination of the relationship between items and factors (Polidoro *et al.*, 2014). The definition of the number of factors, which consists of combining variables that evaluate similar themes, was based primarily on the graphical evaluation of the ScreePlot and the observation of the percentage of total accumulated variance. After, through the analysis according to the main component method, the variables were rotated by Varimax orthogonal rotation (Maroon, 2010; Field, 2009). The denomination of the factors occurred from the identification of the common content of the variables grouped in the same factor (Marôco, 2010). In the present study, the internal consistency of the EASV-U was tested again ($n=1300$), after exploratory factor analysis. This internal consistency was estimated by Cronbach's Alpha Coefficient for the global scale and for each defined factor. This coefficient can range from 0 to 1 and the minimum value of 0.70 was considered for satisfactory internal consistency (Revelle & Zinbarg, 2009). In order to legitimize the dimensional structure extracted in the EFA, the CFA of the EASV-U was carried out. Regarding the indices indicative of quality of the adjusted model, the ratio between chi-square (χ^2) and degrees of freedom (df), Goodness-of-fit (GFI), Comparative Fit Index (CFI), Tucker Lewis Index (TLI) and Root-Mean-Square Error of Approximation (RMSEA) were considered (Polidoro *et al.*, 2014; Bentler & Bonett, 1980). This study complied with the ethical principles of Resolution of the National Health Council (CNS) no. 466/2012 and was approved by the Research Ethics Committee at the State University of Montes Claros - CEP/Unimontes, under Opinion no. 313.870/2013. All participants received and signed the Informed Consent Form (ICF).

RESULTS

According to information collected in the coordination of the Municipal Health Department, in 2015, the primary health care of the municipality consisted of 125 Family Health Strategy teams and 18 vaccination rooms, with an average of six doses of vaccines applied monthly, that is, each month were applied approximately on average 108 vaccines in the 18 rooms, totaling approximately 1296 vaccines in 12 months. For data collection, the study population defined in the sample calculation was previously distributed considering the proportions of vaccines applied in these 18 vaccine rooms of the municipality, according to the last year of vaccination. The proportionality of participants per vaccine room surveyed was thus

distributed: Vaccine Room (VR): VR1 (58 participants), VR2 (79 participants), VR3 (103 participants), VR4 (64 participants), VR5 (59 participants), VR6 (85 participants), VR7 (79 participants), VR8 (165 participants), VR9 (98 participants), VR10 (17 participants), VR11 (86 participants), VR12 (67 participants), VR13 (139 participants), VR14 (87 participants), VR15 (31 participants), VR16 (35 participants), VR17 (16 participants) and VR18 (32 participants), totaling 1300 users who participated in the research. The number of participants exceeded the estimated sample for the study, since it was decided to apply the EASV-U among all users who met the inclusion criteria and agreed to participate in the study during the period of time previously estimated to conduct data collection. Table 1 shows the number of respondents, the mean, the standard deviations, asymmetry coefficient and kurtosis referring to each item of the Vaccine Room Satisfaction Assessment Scale according to Users - EASV-U. The items of the USV-ES presented values of asymmetry and kurtosis that indicate an approximation to the normal distribution (Table 1).

The criteria for selecting items and composing each factor considered the analysis of the descending curve, in which the point at which the slope of the curve is clearly leveled indicates the number of factors that should be generated by the analysis, as well as the total explained variance. Regarding the inspection of factor loadings per item of each factor in the EASV-U EFA, the preset of three factors was considered, thus following the method of the main components and rotation by the Varimax method for extraction of construct factors. Thus, the 11 items were grouped into three factors, with total explained variance of 78.88%. The obtained KMO was 0.94 and the obtained Bartlett's sphericity test was with $p < 0.000$, evidencing the factorability of the data matrix. The analysis of the commonalities showed values between 0.713 and 0.854. In this analysis, the items that correlate were grouped into the appropriate factors, considering that user satisfaction would be related to: Factor I - Satisfaction with the physical/organizational structure (Structure) of the vaccine room: (items 1, 2, 3, 4); Factor II - Satisfaction with the professional/interpersonal relationship (Process) of the vaccine room: (items 5, 6, 7, 8, 11) and Factor III - Satisfaction with the logistic structure (Inputs) of the vaccine room (items 9 and 10). Concerning the internal consistency of the global scale, Cronbach's alpha was equal to 0.949. For each factor, the alpha values were: Factor I equal to 0.876; Factor II, 0.920 and Factor III, 0.867. Table 2 shows the values of the commonalities, the factor loadings of each item by extracted factor, the total explained variance, as well as Cronbach's alpha (Table 2).

The results found in the CFA confirm the structure of three factors generated in the EFA, evidencing quality of adjustment of the model through the indicative indexes: $\chi^2/df = 4.33$; RMSEA = 0.05 (90% CI = 0.042-0.60); CFI = 0.991; TLI = 0.984; GFI = 0.981. The χ^2/df ratio revealed an acceptable fit of the model. The RMSEA value also indicated acceptable adjustment of the structure. Finally, in other comparative measures, it was found that the CFI, TLI and GFI indices reached the optimal adjustment parameter (Figure 1). Regarding interpretability, the evaluation levels of EASV-U were estimated by the additive method weighted for the different construct factors. These estimates were made using the ratio between the sum of the different items that constitute the factors, multiplied by their respective factorial weights (factor loading) and the sum of the factor weights assigned. Then, the mean and minimum and maximum values of the EASV-U were estimated. Regarding the definition of the cutoff point to interpret the data resulting from the application of the instrument, the lower limit of the confidence interval (95% CI) was adopted, i.e., the cutoff point of the physical/organizational structure dimension for the values below 1.64 represents the dissatisfied and the values above 1.71 are satisfied. For the process dimension, the lower limit was 1.59 and the upper limit was 1.66. In the logistic structure/input dimension, the lower limit was 1.63 and the upper limit was 1.70 (Table 3). After applying the established cutoff point, the proportions were observed, by category, in relation to satisfaction with the construct measured in each of the three factors. The participants were categorized as satisfied and dissatisfied.

Table 1. Number of respondents and descriptive measures of the items of the Vaccine Room Evaluation Scale according to Users - EASV-U between parents or guardians of users aged under one year of the vaccine rooms in Montes Claros - MG, 2015/2016

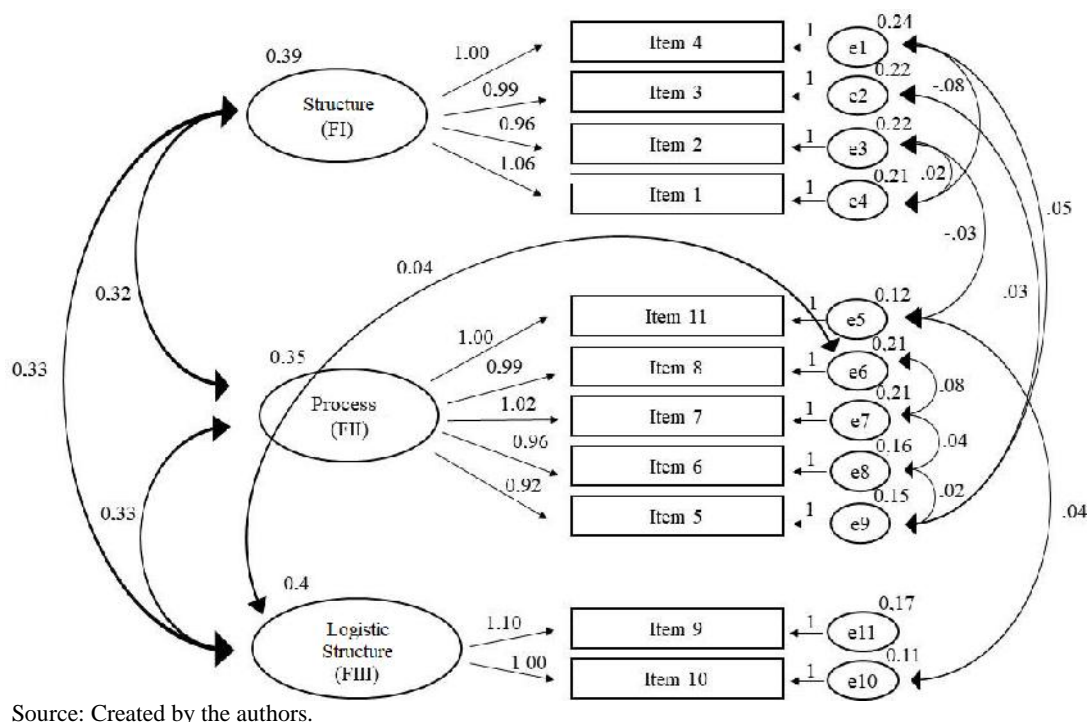
Items	n	Mean	Standard Deviation	Assimetry	Kurtosis
1	1292	4.31	0.79	-1.32	2.04
2	1287	4.32	0.76	-1.19	1.66
3	1293	4.33	0.77	-1.34	2.30
4	1290	4.29	0.79	-1.20	1.56
5	1291	4.39	0.66	-1.08	1.80
6	1290	4.39	0.69	-1.29	2.76
7	1292	4.33	0.75	-1.23	1.97
8	1291	4.33	0.74	-1.37	2.16
9	1291	4.39	0.68	-1.27	2.86
10	1292	4.28	0.80	-1.23	1.68
11	1293	4.37	0.71	-1.29	2.37

Source: Created by the authors.

Table 2. Exploratory factor analysis of the Vaccine Room Evaluation Scale according to Users - EASV-U between parents or guardians for users aged under one year of the vaccine rooms in Montes Claros - MG, 2015/2016. (n = 1300)

Item	Content	Factor I	Factor II	Factor III	Communalities	Cronbach's Alpha	
Satisfaction with the physical/organizational structure (Factor I) Structure						By factor	Global scale
1	Satisfaction with waiting time to get vaccination	0.699	0.315	0.364	0.720	0.876	
2	Satisfaction with accessibility (quality of ramps; doors and or stairs)	0.797	0.172	0.362	0.796		
3	Satisfaction with opening hours	0.761	0.288	0.291	0.747		
4	Satisfaction regarding the physical structure and or the comfort of the vaccine room	0.700	0.499	0.150	0.713		
Professional Satisfaction/Interpersonal Relationship Factor II) Process						0.920	0.949
5	Satisfaction in relation to the courtesy/kindness of the professional who applied the vaccine	0.561	0.679	0.188	0.810		
6	Satisfaction in relation to the perception of the professional's level of preparation to apply the vaccine	0.436	0.728	0.282	0.800		
7	Satisfaction with receiving all necessary information about the vaccine	0.239	0.747	0.462	0.829		
8	Satisfaction regarding the opportunity to clarify doubts about the vaccine applied	0.223	0.649	0.576	0.803		
Satisfaction with logistics structure (Factor III) Inputs						0.867	
9	Confidence level in relation to the services provided	0.361	0.596	0.532	0.768		
10	Satisfaction with assessment of vaccine availability	0.338	0.302	0.805	0.854	0.867	
11	Satisfaction with the availability of materials to apply the vaccine	0.383	0.331	0.762	0.838		
Variance Explained (%)		66.72	7.30	4.86	78.88		

Source: Created by the authors.



Source: Created by the authors.

Figure 1. Factorial structure of the Vaccine Room Evaluation Scale according to Users - EASV-U obtained from confirmatory factor analysis. Montes Claros, MG, Brazil, 2015/2016

Table 3. Descriptive analysis of the 3 factors of the Vaccine Room Evaluation Scale according to Users - EASV-U between parents or guardians of users aged under one year of the vaccination rooms in Montes Claros - MG, 2015/2016

Factor	Mean	SD	Minimum	Maximum	CI (95%)
1 – Physical/organizational structure	1.68	0.66	1	4	1.64 – 1.71
2 – Process	1.62	0.61	1	5	1.59 – 1.66
3 – Logistic structure/inputs	1.67	0.71	1	5	1.63 – 1.70

Source: Created by the authors.

Table 4. Descriptive analysis, regarding the proportion of dissatisfaction considering the 3 factors of the Vaccine Room Evaluation Scale according to Users - EASV-U between parents or guardians of users aged under one year of the vaccination rooms in Montes Claros - MG, 2015/2016

Factor	Satisfaction	
	Satisfied	Dissatisfied
1 – Physical/organizational structure	710(54.8)	586(45.2)
2 – Process	689(53.2)	607(46.8)
3 – Logistic structure/inputs	685(52.9)	611(47.1)

Source: Created by the authors.

Those who presented scores equal to or below this value were considered dissatisfied with the services offered in the vaccination rooms. Those who presented values above this cutoff point were considered satisfied with the construct measured in each of the three factors (Table 4).

DISCUSSION

This study evaluated the evidence of construct validity and reliability of the EASV-U, as well as its interpretability, in a population of parents or guardians of children under one year of age met in the vaccine rooms in Montes Claros - MG. The EASV-U presented adequate construct validity and reliability, thus confirming the applicability of this instrument to assess users' satisfaction with the service offered in the vaccine rooms. Moreover, it was evident that the instrument is easy to interpret, which is why it can be used in analyses in which factors can be evaluated as quantitative and categorical variables, when adopting the proposed cutoff point. Given the originality of this work, thus far, there is no parameter for comparing the data presented. Thus, the data will be discussed with other studies that contemplated the theorized constructs for the scale, as well as with those that built and validated instruments. Thus, the literature is used to reason that "the better and more complete the specification of the construct, the better the guarantee that the instrument will be useful and valid", because every validation test is an opportunity to check whether the instruments used are indeed capable of accurately measuring what they propose (Alexandre & Guirardello, 2002; Alexandre & Coluci, 2011; Coluci *et al.*, 2015).

The importance of elaborating those instruments is highlighted, as, thus far, the literature has a scarcity of in-depth studies in relation to the theme and, when found, are restricted and do not consider the perspective of users in relation to the care received, specifically, in the vaccine rooms. Thus, it is noteworthy the need for tools that allow evaluating vaccination assistance from the user's perspective in a more comprehensive and continuous way, aiming to support the improvement of the quality of those services for the population (Ministry of Health [MH], 2017). The exploratory factor analysis of the instrument submitted to the validation process was considered adequate based on the results found by KMO and Bartlett's tests, with high total explained variance. Thus, the 11 items of the scale were grouped into three factors, which explained 78.88% of users' satisfaction with the vaccine room. With this, the construct validation procedure resulted in the maintenance of the initial version of the EASV-U, with no exclusion of any item from the instrument. In this study, not only statistical parameters were considered, but also the principle that factors should be understandable, theoretically justifiable and consistent with the reality of everyday life. Furthermore, the scale presented short-time practical applicability, considering the size of the study population, being factors that should

be considered when developing an instrument aimed at users of the health service (Polidoro *et al.*, 2014). Thus, through the EASV-U EFA, from the arrangement of the items that combined important statistical results, it was identified their grouping in three factors considered determinant for user satisfaction in relation to the assistance offered by the vaccine room, being associated with: physical and organizational structure, work process (user/professional relationship) and logistic structure/inputs of vaccine rooms. In the factor I analysis, studies describe that access to health services encompasses difficulties and resistances that may be associated with factors such as distance, geographic barriers, transportation, waiting time, available times. These factors represent geographical, economic, cultural and functional accessibility. Thus, the strategies adopted for the evaluation of health and vaccination services should value the way demand, offer, access, use and equity are organized, because the evaluation of the vaccination service is a complex activity that requires the understanding of all factors that interfere in the final result and prevent the effectiveness of this action (Matos, Pires & Sousa, 2010).

The conditions of the physical area of the vaccine room must meet and comply with the standards provided by the PNI, in order to ensure the quality of immunobiologicals since their manufacture, proper conservation and application. In addition, it is also important to warn that the environment for the manipulation and administration of immunobiologicals must strictly follow conservation and cleaning standards, to ensure the maximum safety of its users (MS, 2017). The researched literature confirms that the structure and organization of the functioning of the vaccine room are considered key factors for the success of the immunization service, as its success requires achieving the PNI's recommended goal of promoting safe vaccination to 100% of children under one year of age, with guaranteed vaccination for all children under five years of age, also aiming at 100% for those who have not been vaccinated or who have not completed the basic schedule in the first year of life. Thus, the objective of ensuring immunization with consequent improvement in health quality, as well as the reduction of costs related to the treatment of immunopreventable diseases, shall be achieved. This fact will only be possible if the managers of the services and vaccination rooms adopt actions of standardization, supervision and elaboration of policies and strategies that enable better access and structure for the population to the health service, including the immunization service (Arakawa *et al.*, 2011). Factor II draws attention, since the items of this dimension are those that cover the conduct of the professional that involves competence/technical quality, communication capacity/user-professional interaction, professional-user relationship, characteristics of the professionals who provide the service, personality, and it can be affirmed that these items are inter-related and extremely important to evaluate user satisfaction in relation to the professional of the vaccination room. At this moment, the user/vaccinator interaction occurs, which requires and involves other attributes such as: respect,

consideration, listening, understanding, embracement and kindness from the team professionals. Thus, these findings suggest that the satisfaction of users of the vaccine room is directly associated with the care offered by the professionals of this service. Studies describe that it is common, in vaccination rooms, to have standardizations that guide the work, in which the professional must keep a critical and reflective look at the vaccine gesture and the factors that interfere with the efficiency and effectiveness of this action, besides ensuring that, in the daily routine of the vaccination room, the team's work cover actions before, during and after the application of vaccines. It is also noteworthy the fact that the professional is always seeking training/updating to achieve quality and user satisfaction (Dietz, 1998; Domingues & Teixeira, 2013; MS, 2017).

This is common in immunization services, because the choice of the room to vaccinate the child usually happens well before the child is born, when the woman, still in pregnancy, seeks that room to immunize herself and, from there, creates a bond of trust so that she can take her child to vaccinate also in that same room. It is evident that the structure, operation and bond created make the service received there safe and reliable and, therefore, she seeks or indicates it to relatives or friends, claiming that the structure and operation of the vaccination service and the care provided by the team have impacted on the decision of the population to use that vaccination room (Santos, 1995; Weiss, 1988). When searching for other studies that also used factor analysis, the correlation power between satisfaction and the variables related to users and the service, 90% to 95% of the variations in satisfaction result from variables related to patients and only 5% to 10% to services and their providers. Therefore, when constructing a measurement instrument to assess satisfaction, it is necessary to have items/variables that relate the user/professional relationship, even if it has a lower representativeness (Santos, 1995; Weiss, 1988). The third and final factor demonstrates the user's satisfaction with the vaccine room, related to the logistic structure, mainly in relation to the availability/existence of the necessary inputs (immunobiological and material). A recent study mentions that one of the barriers to achieving vaccination coverage is related to problems in accessing and obtaining high-quality immunization services, which occur mainly due to the lack of immunobiological, which is a factor that negatively affects the user's evaluation. Furthermore, the study recommended including the adequate provision of vaccines to avoid failures in care provision (Barrera *et al.*, 2014).

The reliability of the factors generated according to the criterion of homogeneity was evaluated, as performed in some factor analysis studies (Selnes & Gønhaug, 2000). The analysis showed high internal consistency of the global scale, with Cronbach's alpha equal to 0.949. For each factor, Factor I obtained 0.876; Factor II, 0.920 and Factor III, 0.867, which explains the homogeneity of the items that make up the scale and their ability to measure without errors. By observing the reliability of the results obtained, it is possible to give greater relevance and robustness to the researches (Keszei, Novak & Streiner, 2010) that will use the EASV-U. Regarding interpretability, some studies, with the same purpose of testing the psychometric qualities of research instruments, did not present ways of interpreting the results obtained with their application (Figueiredo-Filho & Silva-Junior, 2010; Reichenheim & Moraes, 2007). Thus, besides being valid and consistent, the EASV-U proved to be interpretable and easy to apply, which allowed collecting answers from a large number of people interviewed. A limitation of the study consists of the defined population, which was restricted to parents or guardians of children aged under one year. However, these people are frequent users of the vaccine rooms, which allows answers consistent with the reality lived by them, besides covering the various sociodemographic profiles. Moreover, the sample planning exceeded the recommendations of the literature, ensuring more robustness and validity to the study, providing greater variability of the analyzed data. Another important consideration concerns the time elapsed between the collection and analysis of the research data. In this sense, it is worth mentioning that the collection occurred in all 18 vaccine rooms of the municipality, according to the proportionality of the number of vaccines applied in

each one, which allowed covering the study population in a representative way, according to the use/attendance of the service. From this perspective, it can also be observed that the number of vaccine rooms in the municipality remained unchanged until the past semester, when only one more vaccine room was implanted. Therefore, the scenario of the services offered in the vaccine rooms probably has undergone little change. Construct analyses showed good psychometric properties in terms of reliability and validity. It is important to highlight that the validation of an instrument cannot be limited to a single study (Polidoro *et al.*, 2014). The scale presented a good performance and evidences its psychometric quality, since it presents satisfactory characteristics regarding construct validity and internal consistency. Moreover, the interpretation of the results obtained through the EASV-U is easy. Its items included questions that considered the user's own perceived satisfaction with the services offered by the vaccine room. When submitted to the EFA, it showed that user satisfaction is related to the physical and organizational structure, the team's work process and the logistic structure/availability of the necessary inputs. The CFA legitimized the tri-factorial model estimated through the EFA, which demonstrated quality of local adjustment. The EASV-U presented adequate qualities for a measurement instrument regarding the methodology adopted to evaluate its psychometric properties. The results obtained indicate that it can be used to assess user satisfaction of vaccine room services. Furthermore, since it is a new instrument, it can be used as a source to build and monitor health indicators and to guide priority actions in decision-making by the public management of care services, based on the user's evaluation, as well as in future studies with the theme addressed.

REFERENCES

- Alexandre NMC, Coluci MZO (2011). Validade de conteúdo nos processos de construção e adaptação de instrumentos de medidas. *Ciência & Saúde Coletiva*, 16, 3061-3068. Available online at <https://www.scielo.org/article/csc/2011.v16n7/3061-3068/>
- Alexandre NMC, Guirardello EDB (2002). Adaptação cultural de instrumentos utilizados em saúde ocupacional. *Jornal Panamericano de Saúde Pública*, 11, 109-111.
- Alfradique ME, Bonolo PDF, Dourado I, Lima-Costa MF, Macinko J, Mendonça CS, Turci MA (2009). Interações por condições sensíveis à atenção primária: a construção da lista brasileira como ferramenta para medir o desempenho do sistema de saúde (Projeto ICSAP-Brasil). *Cadernos de Saúde Pública*, 25, 1337-1349. Available online at <https://www.scielo.org/article/csp/2009.v25n6/1337-1349/pt/>
- Arakawa T, Arcêncio RA, Scatolin BE, Scatena LM, Ruffino-Netto A, Villa TCS (2011). Acessibilidade ao tratamento de tuberculose: avaliação de desempenho de serviços de saúde. *Rev Latino-Am Enfermagem*, 19(4), 1-9.
- Barrera L, Trumbo SP, Bravo-Alcántara P, Velandia-González M, Danovaro-Holliday MC (2014). From the parents' perspective: a user-satisfaction survey of immunization services in Guatemala. *BMC public health*, 14(1), 231. Available online at <https://link.springer.com/article/10.1186/1471-2458-14-231>
- Bentler PM, Bonett DG (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological bulletin*, 88(3), 588. Available online at <https://psycnet.apa.org/record/1981-06898-001>
- Brandão ALDRBDS, Giovannella L, Campos CEA (2013). Avaliação da atenção básica pela perspectiva dos usuários: adaptação do instrumento EUROPEP para grandes centros urbanos brasileiros. *Ciência & Saúde Coletiva*, 18, 103-114. Available online at <https://www.scielo.org/article/csc/2013.v18n1/103-114/pt/>
- Burt S, Hattingh L, Czarniak P (2018). Avaliação da satisfação e experiência do paciente para serviços de vacinação administrados por farmacêuticos na Austrália Ocidental. *Jornal Internacional de Farmacologia Clínica*.

- Coluci MZO, Alexandre NMC, Milani D (2015). Construção de instrumentos de medida na área da saúde. *Ciência & Saúde Coletiva*, 20, 925-936. Available online at <https://www.scielo.org/article/csc/2015.v20n3/925-936/pt/>
- Dietz WH (1998). Health consequences of obesity in youth: childhood predictors of adult disease. *Pediatrics*, 101, 518-525. Available online at https://pediatrics.aappublications.org/content/101/Supplement_2/518.short
- Dini AP, dos Santos Alves DF, Oliveira HC, de Brito Guirardello E (2014). Validade e confiabilidade de um instrumento de classificação de pacientes pediátricos. *Revista Latino-Americana de Enfermagem*, 22(4), 598-603. Available online at <https://www.revistas.usp.br/rlae/article/view/86670>
- Domingues CMAS, Teixeira AMDS (2013). Coberturas vacinais e doenças imunopreveníveis no Brasil no período 1982-2012: avanços e desafios do Programa Nacional de Imunizações. *Epidemiologia e Serviços de Saúde*, 22(1), 9-27. Available online at http://scielo.iec.gov.br/scielo.php?pid=S1679-49742013000100002&script=sci_arttext
- Donabedian A (1983). Quality assessment and monitoring: retrospect and prospect. *Evaluation & the health professions*, 6(3), 363-375. Available online at <https://journals.sagepub.com/doi/abs/10.1177/016327878300600309>
- Esperidião M, Trad LAB (2005). Avaliação de satisfação de usuários. *Ciência & Saúde Coletiva*, 10, 303-312. Available online at <https://www.scielo.org/article/csc/2005.v10suppl0/303-312/>
- Ferreira PL, Raposo V (2006). A governação em saúde e a utilização de indicadores de satisfação. *Revista Portuguesa de Medicina Geral e Familiar*, 22(3), 285-96. Available online at <https://rpmgf.pt/ojs/index.php/rpmgf/article/view/10243>
- Field A (2009). *Descobrimos a Estatística Usando o SPSS-5*. Penso Editora.
- Figueiredo Filho DB, Silva Júnior JAD (2010). Visão além do alcance: uma introdução à análise fatorial. *Opinião pública*, 16(1), 160-185. Available online at https://www.scielo.br/scielo.php?pid=S0104-62762010000100007&script=sci_arttext
- Hannings AN (2019). Percepções do paciente sobre o farmacêutico estudantil e executar celular em fl clínicas de vacinação contra a gripe. *American Journal of Pharmaceutical Education*. 59, 228-231.
- Institute of Medicine (2001). *Committee on quality of health care in America. Crossing the quality chasm: a new health system for the 21st century*. National Academy press: Washington.
- Instituto Brasileiro de Geografia e Estatística (2010). *Montes Claros – IBGE Cidades*. Available online at <https://cidades.ibge.gov.br/brasil/mg/montes-claros/panorama>
- Keszei AP, Novak M, Streiner DL (2010). Introduction to health measurement scales. *Journal of psychosomatic research*, 68(4), 319-323. Available online at <https://www.sciencedirect.com/science/article/abs/pii/S0022399910000115>
- Marôco J (2010). *Análise de equações estruturais: Fundamentos teóricos, software & aplicações*. ReportNumber, Lda.
- Martins AMEDBL, Ferreira RC, Santos Neto PED, Carreiro DL, Souza JGS, Ferreira EF (2015). Insatisfação dos usuários com a assistência odontológica: estudo domiciliar populacional. *Revista de Saúde Pública*, 49, 51. Available online at <https://www.scielo.org/article/rsp/2015.v49/51/pt/>
- Martins AMEDBL, Muniz AB, Silveira MF, Carreiro DL, Souza JGS, Ferreira EF (2016). Avaliação da assistência oftalmológica na perspectiva dos usuários. *Revista Brasileira de Epidemiologia*, 19, 390-402. Available online at <https://www.scielo.org/article/rbepid/2016.v19n2/390-402/pt/>
- Matos E, Pires DEPD, Sousa GWD (2010). Relações de trabalho em equipes interdisciplinares: contribuições para novas formas de organização do trabalho em saúde. *Revista brasileira de enfermagem*, 63(5), 775-781. Available online at https://www.scielo.br/scielo.php?pid=S0034-71672010000500013&script=sci_arttext
- Ministério da Saúde (2017). *Manual de rede de frio do Programa Nacional de Imunizações*. Brasília-DF: Ministério da Saúde.
- Pilati R, Laros JA (2007). Modelos de equações estruturais em psicologia: conceitos e aplicações. *Psicologia: teoria e pesquisa*, 23(2), 205-216. Available online at https://www.scielo.br/scielo.php?pid=S0102-37722007000200011&script=sci_arttext&tlng=pt
- Pires VA, Silva SDAM, Fonseca SA, Vendramini P, Coelho FDS (2014). Dossiê campo de públicas no Brasil: definição, movimento constitutivo e desafios atuais. *Administração Pública e Gestão Social*, 109-167. Available online at <https://repositorio.unesp.br/handle/11449/124598>
- Reichenheim ME, Moraes CL (2007). Operacionalização de adaptação transcultural de instrumentos de aferição usados em epidemiologia. *Revista de Saúde Pública*, 41(4), 665-673. Available online at https://www.scielo.br/scielo.php?pid=S0034-89102007000400024&script=sci_arttext
- Revelle W, Zinbarg RE (2009). Coefficients alpha, beta, omega, and the glb: Comments on Sijtsma. *Psychometrika*, 74(1), 145. Available online at <https://link.springer.com/article/10.1007/s11336-008-9102-z>
- Rodrigues CAQ, Silva PLV, Caldeira AP, Pordeus IA, Ferreira RC, Martins AMEDBL (2012). Fatores associados à satisfação com serviços odontológicos entre idosos. *Revista de Saúde Pública*, 46(6), 1039-1050. Available online at https://www.scielo.br/scielo.php?pid=S0034-891020130005000008&script=sci_abstract&tlng=es
- Santos MP (1995). Avaliação da qualidade dos serviços públicos de atenção à saúde da criança sob a ótica do usuário. *Revista Brasileira de Enfermagem*. 48(2), 109-119.
- Selnes F, Gønhaug K (2000). Effects of supplier reliability and benevolence in business marketing. *Journal of Business Research*, 49(3), 259-271. Available online at <https://www.sciencedirect.com/science/article/abs/pii/S014829639900017X>
- Siqueira LDG, Martins AMEDBL, Versiani CMC, Almeida LAV, Oliveira CDS, Nascimento JE, Bezerra RC (2017). Avaliação da organização e funcionamento das salas de vacina na Atenção Primária à Saúde em Montes Claros, Minas Gerais, 2015. *Epidemiologia e Serviços de Saúde*, 26, 557-568. Available online at <https://www.scielo.org/article/ress/2017.v26n3/557-568/pt/>
- Siqueira LDG, Versiani CMC, Carvalho PDD, Ferreira RC, Martins AMEDBL (2018). Instrumento para avaliação da assistência quanto à vacinação na perspectiva do usuário. *Saúde em Debate*, 42, 916-926. Available online at <https://www.scielo.org/article/sdeb/2018.v42n119/916-926/>
- Sistema de Informações sobre Nascidos Vivos (2013). *Nascidos Vivos – Minas Gerais. Nascimento p/resid.mãe segundo município de Montes Claros*.
- Souza JGS, Oliveira BEC, Lima CV, Sampaio AA, Noronha MDS, Oliveira RF, Martins AMEDBL (2019). Insatisfação com os serviços odontológicos entre idosos brasileiros dentados e edentados: análise multinível. *Ciência & Saúde Coletiva*, 24, 147-158. Available online at <https://www.scielo.org/article/csc/2019.v24n1/147-158/>
- Vuori H (1987). Patient satisfaction--an attribute or indicator of the quality of care?. *QRB. Quality review bulletin*, 13(3), 106-108. Available online at <https://europepmc.org/article/med/3106873>
- Weiss GL (1988). Patient satisfaction with primary medical care. Evaluation of sociodemographic and predispositional factors. *Medical care*, 26(4), 383-392. Available online at <https://europepmc.org/article/med/3352331>