saúde EM DEBATE

ORIGINAL ARTICLE

A comparison standard for assessing the adapted version of the Brazilian Functionality Index

Um padrão de comparação para avaliação da versão adaptada do Índice de Funcionalidade Brasileiro

Un estándar de comparación para evaluar la versión adaptada del Índice de Funcionalidad Brasileño

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ABSTRACT This study aimed to determine the best method of achieving consensus between examiners and workers with disabilities in Brazil regarding their perceived severity of the disability and eligibility for an early retirement pension. We analyzed the agreement among evaluators' perceptions to create a reference standard for the classification of the disability severity of applicant workers with disabilities. Pairs of expert physicians and social workers applied a computer index and then assigned their perceived level of severity, independent of the computer classification. The analysis included 17,350 applicants aged 18 to 76 years. The best-perceived agreement represented the ideal comparison standard for validating the index. The severity perceptions of the evaluators and the workers with disabilities yielded agreement tables portraying the perceived disability severity. Physicians and social workers demonstrated the most significant level of agreement (weighted kappa: 0.2351, 95% confidence interval: 0.2229–0.2473), and the combination of their assessments provided the best standard. From what it appears, this is the first time that this method has been used to create a reference standard. Evaluators' perceptions of disability severity formed the basis for choosing a standard to further analyze the index's accuracy and validity.

KEYWORDS Social welfare. Disability evaluation. Disability studies. Retirement. Observer variation.

RESUMO *Este estudo buscou o melhor método de obtenção de consenso entre examinadores e trabalhadores com deficiência no Brasil quanto à percepção da gravidade da deficiência e da elegibilidade para aposentadoria antecipada. Analisou-se a concordância entre as percepções dos avaliadores para criar um padrão de referência e classificação da gravidade da deficiência. Pares de médicos especialistas e assistentes sociais aplicaram um índice de computador e, em seguida, atribuíram seu próprio nível percebido de gravidade, independentemente da classificação automatizada. A análise incluiu 17.350 candidatos com idades entre 18 e 76 anos. A maior concordância percebida criou o padrão de comparação ideal para validar o índice. As percepções de gravidade dos avaliadores e dos trabalhadores com deficiência foram comparadas em tabelas de concordância sobre a gravidade da deficiência. Médicos e assistentes sociais demonstraram o nível mais significativo de concordância (kappa ponderado: 0,2351, intervalo de confiança de 95%: 0,2229–0,2473), e a combinação de suas avaliações forneceu o melhor padrão. Pelo que consta, essa é a primeira vez que esse método foi usado para criar um padrão de referência. As percepções dos avaliadores sobre a gravidade da deficiência e externas ao índice formaram um padrão para analisar posteriormente a acurácia e validade do índice.*

PALAVRAS-CHAVE *Seguridade social. Avaliação da deficiência. Estudos sobre deficiências. Aposentadoria. Variações dependentes do observador.*

RESUMEN *Este estudio tuvo como objetivo determinar el mejor método para lograr el consenso entre evaluadores y trabajadores con discapacidad en Brasil sobre la gravedad percibida de la discapacidad y la elegibilidad para una pensión de jubilación anticipada. Analizamos la concordancia entre las percepciones para crear un estándar de referencia para la clasificación de la gravedad de la discapacidad. Parejas de médicos y trabajadores sociales expertos aplicaron un índice computarizado y luego asignaron su nivel de gravedad percibido, independientemente de la clasificación computarizada. El análisis incluyó a 17.350 solicitantes de entre 18 y 76 años. La mejor concordancia percibida representó el estándar de comparación ideal para validar el índice. Las percepciones de gravedad generaron tablas de concordancia que muestran la gravedad percibida. Los médicos y los trabajadores sociales demostraron el nivel de concordancia más significativo (kappa ponderada: 0,2351, intervalo de confianza del 95%: 0,2229–0,2473). La combinación de sus evaluaciones proporcionó el mejor estándar. Por lo que parece, esta es la primera vez que se ha utilizado este método para crear un estándar de referencia. Las percepciones de los evaluadores sobre la gravedad de la discapacidad constituyeron la base para elegir un estándar para analizar la precisión y validez del índice.*

PALABRAS CLAVE *Bienestar social. Evaluación de la discapacidad. Estudios de la discapacidad. Jubilación. Variaciones dependientes del observador.*

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Introduction

The 2022 Brazilian Census showed that 14.4 million (7.3%) of the country's 198.3 million inhabitants were Persons with Disabilities (PwDs), of whom 403,255 were formal workers and insured taxpayers in 2015[1,2].

In 2013, the Brazilian National Congress approved Complementary Law (LC) No. 142, which allowed workers with disabilities to retire early with less contribuition time than those without disabilities, regardless of whether their disability is work-related or pre-existing[3,4]. The Brazilian Secretariat of Human Rights initiated the development of the Brazilian Functionality Index through the Institute for Studies on Work and Society (Instituto de Estudos do Trabalho e Sociedade). This non-governmental organization developed a tool to measure and characterize the severity of disabilities[5,6].

A federal government committee adapted the original version of the index to assess eligibility for retirement, legally classifying workers' disabilities as severe, moderate, mild, or 'undefined' (with no right to benefits), and renaming the index the 'Adapted Version of the Brazilian Functionality Index' (IFBRA)[7]. Then, the National Institute of Social Security (INSS) implemented a disability assessment on a provisional scale.

The IFBRA is based on the International Classification of Functioning, Disability and Health (ICF). It contains 41 questions related to daily activities, categorized into 7 domains (sensory, communication, mobility, personal care, domestic life, education and economic life, and living and community life). Using a dependency scale, the interviewer rates applicants' abilities to complete activities, taking into account the help they receive from others and any special aids or adaptive technologies they use[5].

The FUZZY methodology applied four totalizing emblematic questions at the end of the questionnaire, whose positive answers reduced all the scored values within two respective related domains that characterize and reduce the summation scores of the IFBRA for severe impairments in motor or visual skills, communication, and mental capacity since childhood, which are associated with severe dependence[8-12]. A matrix design combines concepts of public health and disability[13-15].

Since 2014, physicians and social workers have used an unvalidated version of the IFBRA to assess more than 17,000 PwDs. Physicians examine applicants to determine their disability type, and then social workers interview them, asking the same questions. The responses were recorded in a computerized system called Information and Systems Regionalization Project (PRISMA), which provides an automatic provisional record of severity for administrative functions. Thus, it was important to validate the IFBRA[16-18].

There was a need to describe the degree of agreement between the evaluators and the PwD workers regarding the severity of the disabilities after the implementation of a computerized automatic index, to create a categorical classification of severity as a standard to measure the accuracy of the scale that allows PwDs in Brazil to obtain pensions according to the severity of the disability. The use of this index in Brazil reflected a national effort to comply with the United Nations (UN) Convention on the Rights of Persons with Disabilities[19].

This study had two main objectives: 1) to determine the best rating agreement among peers of evaluators on the perception of disability severity for use as part of the national public policy for PwD workers; and 2) to build a standard reference scale for future validation of the IFBRA, based on the agreement of peers of evaluators and PwDs, to create a categorical classification of precise severity to allow PwD workers to obtain early retirements in Brazil.

Material and methods

Data sources

We analyzed all national data, collected in Brazil between October 2013 and January 2016, of future retirees self-declared as PwD

workers in the formal labor market, who requested early retirement and spontaneously required evaluation at IFBRA to anticipate retirement, according to LC No. 142/2013[4]. The data come from a national survey, recorded at the INSS, that included IFBRA evaluations, which allowed assessment of the disability severity perceived by the evaluators and the self-perceptions of the PwDs examined. This assessment of perceived disability severity was based on three additional interview questions about the personal perceptions of the evaluators and the PwDs, included at the end of each interview, in addition to the disability scores recorded in the PRISMA system.

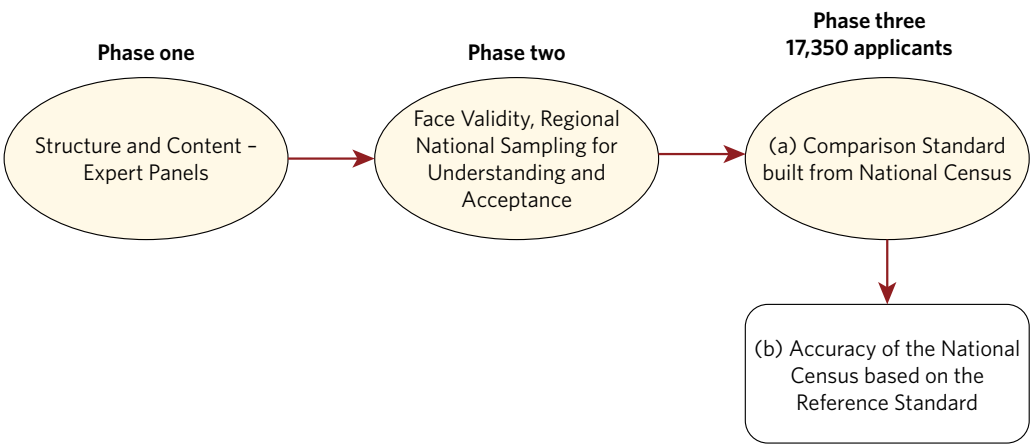
The evaluators worked in pairs, each consisting of a physician and a social worker. Both answered the same question separately: 'From a general perspective, and regardless of IFBRA scores, how would you categorize the severity of PwDs' disability? Mild, moderate or severe, or no disability present?'. The INSS social workers also questioned future retirees in the same way, using the question: 'To what extent does your disability hinder your daily activities?'. They recorded the four possible responses similarly to the responses given by physicians and social workers (i.e., slightly (mild); medium (moderate); a great deal (severe); does not hinder me (undefined – not entitled to benefits)). Responses were then coded as zero (severe), one (moderate), two (mild), or three (undefined – no entitlement to benefits).

The IFBRA computer forms contained fields for supplemental records containing personally identifiable data. Employees entered this complementary data to link these records to the INSS central record of individual data.

Study population

In the validation project phase, called Phase 3a, information was collected and analyzed from the entire national dataset of all PwDs evaluations carried out in Brazil between November 2013 and January 2016, comparing the answers that pairs of evaluators and PwDs gave to the additional questions mentioned above. *Figure 1* shows the validation project phases.

Figure 1. Phases of the qualitative and quantitative validation of the Brazilian Functionality Index Adapted for the retirement of workers with disabilities – IFBRA



Source: Prepared by the authors.

The inclusion criteria for this study were: PwDs aged 18 years or older who requested early retirement during the period of two years after having made social security contributions (INSS) for at least one year. Disabilities were classified by severity in each life period and could be noted as existing from birth or from the date of acquisition or worsening of the disability. PwDs may be independently evaluated more than once by a different pair of evaluators and/or at another institution if they disagree with the original evaluation.

PwDs with incomplete registrations, those who stopped contributing to social security, and those who had been unemployed for more than 12 months on the date of the interview were excluded.

In the PRISMA system operated by the evaluators, the total IFBRA scores can vary from 2,050 to 8,200, provisionally classified as 2,050–5,739, meaning severe disability; 5,740–6,354, meaning moderate disability; 6,355–7,584, meaning mild disability; and 7,585–8,200, meaning no significant disability. However, these scores were not used in this study to define the disability severity; instead, to establish a reference standard, the personal perceptions of the evaluators and the PwDs were considered.

We used the sum of the PRISMA system scores as a measure of disability severity.

Statistical analysis

To analyze interobserver agreement, we used percentage and frequency tables. In addition, we used weighted kappa indices, with the number of interviewees as weights for discrete frequencies, to assess agreement among observers regarding perceived disability severity. We performed analyses using SAS software (SAS Institute, Cary, NC, US).

Evaluators participated in several training sessions and group seminars across the country to improve reliability before evaluations. To meet the sudden demand for disability severity classification by the IFBRA, each INSS unit appointed a number of professionals to examine PwDs. At the time, there were more than 1,500 INSS units in Brazil, and any unit with a trained physician and a social worker pair could evaluate PwD.

We analyzed the distribution of disabilities in the population studied and compared it with data from the national Census. The assessment of disability severity by pairs of evaluators was also cross-referenced to identify the pair with the highest level of agreement across pairs combining physicians, social workers, and the PwD.

This analysis was intended to ensure evaluator consistency nationwide. No regional adjustments were made, as the original quantitative objective was to validate the use of IFBRA at the national level. In the absence of a standard, percentage tables were constructed to determine agreement between pairs of evaluators, and the best standard of comparison was then determined. The objective was to discover the combination of personal opinions that would provide the best reference standard to establish three cut-off points of the sum of the IFBRA scores to define the four categories of severity.

The justification for this search for a national standard to validate the IFBRA was to ensure the highest level of agreement among the evaluators. This agreement was based on two premises. The first was that the people who best know the social, environmental, and cultural barriers faced by a PwD are the PwD themselves; This is called the gold standard[20,21]. The second premise was that social and epidemiological justice depends on a pattern that reflects the country's cultural, historical, and social formation[22]. Therefore, the best evaluation may result from pairing personal evaluators who achieved greater agreement with the principles of the UN Convention on the Rights of Persons with Disabilities[17]. The aim was to select the best pair of total concordances to serve as a future standard.

Ethical approval

This research was conducted in accordance with Brazilian standards and the Principles of the Declaration of Helsinki, and the Research Ethics Committee of the Faculty of Health Sciences of the University of Brasília approved the study protocol. The requirement for informed consent for this database analysis was waived because the study was based on a retrospective analysis of routinely collected data. The full texts and approval of the project are available on the website of the National Committee for Ethics in Research with Human Beings under the Certificate of Presentation of Ethical Appreciation (Certificado de Apresentação para Apreciação Ética – CAAE) No. 37058914.5.0000.0030 and Opinion No. 1,024,284, in accordance with Law No. 14,874, of May 28, 2024[23].

Role of the source of funding

The Ministry of Social Security funded the analysis by providing the official national database of working PwDs and received the final survey report, but played no other role in interpreting the data, writing, or publishing reports. This work was supported by funding from the Ministry of Social Security, Process No. 44000.001814/2013-60, of November 25, 2013, Brazilian Federal Official Gazette, Section 3, page 171.

Results

The analytical database comprised 17,350 interviews conducted by 837 pairs of evaluators in all INSS units, in the 26 Brazilian states and the Federal District, from October 2013 to January 2016.

The total number of interviews includes 547 repeated interviews (0.161%): specifically, 544 PwDs who were interviewed twice and 3 who were interviewed three times. These additional interviews were conducted because PwDs were dissatisfied with their original assessments.

Some analyses included fewer than 17,350 records due to missing data. The missing data in the answers recorded in the questionnaires can be attributed to the combination of clerical officers, physicians, and social workers who asked the questions and entered the personal data obtained by the INSS, which are processed by the public company that manages the government database and, in this system, only the links between the data are recorded. The PRISMA system did not allow data entry or correction, so we decided not to make imputations and kept the original record. Seventy-seven deleted or missing observations were assigned to the system through which IFBRA forms are linked to INSS data.

The age distribution of PwDs ranged from 18 to 64 years, with a mean of 55 years (Standard Deviation [SD]: 5.5 years; 95% Confidence Interval [CI]: 42.2–63.9 years). This meant that 90% of PwDs were not yet eligible for regular retirement, since the minimum age for regular retirement was 55 years for women and 60 years for men, with a minimum of 15 years of contribution to the official pension system. They would be allowed to retire early only if they were recognized as severe PwD under LC No. 142/20134. Most of the working PwDs who applied were women (65%).

The study aimed to select the best pairs with the highest total agreement rate to define a future standard. The types of disability observed during the evaluations and the number of PwDs determined for each disability and level of severity were compared. The total percentages in each cell of the table were summed to establish the importance of each type of disability, as shown in the two columns to the right of *table 1*.

Table 1. Type of impairment and disability severity profile for 17,350 prospective retirees with disabilities assessed by the IFBRA. Data from October 2013 to January 2016

Severity Classification by the automatic sum of scores recorded in the IFBRA – PRISMA System						
Type of disability	**Severe**	**Moderate**	**Mild**	**Undefined**	**Total**	**Groups**
Hearing	1.9	3.5	8.0	2.4	15.8	-
Hearing + multiple	0.6	0.5	1.0	0.3	2.4	18.2
Cognitive + mental	0.6	0.4	1.2	0.7	2.9	2.9
Motor	6.3	11.4	30.2	10.8	58.8	-
Motor + multiple	0.4	0.1	0.2	0.1	0.8	59.6
Visual	1.9	1.2	5.2	4.3	12.5	-
Visual +multiple	0.5	0.4	0.5	0.2	1.6	14.1
Unknown	0.3	0.3	2.0	2.7	5.2	5.2
Total	**12.4**	**17.8**	**48.4**	**21.5**	**100.0**	**100.0**

Source: Raw data tabulated from the PRISMA Computer System – DATAPREV – Brazilian Social Security – regarding the severity of the disability, in accordance with Federal Supplementary Law No. 142/20134.

Abbreviation: IFBRA – 'Adapted Version of the Brazilian Functionality Index'.

The percentage agreement in classifying disease severity between physicians and PwD self-assessment was very low. The kappa index of non-random concordances was very low (weighted kappa: 0.0501; 95% CI: 0.0414–0.0587), indicating very low agreement between physicians and PwDs in their assessments of disability severity. Consequently, it has become important to proceed with the evaluation in other comparison pairs.

Table 2 shows the agreement between social workers and PwDs.

Table 2. Percentage of agreement between social workers and prospective retirees on the classification of disability severity. Data from October 2013 to January 2016

	Social worker				
Insured person	**Severe**	**Moderate**	**Mild**	**Undefined**	**Total**
Severe	17.90	9.14	24.29	1.24	52.58
Moderate	0.09	5.27	0.96	0.89	7.21
Mild	1.91	15.79	20.37	1.22	39.29
Undefined	0.10	0.29	0.12	0.41	0.92
Total	**3,456**	**5,267**	**7,901**	**649**	**17,273**
	20.01	**30.49**	**45.74**	**3.76**	**100.00**

Source: Raw data tabulated from the PRISMA Computer System – DATAPREV – Brazilian Social Security – regarding the severity of the disability, in accordance with Federal Supplementary Law No. 142/20134.

Weighted kappa: 0.1880 ASE 0.0054 (95 CI %: 0.1774–0.1986). Missing observations = 69.

Total agreement between social workers and PwDs was 43.95%, almost double the total agreement between physicians and PwDs.

The score for the weighted kappa coefficient of agreement not attributable to chance was also low (weighted kappa: 0.1880; 95% CI: 0.1774–0.1986).

Table 3 shows the agreement between social workers and physicians.

Table 3. Percentage of agreement on personal criteria between physicians and social workers in rating disability severity. Data from October 2013 to January 2016

	Social worker					
Physician	**Missing**	**Severe**	**Moderate**	**Mild**	**Undefined**	**Total**
Missing	0.01	0.02	0.04	0.09	0.01	0.17
Severe	0.02	7.44	0.32	3.04	0.03	10.86
Moderate	0.17	3.34	19.12	17.86	1.23	41.73
Mild	0.15	8.29	5.54	21.01	0.15	35.14
Undefined	0.05	0.84	5.35	3.55	2.32	12.10
Total	**69**	**3,456**	**5,267**	**7,901**	**649**	**17,342**
	0.40	**19.93**	**30.37**	**45.56**	**3.74**	**100.00**

Source: Raw data tabulated from the PRISMA Computer System – DATAPREV – Brazilian Social Security – regarding the severity of the disability, in accordance with Federal Supplementary Law No. 142/20134.

Weighted kappa: 0.2351 ASE 0.0062 (95%CI: 0.2229–0.2473).

Note: 8 pairs were not included in the table above owing to incomplete records.

For the personal assessment of disability severity, not necessarily related to the IFBRA scores, overall agreement between physician and social worker pairs was 49.89%. Their weighted kappa score for non-random agreement was the best (weighted kappa: 0.2351; 95% CI: 0.2229–0.2473).

Table 4 shows summary lines of the percentage of agreement, preceded by disagreement rates, that allow comparison of evaluation pairs to determine the best measure to use as a future standard for assessing sensitivity, specificity, and predictive values, based on professionals' experience evaluating PwDs.

Table 4. Percentage agreement in the rating of disability severity among physicians, social workers, and persons with disabilities. Data from October 2013 to January 2016

	Agreement %					
Evaluators	**Disagree**	**Severe**	**Moderate**	**Mild**	**Undefined**	**Total (n = 17.350)**
Physician, social worker, PwD	79.38	6.73	9.95	3.65	0.28	20.62
Physician, PwD	72.76	8.52	4.37	14.00	0.35	27.24
Social worker, PwD	56.05	17.90	5.27	20.37	0.41	43.95
Physician, social worker	50.11	7.44	19.12	21.01	2.32	49.89

Source: Raw data tabulated from the PRISMA Computer System – DATAPREV – Brazilian Social Security – regarding the severity of the disability, in accordance with Federal Supplementary Law No. 142/20134.

Weighted Kappa for Physicians x PwDs = 0,0501 ASE 0,0044 (95% CI: 0,0414-0,0587).

Abbreviations: PwD, person with disability.

Total agreement between physicians and PwDs was 27.24%. In particular, there was a marked difference in the recognition of severe disabilities, with physicians classifying less than one-fifth of PwDs who self-assessed as severe as more severe. Agreement among social workers, physicians, and PwDs was 20.62%. This was the lowest agreement rate.

Discussion

The analysis revealed that physicians and social workers showed greater agreement and, therefore, are the most appropriate standard for future validation of the IFBRA.

The literature on disability scales and patterns focuses on applying reference scales to specific groups of diseases and conditions[5,6]. Previous validation studies have addressed the performance of pre-existing scales and/or measured confidence intervals by comparing them to pre-existing gold standards[13,14]. However, few general population studies have addressed PwDs, their work capacities, or the social and environmental barriers they face[18-21], and no previous researcher has proposed a method for creating other patterns[24-30].

The 17,350 PwDs included in this survey represent a fraction (0.73%) of the 325,291 PwDs potentially eligible in the formal labor market, all of whom must attend INSS agencies at any time, according to the law, to establish their permanent rights. Young workers under 55 attended to qualify as PwDs and secure future benefits. Almost half of the estimated 10% (32,500) of PwDs who met the requirements regarding minimum age (50 years) and years of contribution (15 years) were included in this study. Lack of awareness of their new rights and difficulty accessing INSS facilities can prevent PwDs from registering for disability assessment. On the other hand, awareness of the seriousness of their disability and the length of time as a formally registered worker can increase the likelihood of PwD attending an INSS unit for evaluation.

The 15-to-64 age group in the Brazilian Census generally coincides with the age of PwDs, although disability percentages differ. The majority of PwDs had motor and non-visual disabilities, with the proportion of PwDs being less than 25% of the general population. In contrast, the proportion of PwDs was three times higher than in the general population.

PwDs with motor impairments were also perceived mainly as severely impaired in official assessments by physicians and social workers. These impairments were more likely to be considered severe because of the social and environmental barriers they experienced.

Physicians and social workers showed 49.89% total agreement in their assessments of disability severity. Considered separately, compared to physicians, social workers recognized twice as many severe cases; their highest level of agreement was with moderate impairment, and their lowest was related to undefined disability. The classification standard for this study was based on agreement between physicians and social workers, using their intersection sets of total agreement to validate the IFBRA scale.

The weighted kappa index score of non-randomized inter-rater agreement was low, although it was better than other scores. Physicians and social workers showed the highest level of agreement in assessing disease severity. This level of agreement was twice as high as that between social workers and PwDs.

There was very low agreement between social workers and PwDs regarding the assessment of the disability severity . However, it was still about four times lower than the disagreement between physicians and PwDs and six times higher than the agreement between physicians and PwDs.

When the overall agreement between the raters is almost 50%, and the intersection between their severity ratings is greater than 20%, this standard can be considered to represent good reliability, because the overlapping of severe ratings between both raters creates a classification window in which there are no doubts about the disability severity of the people being evaluated.

Not all PwDs classified their disability as severe; 46.5% self-identified as having a moderate or mild disability. This provides evidence against the assertion that PwDs took advantage of benefits to obtain early retirement.

This validation method is not intended to generalize this pattern to other countries

or social policies. Disability is a phenomenon shaped by social and environmental factors, making it impossible to generalize this scale to other countries. Any method for creating standards in other cultural and social contexts must account for contextual specificity and the construction of pairs of expert evaluators from different professions, as these demonstrate a higher profile than self-assessment by PwDs alone.

In recent years, social workers who worked in the forensic examination qualitatively assessed that the social distance between the opinions of the examinees and the evaluators had decreased, especially after the emergence, in 1996, of a new type of social benefit aimed at low-income people who cannot work, but have never contributed to the INSS[31,32]. This new, non-contributory benefit, administered through a monthly income transfer program, is the Continuous Cash Benefit (Benefício de Prestação Continuada – BPC), which has allowed physicians to carry out new forms of evaluation[31,32].

The BPC does not involve Social Security contributions or proof of a causal link between the individual's incapacity for work and their job. The benefits received are considered permanent, as there is no expectation that the PwD will recover or return to work. When these issues receive less attention, there is less conjecture and, therefore, less distance between physicians' and social workers' opinions.

PwDs' self-evaluations reflect their uneasiness with physicians' perceptions, since physicians are professionally inclined to see deficiencies through supposedly objective criteria centered on bodily restrictions supported by test results and medical reports.

The agreement between physicians and social workers presented the lowest level of disagreement and served as the basis for a standard of comparison. This finding may also apply to other countries seeking a national standard, even if the scale of measurement based on perception differs. Using professional assessments to determine disability severity may represent an advance over national systems based on non-validated measurement scales. We assumed that self-assessment by PwDs would be a good standard. Still, the finding that the best agreement occurred between pairs of physicians and social workers forces us to reconsider this assumption and choose the combination of physician and social worker evaluation as the standard.

Limitations

Some data were missing. This may be because the clerks who entered the supplementary data from the IFBRA computer forms knew the complete data was available in the main official records and may not have paid enough attention when entering it, resulting in incomplete observations.

The social workers asked and recorded PwDs' answers to the personal self-assessment questions after the IFBRA. This may have influenced the responses, and any missing data may result from a failure to remember to enter it.

It was not possible to determine how many PwDs did not attend the INSS exams. It was not possible to recover a sample of non-respondents from the 300 thousand eligible people, which means that there are potentially 20 times more candidates across the country.

The 17,350 participants in the national test survey likely reflect implicit survival bias, as the most severe cases would not necessarily attend a single test. Consequently, only less severe PwD would attend INSS agencies to request early retirement while still working. PwDs who do not meet the criteria for the right to retirement by contribution and service applied to the general population are probably those with more severe disabilities, with more acute social and environmental barriers and/or with less schooling or aggravating diseases.

Conclusions

Physicians and social workers had the highest level of agreement regarding moderate disability and the lowest with the severity of undefined disability. Its sets of intersection agreements were considered as a standard for future IFBRA validation. The national survey enabled the development of a method for building a new standard, using the personal perceptions of pairs of professional evaluators to classify disability severity.

Authorship contributions

Merchan-Hamann E (0000-0001-6775-9466)* collaborated to coordinate the academic research team, respond to the search for funding and the execution and financial control, discuss methods and participate in the analysis at all stages, especially in epidemiological techniques, including the review and division of the topics of each report. Corrêa Filho HR (0000-0001-8056-8824)* collaborated in the development of quantitative validation methods, articulated with statistical and software engineering controls for projecting the outputs of the computer program, discussing the analysis and writing the text of this manuscript. Pereira ÉL (0000-0002-7771-1594)* collaborated in the development of qualitative validation methods, coordination of the participation of graduate students in the field of research, description and application of training for field teams, organization of training to obtain uniformity in the conduct of field evaluations, and review and discussion of the manuscript. Barbosa L (0000-0003-2268-3212)* collaborated in the development of qualitative validation methods, coordination of graduate students to work in the field, description and application of training for field teams, review and discussion of the manuscript. Rodrigues DS (0000-0001-7391-1794)* collaborated in the development of qualitative methods related to rehabilitation and severity assessment, description and application of training for field teams, organization of training to achieve uniformity in the conduct of field evaluations, and review and discussion of the manuscript. Souza WR (0000-0002-8915-4895)* collaborated in the development of data collection techniques, database formatting, software and continuous security of data collection, as well as the projection of computer outputs for data analysis according to statistical planning. Höefel MGL (0000-0003-2176-5013)* collaborated in the execution of field training actions throughout the country, combining quantitative and qualitative approaches for training teams for data collection, review and discussion of the manuscript. Silva GL (0000-0001-9650-2993)* collaborated in the coordination of the quantitative distribution of the sampling plan, planning of the analytical approach to determine the type of data collection and the outputs of the computer, execution of analytical procedures in the Item Response Theory and coordination of the quantitative analysis appropriate to the multiple responses and domains of deficiency in relation to the ICF.■

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