## Title:

## Defining **quality categories for evaluation of the doctor-patient relationship**assessed through the patient-doctor relationship questionnaire (PDRQ-9).

## Running head:

## **Quality categories for evaluation of the doctor-patient relationship.**

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## ****Key messages:****

A strong doctor-patient relationship is crucial to delivering quality healthcare.

The PDRQ-9 is widely used to assess the quality of doctor-patient relationship.

Whether actionable quality categories defined from the PDRQ-9 score could be used to guide feedback and improve patient care is a relevant topic for research.

**ABSTRACT**

**Background**

The quality of the doctor-patient relationship plays a crucial role in patients' experiences with healthcare services, positively influencing clinical outcomes and satisfaction with care. The Patient-Doctor Relationship Questionnaire (PDRQ-9) is widely used to assess this relationship. However, there are no quality categories that can be derived from the instrument's score to facilitate understanding and decision-making.

**Objective**

This study aims to establish categories of the quality of the relationship based on the PDRQ-9 score.

**Methods**

A latent class analysis was conducted using interviews with 6,160 users of Primary Health Care Units throughout Brazil to define different homogeneous response profiles. The Youden index was used to determine the cut point between classes.

**Results**

Latent class analysis identified the presence of two response profiles, one associated with a high evaluation of the quality of the doctor-patient relationship and another associated with a moderate evaluation. The cut point between classes, established through the Youden index, was 3.5 (on a possible score range of 1 to 5) or 31 (on a possible score range of 9 to 45). The cut point demonstrated high accuracy (0.94), sensitivity (0.96), and specificity (0.98).

**Conclusions**

The categorization proposed in this study enhances the interpretability of PDRQ-9 results, providing a practical framework for assessing the quality of the doctor-patient relationship. By establishing actionable quality categories, this tool could support targeted interventions, such as performance feedback and training, aimed at fostering empathy, communication, and trust in healthcare settings.

**KEYWORDS**

Physician-Patient Relations; Psychometrics; Quality Indicators, Health Care; Process Assessment, Health Care.

**BACKGROUND**

**The doctor-patient relationship is one of the main elements responsible for the patient's experience in healthcare services. It manifests itself through attributes such as good communication, empathy, trust, and longitudinality1,2**. **A good doctor-patient relationship is associated with a variety of positive effects. Better outcomes in the care of chronic diseases and better self-care can be observed3,4. In addition to better outcomes, patients are also more satisfied with the treatment they receive5. Behind this is the greater adherence to treatments and medical recommendations, catalyzed by a good relationship6.**

**As a result, the doctor-patient relationship is placed as a central component in established quality paradigms. Whether in a macro perspective of healthcare systems, such as the Quadruple Aim, influencing the experience of care, or in the micro management of care, such as the patient-centered clinical method, where it is the catalyst for quality. In the context of Primary Health Care (PHC), it is the relationship of mutual trust that is established over time7–9.**

**In order to assess the quality of the doctor-patient relationship, psychometric instruments have been commonly used, with particular emphasis on the patient-doctor relationship questionnaire (PDRQ-9), given its practicality and good psychometric parameters1**. **The PDRQ-9 is an instrument that assesses the doctor-patient relationship from the patient's perspective, focusing on the perception of the physician's helping attitude and empathy10. The items of the instrument are statements related to the presence of attributes of the doctor-patient relationship (help, time, trust, understanding, dedication, agreement, availability, contentment, and accessibility), on which the patient must express their agreement on a five-point Likert scale. The overall score of the instrument can be calculated in two ways: through the arithmetic mean of the 9 items, in which case it can vary from 1 to 511,12, or through the sum of the 9 items, with a possible range of 9 to 4510,13. The PDRQ-9 has already been validated in several contexts and countries, but to date, categories of quality of the patient-doctor relationship based on the instrument's score have not been defined.**

**Countries such as Brazil and Switzerland plan to use the PDRQ-9 as an instrument to assess the quality of PHC, including for performance-based payment purposes14,15.** The PDRQ-9 was also used by the Brazilian Census Bureau (IBGE) in a national household survey aimed at evaluating the quality of primary care in child health16. **It is necessary that the results be presented in a way that is easily understood by professionals, patients, and managers, helping in decision-making that can trigger processes to improve the quality of care17. The proposal of a cut point, differentiating the PDRQ-9 score into quality categories, can help in the communication and use of the results of the instrument18.** These categories can help identify areas needing improvement, such as clinical communication or empathy, aiding in decision-making and providing actionable insights for enhancing care. By using thresholds, the PDRQ-9 score becomes a practical tool for both clinical assessments and organizational planning.

**The objective of this study is to establish a categorical reference for the quality of the patient-physician relationship based on the PDRQ-9 score.**

**METHODS**

***Design and sample****.* This study is nested within a national cross-sectional study conducted to assess the quality of care provided by the Brazilian Primary Health Care (PHC) system, focusing on physicians with different profiles working in the Mais Médicos (More Doctors) Program (PMM), a federal initiative aimed at supplying professionals to underserved areas. The three physician groups included Cuban doctors and Brazilian doctors affiliated with the PMM, as well as Brazilian doctors not affiliated with the program19. In each region of the country, municipalities were selected with probability proportional to the number of PHC units with the Family Health Strategy (FHS), **the federal strategy that funds PHC**. The units were selected in each municipality using a systematic sampling methodology, being stratified by the number of FHS teams. The data for sample selection were obtained through a list of all physicians working in the FHS in Brazil provided by the Ministry of Health.

In each selected PHC unit, adult users were interviewed in loco, through consecutive selection after medical consultation. The questionnaires were applied in the PHC units, through an electronic tool (tablet), by trained interviewers. These users answered the PDRQ-9 questionnaire, the short version of the Primary Care Assessment Instrument Tool (PCAT) and structured questions about sociodemographic variables, morbidity, and quality of care received. The PCAT is a questionnaire used to assess the quality of primary care services from the patient's perspective, focusing on essential aspects such as accessibility, continuity, comprehensivenessand coordination of care20. Data collection took place between July and November 2016.

Participants received the following instructions when answering the PDRQ-9: 'I will read nine statements that a person can make about their doctor. Please choose the appropriateness of each statement for your doctor.' The meaning of the numbers is as follows: 1 - not at all appropriate, 2 - somewhat appropriate, 3 - appropriate, 4 - mostly appropriate, 5 - totally appropriate.

The sample size calculation of the original study predicted 6,193 patients in 516 clusters (physicians), to identify meaningful a difference of 0.3 points between the PCAT scores between the groups, with a standard deviation of 1.7, design effect (DEFF) 3.4 and 20% losses, considering power 80% and significance 5%. The total number of patients was equally distributed among the three groups of physicians, with 12 patients needing to be interviewed for each doctor in order for the cluster to be considered valid.

To be included, the patient had to be over 18 years old, have consulted with the selected physician on the same day and at least once before the interview, and be able to answer the questionnaire.

***Statistical analysis****.* To identify homogeneous response classes from the nine items that make up the PDRQ-9, latent class analysis (LCA) was used. This methodology consists of a collection of models that relate a set of observable qualitative variables (PDRQ-9 items) to a latent categorical variable, with the purpose of capturing non-observable homogeneous subpopulations (the classes). The differences and similarities between individuals according to their response pattern on the items are considered in the discovery of latent classes21,22**.**

The model fit was assessed against the AIC (Akaike Information Criterion), BIC (Bayesian Information Criterion) and χ2 (Chi-square goodness of fit) measures. Lower values for such statistics suggest better-fitting models. The degree of class separation was assessed by the mean of the posterior probabilities of each latent class, and values equal to or greater than 0.7 suggest that the classes are well separated. Regarding the homogeneity of each class, the probability of response to the k-th response category to the item (K varies from '1 - not at all appropriate to '5 - totally appropriate'), of the m-th item of the PDRQ-9 (m = 1, 2, .., 9), conditioned to the latent class c, namely class 1 and class 2, in this study. Values of the conditional probability greater than 0.7 or less than 0.3 suggest high homogeneity21-23**.**

To suggest a cut point in the score typically produced by the arithmetic mean of the responses to the PDRQ-9 items, the classification of individuals resulting from the application of the latent class model was considered as the reference standard. Under this assumption, the Youden index was used to obtain the cut point value in the PDRQ-9 score. This index aims to maximize the appropriate classification of individuals and is illustrated by a value from 0 to 1. The highest values (close to 1) of the index show better test performance and, conversely, values of the index close to zero suggest poor performance24,25**.**

The description of the sample studied was performed by the distribution of absolute frequency and absolute percentage frequency. All analyzes were performed using the R program version 4.3.1, using the poLCA package for latent class analysis and the cutpointr package for the Youden index.

**RESULTS**

A total of 6,160 users were interviewed. As shown in Table 1, the majority of individuals were women, with self-declared non-white skin color and over 45 years of age. Two-thirds of the participants had at least one of the chronic comorbidities investigated (hypertension, diabetes mellitus, asthma or chronic obstructive pulmonary disease, depression, obesity, and smoking).

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| **Table 1. Distribution of participant characteristics. Brazil – 2016.**  |
| **Characteristics** |  n |  % |
| n=6,160 |
| **Region** | North | 722 | 12% |
|  | Northeast | 2,194 | 36% |
|  | Southeast | 1,826 | 30% |
|  | South | 1,043 | 17% |
|  | Midwest | 375 | 6% |
| **Municipal Typology** | Urban | 4,279 | 70% |
|  | Rural  | 1,226 | 20% |
|   | **Intermediate** | 655 | 11% |
| Sex of the patient | Female | 4,667 | 76% |
|  | Male | 1,493 | 24% |
| Color or race of the patient | White | 2,055 | 33% |
|  | Black | 671 | 11% |
|  | Yellow | 128 | 2% |
|  | Brown | 3,260 | 53% |
|   | Indigenous | 46 | 1% |
| Age range of the patient | 18 to 29 | 1,184 | 19% |
|  | 30 to 44 | 1,501 | 24% |
|  | 45 to 59 | 1,731 | 28% |
|   | 60 or older | 1,742 | 28% |
| The patient lives with a spouse or partner | Yes | 4,148 | 67% |
|  | No | 2,012 | 33% |
| Education (in years) of the patient | Up to 5 | 2,927 | 48% |
|  | 6 to 9 | 1,226 | 20% |
|   | 10 or more | 2,007 | 33% |
| Socio-economic status\* | A, B e C | 3,528 | 57% |
|   | D e E | 2,632 | 43% |
| Employment status of the patient | Working | 2,156 | 35% |
|  | Retired/Welfare benefit | 1,773 | 29% |
|  | Not working | 2,231 | 36% |
| Number of comorbidities of the patient\* | 0 | 1,888 | 31% |
|  | 1 | 1,963 | 32% |
|   | 2 or more | 2,309 | 38% |
| Number of appointments in the last 12 months at the PHC unit | Up to 3 | 2,514 | 41% |
|   | More than 3 | 3,637 | 59% |
| PHC score (PCAT) | Low score | 2,626 | 43% |
|   | High score | 3,514 | 57% |
| \* Classes as defined by the Brazilian Institute for Geography and Statistics: A, upper class (elite); B, upper middle class; C, lower middle class; D, working class; and E, poor and unemployed.\*\*Diabetes, hypertension, respiratory diseases (asthma/COPD), depression, obesity, or smoking.PHC: primary health care; PCAT: Primary Care Assessment Tool – short version. |

The distribution of responses of participants in each item of the PDRQ-9 shows a concentration in the intermediate score, with more than half of the responses grouped in the intermediate values for all items (Table 2). The mean score of the study population was 3.31 (SD 0.02).

Latent class analysis identified two categories, the first with the highest probability of responses with high PDRQ-9 scores and the second with the highest probability of responses with the intermediate score (Table 3).

The model had an AIC of 109061.6, a BIC of 109552.6, and a χ2 of 42569039454. The a posteriori probability mean of the first latent class was 0.32, while that of the second latent class was 0.68.

The cut point to separate the two classes was set at 3.5, considering a general score calculated as the arithmetic mean of the items. For a general score calculated as the sum of the items, with a possible range from 9 to 45, the point was set at 31 (Table 4). These values are statistically equivalent and have a Youden index of 0.94, with a sensitivity of 0.96 and a specificity of 0.98. The ROC curve can be seen in Figure 1.

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| **Table 2.** Distribution of participants' responses on each item of the PDRQ-9. **Brazil – 2016.** |
| Items | Response categories |
| 1Not at all appropriate | 2Somewhat appropriate | 3Appropriate | 4Mostly appropriate | 5Totally appropriate |
| n | % | n | % | n | % | n | % | n | % |
| 1. My PCP helps me | 208 | 3,38% | 497 | 8,07% | 3627 | 58,88% | 849 | 13,78% | 979 | 15,89% |
| 2. My PCP has enough time for me | 601 | 9,76% | 760 | 12,34% | 3132 | 50,84% | 810 | 13,15% | 857 | 13,91% |
| 3. I trust my PCP | 190 | 3,08% | 436 | 7,08% | 3341 | 54,24% | 1046 | 16,98% | 1147 | 18,62% |
| 4. My PCP understands me | 178 | 2,89% | 426 | 6,92% | 3552 | 57,66% | 905 | 14,69% | 1099 | 17,84% |
| 5. My PCP is dedicated to help me | 237 | 3,85% | 472 | 7,66% | 3476 | 56,43% | 891 | 14,46% | 1084 | 17,60% |
| 6. My PCP and I agree on the nature of my medical symptoms | 261 | 4,24% | 459 | 7,45% | 3689 | 59,89% | 766 | 12,44% | 985 | 15,99% |
| 7. I can talk to my PCP | 168 | 2,73% | 357 | 5,80% | 3666 | 59,51% | 845 | 13,72% | 1124 | 18,25% |
| 8. I feel content with my PCP’s treatment | 155 | 2,52% | 360 | 5,84% | 3343 | 54,27% | 1014 | 16,46% | 1288 | 20,91% |
| 9. I ﬁnd my PCP easily accessible | 519 | 8,43% | 740 | 12,01% | 3240 | 52,60% | 716 | 11,62% | 945 | 15,34% |

PCP: Primary Care Practitioner

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| **Table 3.** Estimates of conditional probabilities (given the class) of response to each item of the PDRQ-9\*. **Brazil – 2016.** |
| Items | Latent class | Response categories |
| 1Not at all appropriate | 2Somewhat appropriate | 3Appropriate | 4Mostly appropriate | 5Totally appropriate |
| 1. My PCP helps me | 1 | 0,0031 | 0,0240 | 0,2435 | **0,3136** | **0,4158** |
|  | 2 | 0,0486 | 0,1080 | **0,7554** | 0,0530 | 0,0350 |
| 2. My PCP has enough time for me | 1 | 0,0222 | 0,0600 | 0,2042 | **0,3135** | **0,4000** |
|  | 2 | 0,1339 | 0,1539 | **0,6552** | 0,0437 | 0,0133 |
| 3. I trust my PCP | 1 | 0,0019 | 0,0123 | 0,1075 | **0,3559** | **0,5223** |
|  | 2 | 0,0448 | 0,0990 | **0,7522** | 0,0800 | 0,0240 |
| 4. My PCP understands me | 1 | 0,0010 | 0,0131 | 0,1001 | **0,3676** | **0,5182** |
|  | 2 | 0,0423 | 0,0962 | **0,8066** | 0,0404 | 0,0145 |
| 5. My PCP is dedicated to help me | 1 | 0,0022 | 0,0170 | 0,1055 | **0,3663** | **0,5090** |
|  | 2 | 0,0560 | 0,1054 | **0,7856** | 0,0377 | 0,0153 |
| 6. My PCP and I agree on the nature of my medical symptoms | 1 | 0,0064 | 0,0245 | 0,1693 | **0,3287** | **0,4710** |
|  | 2 | 0,0597 | 0,0986 | **0,8061** | 0,0257 | 0,0098 |
| 7. I can talk to my PCP | 1 | 0,0010 | 0,0160 | 0,1142 | **0,3349** | **0,5339** |
|  | 2 | 0,0399 | 0,0782 | **0,8272** | 0,0418 | 0,0129 |
| 8. I feel content with my PCP’s treatment | 1 | 0,0000 | 0,0055 | 0,0725 | **0,3447** | **0,5774** |
|  | 2 | 0,0373 | 0,0840 | **0,7696** | 0,0777 | 0,0314 |
| 9. I ﬁnd my PCP easily accessible | 1 | 0,0284 | 0,0618 | 0,1700 | **0,2937** | **0,4461** |
|   | 2 | 0,1112 | 0,1483 | **0,6977** | 0,0306 | 0,0122 |
| \*Bold Highlight: Higher probabilities in each latent class.PCP: Primary Care Practitioner |  |  |  |  |  |



**Figure 1.** ROC Curve of the Youden Index for the cut point assignment of PDRQ-9.

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| **Table 4.** Cut points found for the different ranges of the overall score used in the application of the PDRQ-9. |
| **Range** | Cut point for a high-quality doctor-patient relationship |
| **1 a 5** | **≥ 3.5** |
| **9 a 45** |  **≥ 31** |

**DISCUSSION**

**Latent class analysis of PDRQ-9 in the Brazilian adult population, users of the primary care in the public system, identified two categories, one related to a high evaluation of the quality of the doctor-patient relationship and another related to a moderate evaluation. The cut point for separation between these classes in the PDRQ-9 score, established through the Youden index, was 3.5, for the overall score calculated by arithmetic mean, or 31, for the overall score calculated by summing the items.**

**The evaluation of the quality of the doctor-patient relationship made by measurement instruments typically receives high scores. In PDRQ-9 uses, it is frequent that the mean of the scores is above 4.010,26,27. In Brazil, the use of PDRQ-9 presented a moderate mean score, which helped in the separation of different latent classes. However, as in other studies, a homogeneous category that presents low instrument scores cannot be observed12,13,28.**

**The difficulty in identifying a poor doctor-patient relationship may be related to the inability of instruments to discriminate this group. Common response biases to this type of evaluation, such as the tendency to rate health services well, should also be considered. The way the questions are designed can influence the responses in a way that induces positive evaluations29. Patients may be afraid to rate the service or professionals poorly and be retaliated for their responses30. It is also possible that a "survival bias" exists in research where data collection is conducted in health services, since only patients who have already received care will be included. In relation to the present study, the items and the score of the PDRQ-9 were created following the best practices of the field31 and there was a guarantee of confidentiality of the responses, which minimizes the biases described. True proficiency of professionals in the ability to relate also needs to be considered.**

**This study proposes to present categories of quality of the doctor-patient relationship based on the PDRQ-9 score, to be considered in the applications of the instrument from now on. However, it is important to consider that it was developed from a sample of patients using the Brazilian public primary care, consulting mainly with family physicians or generalists. Different populations, in different contexts, as well as using different methodologies for assigning the cut point, may reach different results, something inherent in this kind of result32. It is also important to consider the criticisms made of the establishment of cut points in continuous scales and the eventual loss of information and precision that may result from this choice33.**

**New studies can be dedicated precisely to evaluating the occurrence of differences in the use of the categorical or continuous score of the PDRQ-9. In addition, new studies can use the categorization of the score to identify characteristics of doctors, patients, and health services, as well as clinical outcomes, that are associated with different quality categories of the PDRQ-9 in different contexts. Another interesting study topic is to find ways to identify the low-quality doctor-patient relationship, something that measurement instruments in this domain have had difficulty in capturing.**

In summary, the categorization of PDRQ-9 scores proposed in this study offers a valuable framework for evaluating the quality of the doctor-patient relationship in primary healthcare settings. By establishing actionable quality categories, this approach enhances the interpretability of patient feedback and aids in identifying key areas for improvement. As the demand for patient-centered care grows, tools like the PDRQ-9 can become instrumental in guiding healthcare teams and managers toward interventions that foster empathy, effective communication, and trust.

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**Conflict of interest**

None declared.

**Ethical approval and consent to participate**

This project was submitted and approved by the Research Ethics Committee of the Hospital de Clínicas de Porto Alegre, CAAE 48653615.6.0000.5327.The Free and Informed Consent Term was signed by all interviewees.

**Data availability**

The data underlying this article will be shared on reasonable request to the corresponding author.

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