Dovepress
Taylor & Francis Group

ORIGINAL RESEARCH

Impact on Participation and Autonomy Questionnaire (IPA): Reliability and Validity of the Chinese Version for Stroke Survivors

Ya-Nan He*, Xiao-Huan Qin*, Jian-Hong Lv, Yan-Ping Guo

Department of Nursing, Shanghai East Hospital, School of Medicine, Tongji University, Shanghai, 200092, People's Republic of China

*These authors contributed equally to this work

Correspondence: Jian-Hong Lv; Yan-ping Guo, Department of Nursing, Shanghai East Hospital, School of Medicine, Tongji University, No. 150 Jimo Road, Pudong New Area, Shanghai, 200120, People's Republic of China, Tel +86-18930805118; +86-13764211995, Email lv2253jh6@outlook.com; gyp13764211995@126.com

Purpose: This study aimed to evaluate reliability and validity of the Chinese version of the Impact on Participation and Autonomy Questionnaire (IPA-C) for people with stroke.

Methods: The English version of the IPA (IPA-E) was translated into the Chinese version using the protocol for linguistic validation of patient-reported outcome instruments. In total, 421 patients diagnosed with first-ever stroke participated in this study. A cross-sectional study with a test–retest subsample was conducted. Three reliability evaluation methods were used to assess the reliability of IPA-C. Internal consistency reliability was evaluated by calculating the Cronbach's alpha and split-half reliability. Split-half reliability was recorded using the Guttman split-half coefficient. Item reliability was assessed using test–retest reliability. Validity content and construct validity were used to assess the IPA-C validity.

Results: IPA-E consists of five domains: autonomy indoors, family role, autonomy outdoors, social life and relationships, and work and education opportunities. In this study, the domain 'work and educational opportunities' and the item 'My chances of having an intimate relationship are' were excluded from the analysis. Because they were not applicable to most participants. So, the first part (IPA-C-I), contained 25 items across 4 subscales (Autonomy Indoors, Family Role, Autonomy Outdoors, Social Life and Relationships). The second part (IPA-C-II), the experience of problems, contains further 7 questions, which are 7 domains (mobility, self-care, activities, economic management, leisure, social life and relationships, and helping others). The Cronbach's alphas of the IPA-C-I was 0.962, IPA-C-II was 0.823, and 0.968 (autonomy indoors), 0.966 (Family role), 0.870 (Autonomy outdoors), 0.913 (Social life and relationships). The Guttman Split-Half Coefficient of the IPA-C-I was 0.792. Item reliabilities estimated from the test-retest ranged from 0.915 to 0.975. The overall content validity index was 0.949. Four factors emerged from the 25 items, accounting for 82.918% of the variance with item loadings above 0.40.

Conclusion: The IPA-C can be considered a valid and reliable instrument for assessing participation and autonomy in patients with stroke. Later, researchers could choose IPA-C as a good tool to evaluate perceived participation and problems in stroke patients. However, in patients with a variety of diagnoses and other cultural backgrounds, further assessment of psychometric properties is needed.

Keywords: Participation, WHO-ICF, autonomy, stroke, rehabilitation, outcome assessment, IPA

Introduction

In May 2001, at the 54th World Health Assembly, "International Classification of Impairments, Disabilities, and Handicaps, ICIDH" was officially revised to "International Classification of Functioning, Disability and Health, ICF". The ICF emphasizes three levels of health condition climate: "body function and structure" at the physical level, "activity" at the individual level, and "participation" at the social level. The International Classification of

1721

Functioning, Disability, and Health (ICF) has been used as a conceptual framework for rehabilitation since its issuance by the WHO.[1] Participation, defined as social involvement in a life situation,[2] is a key functional component of the ICF.

Therefore, assessment of social participation should be based on a new concept of participation. Nevertheless, a review of instruments revealed that most of them were based on the former concept of handicap[3] and centered on objective perspectives rather than person-perceived concepts.[4] There is a need for deeper knowledge of people with disabilities' own perceptions, which is in contrast to conventional investigations from an outsider perspective.[3–6] Objective perspectives may overshadow the lived experiences of persons with disabilities, and both at the individual and social levels, influence the design and aim of rehabilitation services. Therefore, developing instruments that fully consider people's perspectives on involvement in life situations has become increasingly important.

Assessment of person-perceived participation is essential when evaluating rehabilitation interventions.[7] A widely used instrument: the Impact on Participation and Autonomy (IPA), was developed by Cardol et al,[7–9] which was based on the concept of participation.[10] The IPA is a generic self-report outcome measurement that addresses the personal impact of illness on participation, autonomy, and related experiences of problems from the client's perspective.[7,8] It includes two parts: perceived participation and experience of problems,[9] 41 items in total. The first part (IPA-I), perceived participation, contained 32 items across 5 subscales (Autonomy Indoors, Family Role, Autonomy Outdoors, Social Life and Relationships, Work and Education opportunities). Scores ranged from 0 (very good) to 4 (very poor). The second part (IPA-II), the experience of problems, contains further 9 questions, which are 9 domains (mobility, self-care, activities, economic management, leisure, social life and relationships, work, education and training, and helping others). The client rated each question on a scale ranging from 0 (no problems) to 2 (major problems).[11] The two parts were recorded as two separate scores with ranges of 0–4 and 0–2. The higher the score, the worse the person's perceived participation and perceived participation problems. IPA significantly enhances the possibility of evaluating an individual's participation in various aspects of their life.

The IPA was developed in the Netherlands, and the English version was adapted for use by the Universities of Southampton.[12] Up to date, it is available in Dutch,[13] English, Danish, Finnish,[14] Iran,[15] French, German, Norwegian, Swedish, Polish[16] and Persia.[17] Validation studies have been conducted in the Netherlands,[7–9] the UK,[18,19] Sweden,[20,21] Italy,[22] and Persia[23] using factor analysis, confirmatory factor analysis, and Rasch analysis. The IPA is valid, reliable, and responsive to changes. The Cronbach's alpha of it was 0.65–0.92.[15] All versions of IPA are widely used.

IPA has been introduced and used in China. This study examined the reliability and validity of the Chinese version of IPA. IPA is a generic questionnaire that focuses on persons with all types of disabilities.

Stroke is the leading cause of disability worldwide. Therefore, studies focusing on stroke patients are necessary. In 2021,[24] the China Stroke Report 2020 (Chinese Edition) indicated that stroke is the leading cause of premature death in China.[25] According to the Global Burden of Disease Study (GBD) in 2019, stroke is the leading cause of disability-adjusted life years (DALYs) in China, which is higher than other diseases such as heart disease and respiratory or digestive tumors.[26,27] Three-quarters of stroke survivors are left with varying degrees of functional impairment. Co-morbidities or complications (eg, communication difficulties, visual impairment, infections) can exacerbate stroke-related disability. Therefore, introducing and translating the IPA, conducting a validity study, and using it as a measurement instrument are meaningful.

Procedures
Study Population and Data Collection
Convenience sampling was used to recruit participants between January 2024 and June 2024. Participants in this study were people diagnosed with stroke who passed the acute phase, were discharged by the hospital, and fulfilled the inclusion criteria.

The inclusion criteria were as follows: (1) having a confirmed diagnosis of first stroke, (2) having had a stroke for over a month, (3) being able to understand the questions and express their responses in Chinese, (4) not being diagnosed with Transient ischemic attack or multiple strokes, (5) not being diagnosed with severe heart failure, liver failure, renal failure, respiratory failure or malignancy (6) Informed consent was obtained from the subjects.

Eligibility criteria were determined by the project leader and the investigators in the four communities on the basis of the participants' medical history. Data were collected by the researchers in the four communities, in the form of home visits, according to the follow-up arrangements in the communities.

A total of 485 individuals who met the inclusion criteria were identified from the database of the four communities. The purpose of our study was explained to the participants, who were invited to participate in the study, and 421 (participant rate of 86.8%) agreed and gave informed consent to participate. The basic demographic characteristics of the study participants are presented in Table 1.

Statistical Analysis

The SPSS software package (version 21.0) was used for statistical analysis. Descriptive statistics were used to summarize the demographic characteristics. Reliability: Three reliability evaluation methods were used to assess the reliability of IPA. Internal consistency reliability was evaluated by calculating the Cronbach's alpha and split-half reliability. Split-half reliability was recorded using the Guttman split-half coefficient. Item reliability was assessed using test–retest reliability. The test–retest reliability was determined by calculating intraclass correlation coefficients (ICC) using data from 40 participants who were randomly selected from the 421 participants and filled in the IPA after a 2-week interval. Cronbach's alpha of 0.70 or greater is considered statically acceptable. ICC values can be categorized by their level of agreement, ranging from poor to fair (<0.40), moderate (0.41–0.60), good (0.61–0.80), and excellent (>0.80).

Content validity and construct validity were used to assess the IPA-C validity. A multidisciplinary panel, consisting of an associate chief physician, two nurse practitioners, and five professors in nursing and medicine, tests the content validity. A content validity index was used to test item clarity and content validity of the translated version. The content validity index of each item (I-CVI) was first calculated by dividing the number of experts who scored by the total number of experts. The content validity index for the scale (S-CVI) was estimated by computing the average content validity

Table 1 Demographic Characteristics of the Participants in the Study (n = 421)

Variables	Sample (N = 421)
	n (%)
Age (mean, standard deviation)	66.95±11.904
Gender	
Male	253(60.10)
Female	168(39.90)
Education	
Junior high school or below	269(63.90)
High school	102(24.20)
College graduate or above	50(11.90)
Marital status	
Single	5(1.20)
Married	327(77.70)
Divorce/widowed	89(21.10)
Employment status	
Employed	54(12.80)
Retired	348(82.70)
Unemployed	19(4.50)
Time after stroke (months)	
Mean (SD)	7.70(12.739)
Range	1–58
Type of stroke	
Ischaemic	329(78.10)
Haemorrhagic	92(21.90)

indices of the items. The construct validity of IPA-C was determined using exploratory factor analysis (EFA). Before executing the EFA, the Kaiser–Meyer–Olkin (KMO) test and Bartlett's test of sphericity coefficient must be conducted to determine whether there are a sufficient number of significant correlations to carry out this analysis. When a KMO measure of sampling adequacy of 0.6 and Bartlett's test of sphericity with P <0.05, EFA was used.

Results

Demographic Data

Demographic characteristics, such as age, sex, education, marital status, employment status, time after stroke, and type of stroke are summarized in Table 1.

Descriptive Statistics of the Scale Items

The domain "work and educational opportunities" and the item "My chances of having an intimate relationship are" were excluded from the analysis because they were not applicable to most participants. So, the first part (IPA-C-I) contained 25 items across 4 subscales (Autonomy Indoors, Family Role, Autonomy Outdoors, Social Life and Relationships). The second part (IPA-C-II), the experience of problems, contains further 7 questions, which are 7 domains (mobility, self-care, activities, economic management, leisure, social life and relationships, and helping others). The means and standard deviations for each item are listed in Table 2.

Table 2 Means (M), Standard Deviation (S.d.) and Test–Retest Reliability for IPA-C-I Items

Items	M	SD	Test-Retest Reliability (ICC)
Autonomy indoors			0.975
1a. My chances of getting around in my house where I want to are	1.89	1.114	0.990
1b. My chances of getting around in my house when I want to are	1.89	1.119	0.990
2a. My chances of getting washed and dressed the way I wish are	1.97	0.974	0.894
2b. My chances of getting washed and dressed when I want to are	1.94	0.991	0.916
2c. My chances of getting up and going to bed when I want to are	1.36	0.916	0.941
2d. My chances of going to the toilet when I wish and need to are	1.54	1.058	0.883
2e. My chances of eating and drinking when I want to are	1.37	0.916	0.874
Family role			0.967
3a. My chances of contributing to looking after my home the way I want to are	2.78	1.179	0.926
3b. My chances of getting light tasks done around the house (eg making tea or coffee), either by myself or by others, the way I want them done are	2.42	1.248	0.903
3c. My chances of getting heavy tasks done around the house (eg cleaning), either by myself or by others, the way I want them done are	2.74	1.231	0.894
3d. My chances of getting housework done, either by myself or by others, when I want them done are	2.48	1.170	0.927
3e. My chances of getting minor repairs and maintenance work done in my house and garden, either by myself or by others, the way I want them done are	2.70	1.201	0.885
3f. My chances of fulfilling my role at home as I would like are	2.83	1.180	0.887
4a. My chances of choosing how I spend my own money are	2.54	1.227	0.859
Autonomy outdoors			0.970
1c. My chances of visiting relatives and friends when I want to are	2.84	1.187	0.937
1d. My chances of going on the sort of trips and holidays I want to are	3.33	1.123	0.434
5a. My chances of using leisure time the way I want to are	2.60	1.147	0.911
6g. My chances of seeing people as often as I want are	2.06	1.193	0.861
10. My chances of living life the way I want to are	2.74	1.043	0.896

(Continued)

Table 2 (Continued).

Items	M	SD	Test-Retest Reliability (ICC)
Social life and relationships			0.915
6a. My chances of talking to people close to me on equal terms are	1.26	1.135	0.927
6b. The quality of my relationships with people who are close to me	1.04	1.012	0.920
6c. The respect I receive from people who are close to me is	1.08	1.010	0.879
6d. My relationships with acquaintances are	1.47	1.092	0.816
6e. The respect I receive from acquaintances is	1.52	1.070	0.826
7a. My chances of helping or supporting people in any way are	2.89	0.916	0.857
IPA-C-I			0.984

Reliability

The Cronbach's alphas of the IPA-C-I were 0.962, IPA-C-II was 0.823, and 0.968 (autonomy indoors), 0.966 (Family role), 0.870 (Autonomy outdoors), 0.913 (Social life and relationships). The Guttman Split-Half Coefficient of the IPA-C-I was 0.792. Item reliabilities estimated from the test-retest ranged from 0.915 to 0.975. These results indicated good to excellent agreement (Table 2).

Validity

Content Validity

The final version of the IPA-C was sent to panel members, who were informed of the concepts involved and the instrument's purpose. The content validity index was calculated for each item. The minimum I-CVI was 0.870, S-CVI was 0.949. The panel members were then asked to comment on each item regarding the accuracy, clarity, style, and cultural relevance of the translated version. Subsequently, a modified version of the panel was developed.

Construct Validity

Exploratory factor analysis (EFA) for IPA-C-I was conducted to examine the construct validity. In this study, the Kaiser–Meyer–Olkin value was 0.936, and Bartlett's test of sphericity was highly significant ($p < 0.001$); therefore, exploratory factor analysis (EFA) was considered appropriate for the data. Four factors emerged from the 25 items, accounting for 82.918% of the variance with item loadings above 0.40 (Tables 3 and 4).

The percentage variances for the "Autonomy indoors" "family role" "Social life and relationships" "autonomy outdoors" factor were 25.949%, 22.896%,19.359%,14.714%, respectively (Table 3).

The two items changed their components compared with the original IPA-E. One is the item "My chances of seeing people as often as I want are", which was loaded from "Social life and relationships" to "autonomy outdoors". The other is the item "My chances of helping or supporting people in any way are", which was loaded from "autonomy outdoors" onto "social life and relationships" (Table 4).

Table 3 Eigenvalues of factors and Variance explained after rotation

Factor	Rotation Sums of Squared Loadings		
	Eigenvalues	**% of Variance**	**Cumulative %**
1	6.487	25.949	25.949
2	5.724	22.896	48.845
3	4.840	19.359	68.204
4	3.679	14.714	82.918

Table 4 Exploratory Factor Analysis Results for IPA-C-I (Factor Loading of Each Item)

Item	F1	F2	F3	F4
1a. My chances of getting around in my house where I want to are	**0.755**	0.413	0.054	0.264
1b. My chances of getting around in my house when I want to are	**0.757**	0.415	0.055	0.280
1c. My chances of visiting relatives and friends when I want to are	0.454	0.478	0.139	**0.588**
1d. My chances of going on the sort of trips and holidays I want to are	0.317	0.511	0.090	**0.598**
2a. My chances of getting washed and dressed the way I wish are	**0.818**	0.350	0.085	0.264
2b. My chances of getting washed and dressed when I want to are	**0.839**	0.362	0.086	0.251
2c. My chances of getting up and going to bed when I want to are	**0.875**	0.238	0.022	0.139
2d. My chances of going to the toilet when I wish and need to are	**0.864**	0.302	0.073	0.159
2e. My chances of eating and drinking when I want to are	**0.897**	0.218	0.017	0.142
3a. My chances of contributing to looking after my home the way I want to are	0.341	**0.705**	0.062	0.478
3b. My chances of getting light tasks done around the house (eg making tea or coffee), either by myself or by others, the way I want them done are	0.434	**0.806**	0.095	0.181
3c. My chances of getting heavy tasks done around the house (eg cleaning), either by myself or by others, the way I want them done are	0.382	**0.829**	0.099	0.189
3d. My chances of getting housework done, either by myself or by others, when I want them done are	0.433	**0.788**	0.139	0.231
3e. My chances of getting minor repairs and maintenance work done in my house and garden, either by myself or by others, the way I want them done are	0.407	**0.798**	0.162	0.220
3f. My chances of fulfilling my role at home as I would like are	0.351	**0.724**	0.099	0.457
4a. My chances of choosing how I spend my own money are	0.389	**0.550**	0.191	0.509
5a. My chances of using leisure time the way I want to are	0.297	0.365	0.322	**0.649**
6a. My chances of talking to people close to me on equal terms are	0.018	0.053	**0.854**	0.123
6b. The quality of my relationships with people who are close to me	0.051	0.118	**0.944**	0.013
6c. The respect I receive from people who are close to me is	0.060	0.129	**0.943**	−0.013
6d. My relationships with acquaintances are	0.029	0.131	**0.905**	0.182
6e. The respect I receive from acquaintances is	0.054	0.121	**0.886**	0.176
6g. My chances of seeing people as often as I want are	0.134	−0.151	**0.631***	0.535
7a. My chances of helping or supporting people in any way are	0.185	0.322	0.145	**0.757***
10. My chances of living life the way I want to are	0.348	0.447	0.187	**0.636**

Notes: Bold numbers indicate that the item has a highest factor loadings (>0.40) on the above common factors, and a low factor loadings on the other common factors. * Items not included in the dimensions of the original scale. Extraction Method: maximum likelihood estimation, MLE. Rotation Method: Varimax with Kaiser Normalization (Rotation converged in 7 iterations).

Discussion

The Reliability and Validity of the IPA-C were Demonstrated in Stroke Survivors in Mainland China.

Statistical analyses were conducted using a sample (n of 421) to examine reliability and validity. The Cronbach's alpha values for the IPA-C-I, IPA-C-II, and all subscales were acceptable. Regarding the stability of the IPA-C-I, the test–retest reliability of the scores 2 weeks interval from the current study was satisfactory. The content validity index of the scale is high (0.949). The results of the exploratory factor analysis (EFA) indicated that all items had factor loadings >0.40, which satisfied the criterion that the predictive items had loadings. The results of this study are consistent with those of other scholars.[13–15,17] In addition, the results suggest a four-factor structure consistent with the original English version.[11]

Compared to the Original Version, the Two Items were Loaded onto Different Components in the EFA of the IPA-C.

The item "My chances of seeing people as often as I want are" related to "autonomy outdoors" was loaded to "Social life and relationships". A possible explanation for this is the cultural differences between the East and West. In China, relatives and friends visit patients more frequently to provide care. Thus, they could see their relatives and friends more frequently. The other item, "My chances of helping or supporting people in any way are" related to "Social life and

relationships" was loaded to "autonomy outdoors". A possible reason is that, in China, once diagnosed with stroke, people will soon become addicted to the patient's role. That is to say, they are people who need to be taken care of rather than people who offer help. A similar situation was encountered in the study of Professor Berenschot L's group, which showed that the composition of the IPA-MO domains showed slight differences. The item on "mobility indoor" shifted from Autonomy indoors (IPA) to Family Role in IPA-MO. The item on reciprocity shifted from Social Life and relations (IPA) to Autonomy outdoors (IPA-MO).[13]

The Domain "Work and Educational Opportunities" and the Item "My Chances of Having an Intimate Relationship are" were Excluded from the Analysis.

The original IPA-E consists of five domains: autonomy indoors, autonomy outdoors, family role, social relations, work and education. However, the items of the domain "work and educational opportunities" were applicable to only 18.7% (n of 79) of the study population. As a result, they were not applicable to most participants and were excluded from the analysis. Other studies also revealed that it is not applicable to most participants.[1,7] In this study, the mean age of the sample was 66.95 years and 82.70% participants retired. A similar situation was found in the research of Professor Maarit E Karhula's group, which showed that the Work and Educational Opportunities domain was excluded from analysis, because it was only applicable to 51 persons.[14] The results are also similar to those of Professor Berenschot L's group, which showed that due to high non-response on Work & education, construct validity was first tested for a five-domain IPA-MO model.[13] In China, most people do not feel comfortable with items that address sexual relationships. Therefore, we excluded the item "My chances of having an intimate relationship" from the analysis. A similar situation was encountered in the research of Professor Lund ML's group, which showed that the IPA-S has 27 items for perceived participation and 6 items for perceived problems with participation, indicating 2 underlying unidimensional constructs for use in people with spinal cord injury, after removal of misfitting items.[20]

Conclusions

The reliability and validity of the IPA-C were demonstrated in this study in Mainland China. In this study, four factors were confirmed in the IPA-C: autonomy indoors, autonomy outdoors, family role, social life and relationships. This is consistent with the English version of IPA. So it can be conveniently used as a useful tool to assess the severity of restrictions and perceived problems in participation in China. It is potentially beneficial to provide more important information for rehabilitation outcome measurement, and this information will attract rehabilitation physicians' attention to help persons with disabilities participate in social activities and integrate into society. The current study has some limitations. In our study, only people with stroke, rather than heterogeneous populations, were included, whereas the IPA is a generic questionnaire. Therefore, further studies should focus on patients diagnosed with chronic diseases and/or disabilities. We then conducted multigroup modeling to examine the stability of the IPA-C factorial structure, measurement parameters, and structural parameters. In this way, the IPA will be tested and used more widely and will finally meet the requirements of rehabilitation outcome measurement.

Data Sharing Statement

Data and information supporting this study are available from the corresponding authors upon request.

Ethics Approval and Consent to Participate

Ethical review and informed consent: The study was approved by the Ethics Committee of Shanghai East Hospital (2019–2024) and was conducted in accordance with the tenets of the Declaration of Helsinki. Informed consent was obtained from all participants prior to their participation in the study.

Acknowledgments

 1727

Funding

1. This study was funded by the General Project of the Shanghai Pudong New Area Health Commission (grant no. PW2019A-44). 2. Jiangxi Province Municipal Health Commission Science Technology (Grant No. 20202113). 3. Sailing talent program for Shanghai East Hospital (grant no. DFYY-YH19).

Disclosure

The authors declare that they have no conflict of interest in this work.

References

1. Cardol M, de Jong BA, den Bos GA, Beelem A, de Groot IJ, de Haan RJ. Beyond disability: perceived participation in people with a chronic disabling condition. *Clin Rehabil*. 2002;16(1):27–35. doi:10.1191/0269215502cr464oa
2. World Health Organisation (WHO). *International Classification of Functioning, Disability, and Health*. Geneva: WHO; 2001.
3. Cardol M, Brandsma JW, de Groot IJ, den Bos GA, de Haan RJ, de Jong BA. Handicap questionnaire: what do you assess? *Disabil Rehabil*. 1999;21(3):97–105. doi:10.1080/096382899297819
4. Harwood RH, Rogers A, Dickinson E, Ebrahim S. Measuring handicap: the London Handicap Scale: a new outcome measure for chronic disease. *Qual Health Care*. 1994;3(1):11–16. doi:10.1136/qshc.3.1.11
5. Carr AJ, Thompson PW. Towards a measure of patient-perceived handicap in rheumatoid arthritis. *Br J Rheumatol*. 1994;33(4):378–382. doi:10.1093/rheumatology/33.4.378
6. Noreau L, Fougeyrollas P. Long-term consequences of spinal cord injury on social participation: the occurrence of handicap situations. *Disabil Rehabil*. 2000;22(4):170–180. doi:10.1080/096382800296863
7. Cardol M, de Haan RJ, den Bos GA, de Jong BA, de Groot IJ. Development of a handicap assessment questionnaire: impact on Participation and Autonomy (IPA). *Clin Rehabil*. 1999;13(5):411–419. doi:10.1191/026921599668601325
8. Cardol M, de Haan RJ, de Jong BA, den Bos GA, de Groot IJ. Psychometric properties of impact on participation and autonomy. *Arch Phys Med Rehabil*. 2001;82(2):210–216. doi:10.1053/apmr.2001.18218
9. Cardol M, Beelen A, den Bos GA, de Jong BA, de Groot IJ, de Haan RJ. Responsiveness to the Impact of Participation and Autonomy Questionnaire. *Arch Phys Med Rehabil*. 2002;83(11):1524–1529. doi:10.1053/apmr.2002.35099
10. Cardol M, De Jong BA, Ward CD, et al. Autonomy and participation in rehabilitation. *Disabil Rehabil*. 2002;24(18):970–974. doi:10.1080/09638280210151996
11. Kersten P. Impact on Participation and Autonomy(IPA): manual of the English version: IPA[EB/OL]. 2024. Available from: http://www.nivel.nl/sites/default/files/bestanden/INT-IPA-Manual.pdf. Accessed Mar 22, 2007.
12. Abilitylab SR. Impact of Participation and Autonomy Questionnaire[EB/OL]. Available from: https://www.sralab.org/rehabilitation-measures/impact-participation-and-autonomy-questionnaire. Accessed Dec 23, 2013.
13. Berenschot L, Grift Y. Validity and reliability of the (adjusted) Impact on Participation and Autonomy questionnaire for social support populations. *Health Quality Life Outcomes*. 2019;17(1):41. doi:10.1186/s12955-019-1106-0
14. Karhula ME, Salminen A-L, Hämäläinen PI, Ruutiainen J, Era P, Tolvanen A. Psychometric Evaluation of the Finnish Version of the Impact on Participation and Autonomy Questionnaire for Persons with Multiple Sclerosis. *Scand J Occup Ther*. 2017;24(6):410–420. doi:10.1080/11038128.2016.1272630
15. Vazirinejad R, Zakeri MA, Ahmadinia H, Rafsanjanipoor SMH. A preliminary validation of the impact on participation and autonomy questionnaire in an Iranian sample of patients with type 2 diabetes. *J Educ Health Promotion*. 2024;13(1):61. doi:10.4103/jehp.jehp_1655_22
16. Opara JA, Mehlich K, Bielecki A. Kwestionariusz wpływu na uczestnictwo i autonomie–impact on participation and autonomy (IPA) [Questionnaire impact on participation and autonomy (IPA)]. *Wiad Lek*. 2008;61(1–3):58–61.
17. Vazirinejad R, Joorian J, Lilley JM, Sayadi AAR, Sayadi Anari AR. Persian Version of a Participation Scale: is It Valid and Reliable Enough for Use among Iranian patients with MS. *J Clin Neurol*. 2015;11(2):157–163. doi:10.3988/jcn.2015.11.2.157
18. Sibley A, Kersten P, Ward CD, White B, Mehta R, George S. Measuring autonomy in disabled people: validation of a new scale in a UK population. *Clin Rehabil*. 2006;20(9):793–803. doi:10.1177/0269215506070808
19. Kersten P, Cardol M, George S, et al. Validity of the impact on participation and autonomy questionnaire: a comparison between two countries. *Disabil Rehabil*. 2007;29(19):1502–1509. doi:10.1080/09638280601030066
20. Lund ML, Fisher AG, Lexell J, Bernspang B. Impact on participation and autonomy questionnaire: internal scale validity of the Swedish version for use in people with spinal cord injury. *J Rehabil Med*. 2007;39(2):156–162. doi:10.2340/16501977-0031
21. Hammar IO, Ekelund C, Wilhelmson K, et al. Impact on participation and autonomy: test of validity and reliability for older persons. *Health Psychol Res*. 2014;2(3):1825. doi:10.4081/hpr.2014.1825
22. Franchignoni F, Ferriero G, Giordano A, et al. Rasch psychometric validation of the Impact on Participation and Autonomy questionnaire in people with Parkinson's disease. *Eura Medicophys*. 2007;43(4):451–461.
23. Fallahpour M, Jonsson H, Joghataei MT, et al. Impact on participation and autonomy (IPA): psychometric evaluation of the Persian version to use for persons with stroke. *Scand J Occup Ther*. 2011;18(1):59–71. doi:10.3109/11038121003628353
24. Preparation group of China Stroke Prevention and Control Report 2021, Wang Longde. Outline of the China Stroke Prevention and Treatment Report 2021. *Chin J Cerebrovascular Dis*. 2023;20(11):783–792.
25. Congjun W, Zixiao L, Hongqiu G, et al. China stroke report 2020(Chinese version)(2). *Chin Stroke J*. 2022;17(6):553–567.
26. Feigin VL, Stark BA, Johnson CO, GBD. Stroke Collaborators. Global, regional, and national burden of stroke and its risk factors, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet Neurol*. 2021;20(10):795–820. doi:10.1016/S1474-4422(21)00252-0
27. GBD. Stroke Risk Factor Collaborators. Global, regional, and national burden of stroke and its risk factors, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021. *Lancet Neurol*. 2024;23(10):973–1003. doi:10.1016/S1474-4422(24)00369-7