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ORIGINAL ARTICLE

Detecting Domestic Violence: Spanish External Validation of the Index of Spouse Abuse

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Abstract The aims of the study were to assess the psychometric properties of the Spanish version of the Index of Spouse Abuse (ISA), and to validate it against external criteria of intimate partner violence. The Spanish version of the ISA was administered to 223 non-abused women and 182 victims of intimate partner violence. Internal consistency coefficients oscillated between 0.88 and 0.98. The Confirmatory Factor Analysis failed to replicate the original two-factor structure. Using Exploratory Factor Analysis, a two-factor solution was found: physical (ISA-P) and non-physical (ISA-NP), but the items included in each factor were slightly different from the original two subscales. Receiver operating characteristic curve analysis revealed an AUC value for the ISA global score of 0.99 (95% CI: 0.98–0.99), with the optimal cut-off of 12 for detecting intimate partner violence. The Spanish version of the ISA is a valid instrument for detecting intimate partner violence in a female population.

Keywords Domestic violence · Intimate partner violence · Index of spouse abuse · Validation · Spanish

Intimate partner violence (IPV) is a pattern of abusive behaviors that includes a wide range of physical, sexual, and psychological maltreatment (American Psychological Association 1996). This definition includes maltreatment used by someone against another in an intimate relationship to gain power unfairly or maintain that person's misuse of power, control and authority (Walker 1999). Around the world, approximately one third of women have been battered or abused (World Health Organization 2002). In Spain, the prevalence of IPV has decreased with respect to

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previous years, being estimated at about 3.6%. Moreover, there was another 6% that did not perceive themselves as victims of IPV, despite the fact that they were technically maltreated according to IPV indicators (Women's Institute 2006). IPV is a chronic condition with serious adverse effects to health and potentially life-threatening consequences (Campbell 2002). IPV has been consistently associated with poorer physical health (Taft et al. 2007). The prevalence of psychiatric disorders in battered women is around 60% (Lorente 2001). The most prevalent among these are depressive disorders, post-traumatic stress disorder, anxiety disorders, eating disorders, substance abuse behavior and suicide attempts (Campbell 2002, 1989; Coker et al. 2002; Echeburúa and Corral 2002), as well as personality disorder symptoms (Pico-Alfonso et al. 2008).

The majority of studies have been developed for women suffering from physical abuse because it is more easily verifiable (Butterworth 2004; Leserman et al. 1997; Tang 1998). Nevertheless, less evident forms of IPV, such as psychological abuse are more frequent and it is suggested that psychological abuse has longer-term effects on mental health and women's psychological functioning (Pico-Alfonso 2005). Some studies found that psychological abuse has a unique and sometimes even greater impact on depression and PTSD than physical abuse (Campbell and Lewandowski 1997; Coker et al. 2000; O'Leary 1999; Street and Arias 2001; Weaver and Etzel 2003), although contradictory results were found due to methodological flaws (Follingstad 2009). Moreover, subjective reports by victims of IPV also suggest that women perceive psychological abuse as having a greater adverse effect than physical abuse (O'Leary 1999).The use of diagnostic instruments with demonstrated reliability and construct validity would facilitate the detection of women affected by IPV, as well as the comparability between studies.

Although several screening tools have been developed for the detection of IPV, there are only a few instruments validated in the Spanish population (Plazaola Castaño et al. 2006). Some widely used and well-validated instruments developed for English-speaking women are the Conflict Tactics Scale (CTS; Straus 1979), the Abuse Risk Inventory (ARI; Yegidis 1989), the Composite Abuse Scale (CAS; Hegarty et al. 1999), or the Index of Spouse Abuse (ISA; Hudson and McIntosh 1981). However, some limitations exist regarding the use of these instruments. The CTS has been criticized for including only a limited range of psychological abuse (verbal aggression), as well as for considering violence as a part of the conflict-resolution tactic (Straus 2007). The CTS was not specifically designed for measuring intimate partner violence. CTS does not include questions that elicit information about the intensity, context, consequences or intention of the action. Consequently, quantitative studies using CTS could be affected by measurement error (Hegarty et al. 1999). Even though the Revised Conflict Tactics Scale (CTS2; Straus et al. 1996) attempted to address the above limitations, it still encompassed limited situations of psychological abuse (Hegarty et al. 1999). Even though the ARI scale attempts to measure the full range of forms of abuse, it has been validated only on small samples (Yegidis 1989). The CAS includes a wide range of items about emotional, physical and sexual abuse, but additional psychometric properties and validation in clinical samples are needed (Hegarty et al. 1999). Other instruments, such as the Psychological Maltreatment of Women Inventory (PMWI; Tolman 1989), the Index of Psychological Abuse (IPA; Sullivan and Bybee 1999) or the Profile of Psychological Abuse (PPA; Sackett and Saunders 1999) were designed only for detecting and measuring psychological abuse and therefore are limited in application as a broad measure of IPV.

In contrast, the Index of Spouse Abuse (ISA) is an instrument designed to measure different types of spouse abuse: physical and non-physical abuse, including the degree or intensity of each abuse (Hudson and McIntosh 1981). The ISA is an instrument widely used in a variety of settings, such as incarcerated women (Eliason 2005), primary care (Coker et al. 2000, 2004), hospital emergency rooms (Feldhaus et al. 1997), perinatal clinics (Campbell et al. 1999), and support groups (Tutty et al. 1993). The ISA has been used as a "gold standard" in the validation of other IPV screening tools (Ernst et al. 2004). Each of the ISA items represents some form of behavior or partner interaction that is considered to be abusive, and each of the items represents different degrees of abuse severity (Hudson and McIntosh 1981). The physical abuse subscale (11 items) includes items about physically abusive behaviors, one item about sexually abusive behavior, as well as items about threats of physical violence (Cook et al. 2003). Some examples are item 13 "My partner threatens me with a weapon" and item 30 "My partner acts like he would like to kill me." Non-physical abuse subscale (19 items) includes items about different forms of psychological abuse, such as verbal abuse and domination, isolation and controlling behavior (Cook et al. 2003). Some examples are item 20 "My partner does not want me to socialize with my female friends" and item 11 "My partner insults or shames me in front of others." In order to accurately assess the severity of the abuse the original authors took into account the different degree of abuse measured by each item developing different item weights (Hudson and McIntosh 1981). The authors postulated that if the items were given equal weights, the scores may partially fail to reflect the fact that some women were more severely abused than others (Hudson and McIntosh 1981). Therefore, from the calibration study, item 17 "My partner beats me so badly that I must seek medical help" was considered as the most serious

form of spouse abuse, with an item weight of 98, whereas item 1 "My partner belittles me", with an item weight of 1, was considered the mildest form of spouse abuse.

Hudson and McIntosh's (1981) study designed and validated the ISA using three separate samples. The first sample, in which the factor analysis was conducted, consisted of 398 graduate and undergraduate female students from the University of Hawaii, whose mean age was 22.8 years, and only 16.6% were married. The second sample, used for developing the item weights, consisted of 188 graduate and undergraduate students from the University of Hawaii. In the last sample, used to establish the reliability and clinical cutoffs of the ISA, 107 women recruited from social agencies and protective shelters were assessed by experienced therapists as being victims of IPV. Sixty-four of the women were classified as IPV victims and 43 were classified as being free of IPV. The mean age was 29.9 years; 54% were married and 43.7% had one or two children. Reliability coefficients were reported separately for the second and third samples, but factor analysis was performed only on the student sample. Subsequent validation studies of the ISA have pointed out the need to adapt the ISA to specific populations, reporting different psychometric properties and factorial structure (Campbell et al. 1994; Cook et al. 2003; Eliason 2005).

There is a previous Spanish validation of this scale that reported partial information about its psychometric properties and cut-off scores (Plazaola Castaño et al. 2006). This was a cross-sectional study with a sample of 390 women recruited from a primary care setting. Cut-off scores were calculated by means of cluster analyses due to the absence of external criterion of IPV. Consequently, the sensitivity and specificity of proposed cut-offs remained unknown. Furthermore, ISA psychometric properties in battered women are unknown due to the limited cases of IPV victims included in this study. To our knowledge, no studies with a Spanish population have validated the ISA against external criteria of IPV.

The main objectives of the present study were to: 1) obtain the item weights of the Spanish version of the ISA in a sample of female students (calibration study), and 2) examine the psychometric properties and to validate the Spanish ISA in a sample of victims of IPV and non-abused control women (validation study).

Objective 1 Calibration Study

For the first objective (calibration study), a sample of undergraduate students rated the severity of each item in order to develop the Spanish item weights. The item weights were necessary for the scoring process of the ISA. Hudson and McIntosh (1981) computed the ISA scores by multiplying the item frequency by the item weight. Next, the weight-by-frequency scores were summed and finally converted to scores from 0 to 100 (Hudson and McIntosh 1981; Eqs. 1 to 5).

Method

Participants

The calibration sample consisted of 310 undergraduate female students from the Faculty of Psychology at a public university. Students were recruited during the months of May, June and October of 2006. All subjects gave informed consent to participate in the study. Mean (SD) age was 21.6 (2.4) (range: 19–39). 5.1% were not Spanish. A total of 64.4% had a partner relationship.

Procedure

Each of the participants was asked to rate each of the ISA items in terms of the seriousness of the abuse by means of a score from 1 to 100. Researchers had predetermined the least serious form of spouse abuse (item 1: "My partner belittles me"). Two or more items perceived as equivalent in grade of severity could be rated with the same score. In order to compute the item weights, the scaling procedure was based on the Thurstone's law of comparative judgments, according to the procedure used by Hudson and McIntosh (1981). The ratings were used to generate all possible paired comparisons, which were converted into scale weights according to the procedures described by Nunnally (1978). To obtain scale values, the frequencies with which item i was judged as more severe than item j were placed in a frequency (F)-matrix, after which the proportion (P)–matrix was obtained by computing the proportion corresponding to the frequencies in the F-matrix. Subsequently, the standardized z-values related to the proportions were determined to produce a Z-matrix. The zij-values in each column were summed and placed in order of succession, after which the mean z–values were calculated and regarded as the scale value. A constant was added to the scale values to obtain positive values. Final values were transformed to have a range from 1 to 100.

Results

Table 1 shows final scale weights for the ISA items obtained in the Spanish sample as well as in the original calibration sample. In our sample, most of the items obtained higher weights than those of the original study. Rank order was in general similar, with the exception of item 5, considered largely more serious in the Spanish sample, and item 24, considered more serious in the original calibration sample.

Table 1 Scale weights for the ISA items studied in a sample of 310 undergraduate female university students

Item	Weight		Rank order	
	Spain (N=310)	USA	Spain (N=310)	USA
1	2	1	1	1
2	35	17	5	10
3	32	15	3	8
4	73	50	21	22
5	53	4	12	2
6	38	8	6	3
7	91	75	26	26
8	54	26	13	15
9	49	8	9	3
10	57	20	15	12
11	72	41	20	20
12	42	15	7	8
13	100	82	30	29
14	33	12	4	5
15	55	20	14	12
16	49	14	9	7
17	96	98	29	30
18	60	21	16	14
19	25	13	2	6
20	44	18	8	11
21	81	52	24	23
22	79	38	23	18
23	95	80	28	27
24	70	65	18	25
25	51	29	11	16
26	60	39	16	19
27	77	44	22	21
28	81	55	24	24
29	71	29	19	16
30	92	80	27	27

Discussion

The main goal of study 1 was to obtain the Spanish item weights of the ISA, which are taken into account in the scoring procedure (Appendix B). The use of undergraduate university students for the assessment of severity of the abuse could be debated due to the generalizability of the results. In particular, socio-demographic characteristics differ from the IPV victims described in study 2. Future calibration studies may consider the use of IPV victims to calibrate the items. In comparison with the US weights, the Hudson and McIntosh's (1981) calibration sample was also composed by university students, so the item weights were comparable and the differences between them could be more attributable to cultural and historic factors than to socio-economic and educational factors. Item 5 ("My partner becomes very upset if dinner, housework or laundry is not done when he thinks it should be") is considered more serious in the Spanish calibration sample in comparison with the American sample. Historical differences in gender roles ideology could partially be associated with this discrepancy. Moreover, recent Spanish legislation about Gender Violence (Spanish Congress 2004), with special emphasis on achieving equality between both genders, could have influenced attributions and perceptions about behaviors that were previously socially accepted. In contrast, item 24 ("My partner becomes aggressive when he drinks") is considered more serious in the American calibration sample. This difference could be associated to the Spanish permissiveness about alcohol consumption, which is clearly part of the so-called "wet-drinking cultures" (Gual 2006). Although several authors have considered items about alcohol consumption as a measure of alcohol related problems or a measure of intimate partner homicide (Cook et al. 2003; Sharps et al. 2001), the perception of item 24 as less serious in the Spanish calibration sample is in accordance with the fact that in Spain the social perception of risks associated with alcohol consumption has shown a decreasing tendency over recent years (Gual 2006).

Objective 2 Validation Study

In the validation study, the Spanish version of ISA was administered to a sample of victims of IPV and non-abused control women in order to assess its psychometric properties and validate it against external criteria of intimate partner violence.

Method

Participants

A case control, cross-over study was designed to validate the ISA for detection of IPV. All participants were women aged 18 years or older who had been in a partner relationship within the previous year and involved with an intimate relationship for at least one year. Exclusion criteria were illiteracy or non-comprehension of Spanish. All women gave informed consent to participate in the study. The study protocol was approved by the institutional review board. Participants were recruited between July, 2005 and April, 2007. Victims of IPV were recruited from Domestic Violence Centers and non-abused control women were recruited from Primary Care Centers. The women identified as victims of IPV in Primary Care Centers were reassigned to the group of cases (victims of

IPV), in order to obtain a subgroup of victims with less severe forms of violence, who did not seek help and/or who did not recognize her situation as compatible with domestic violence (Hudson and McIntosh, 1981; Plazaola Castaño et al. 2006).

Measures

Index of Spouse Abuse (ISA; Hudson and McIntosh 1981) The ISA is a 30-item self-report inventory that measures the severity of physical and/or psychological abuse in an intimate relationship. It can be completed in approximately 5 minutes. The ISA is rated on a 5-point scale ranging from 1 (never) to 5 (very frequently). Scoring includes the item calibration to obtain a more valid measure of seriousness of abuse. Three different scores can be computed: ISA-P (severity of physical abuse), ISA-NP (severity of non-physical abuse), and ISA global score. All three scores range from 0 to 100 where lower scores represent the relative absence of IPV and higher scores represent the most severe forms. Original English validation obtained excellent reliability coefficients. The clinical cut-off scores were 10 for ISA-P, and 25 for ISA-NP (Hudson and McIntosh 1981).

Clinical Semi-Structured Interview The Semi-Structured Interview was based on the interview published by the Spanish Institute of Women (1999, 2002). The interview was designed to estimate the prevalence of IPV as reported in three larger epidemiological studies (Institute of Women 1999, 2002, 2006). It included 26 indicators of IPV, 13 mild and 13 strong markers (Institute of Women 1999). To facilitate the answers the clinical interviewer asked an open question about each indicator, introducing some examples. If the reply was affirmative the interviewer asked the women to explain the situations and their characteristics with detail. The psychologist asked about the severity, frequency, recurrence and chronicity of each situation. A woman was diagnosed as a victim of IPV if she was positive on at least one of the 13 strong markers, according to the interview criteria published by the Institute of Women (1999). For the current study additional items such as the presence and type (psychological and/or physical) of IPV during last year were included. The inter-rated reliability study showed excellent kappa's statistic results (*Kappa*=0.83; *N*=40).

Procedure

The study protocol followed the ethics and safety recommendations of research in Domestic Violence required by the World Health Organization (2001). Women were invited to participate by their health or social worker (L.G., M.J.T and Z.H.), who fully explained the study, obtained the signed informed consent form, collected socio-demographic data, and administered the ISA. All participants were subsequently interviewed by two blind trained psychologists (A.T. and P.N.) with the Semi-Structured Clinical Interview in order to establish the presence and type of IPV. Partners were not present in the assessment process. In case of diagnosis doubts in Primary Care Centers a Longitudinal Expert All Data Procedure for diagnosis of IPV was formulated on the basis of the clinical interview and all available clinical data: from health professionals, from social workers, and medical records (Spitzer 1984).

Statistical Analysis

Differences between victims of IPV and non-abused control women with respect to the socio-demographic variables were analyzed using the Chi-square test, Student's t-test, as well as the analysis of variance (ANOVA). Internal consistency was calculated using Cronbach's alpha coefficients and the correlations of each item with their corrected scale (Stewart and Ware 1992). A Confirmatory factor analysis was conducted with Amos 7.0 (Arbuckle 2006), using maximum likelihood procedure as the technique for parameter estimation (Hoyle 1995). Chi square statistics as well as the Comparative Fit Index (CFI), the Incremental Fit Index (IFI), and the Root Mean Square Error of Approximation (RMSEA) were used as model fit indices. Adequate model fit is achieved if CFI and IFI indices are greater than 0.90 (Hoyle and Panter 1995) and the RMSEA value is below 0.05 (Byrne 2001). Exploratory Factor Analyses were performed using the principal components extraction method retaining different numbers of factors (from two to four). Factors extracted were rotated to an oblique Oblimin criterion. Best solution was established through standard rules for the number of factors (Kaiser, Scree test), as well as replication criteria, simple structure, and psychological interpretability. Scores were computed using the scoring procedure described by the original authors (Hudson and McIntosh 1981), with the Spanish item weights obtained in our calibration study 1 (Appendix B). The validity of the ISA for detecting IPV was analyzed using two different definitions of a case: 1) IPV (physical and/or psychological) for the validation of the ISA global score and ISA-NP (non-physical subscale); 2) only physical IPV for the validation of ISA-P (physical subscale). Receiver operating characteristic (ROC) curves were also constructed (Zweig and Campbell 1993), and the area under the curve (AUC) was calculated with a 95% confidence interval (CI). Sensitivity, specificity and the Positive Predictive Value (PPV) and Negative Predictive Value (NPV) were calculated for a range of cut-off scores against external criteria of IPV. PPV and NPV were calculated using the prevalence rates of IPV (17.8%) and physical IPV (5.4%) obtained in Spanish Primary Care Centers (Ruiz-Pérez et al. 2006). Analyses were performed

using the SPSS (version 14.0) computer program. Statistical significance was set at $p<0.05$.

Results

A total of 462 women were contacted to participate in the study. Nine women did not meet the inclusion criteria and forty eight declined to participate; consequently a total of 405 women (89.4%) were included in the study. One hundred thirty-nine women were recruited from Domestic Violence Centers and 266 women from Primary Care Centers. According to the Semi-structured Interview, 43 women recruited from Primary Care Centers were identified as victims of IPV and, consequently, were reassigned to the case group. The final sample included 223 non-abused women and 182 victims of IPV (116 with psychological IPV, and 66 with physical and psychological IPV). IPV victims, in comparison with non-abused control women, were separated or divorced ($p<0.001$), had more children ($p<0.001$), lower education level ($p<0.001$), were more frequently unemployed ($p=0.001$) and had a monthly household income lower than 1,300 Euros ($p<0.001$) (Table 2). Victims of IPV scored significantly higher than non-abused women on all the ISA scores ($p<0.001$) (Table 3).

Factor Structure and Internal Reliability

In the Confirmatory Factor Analysis, there was unsatisfactory index-of-fit indices ($\chi^2=2905.53$; $\chi^2/df=7.19$; $CFI=0.80$; $IFI=0.80$; $RMSEA=0.12$), suggesting that the original ISA factor structure did not fit the present data. A series of Exploratory Factor Analyses with Principal Component Analysis and Oblimin rotations were performed with all women ($N=405$) and in the group of IPV victims ($N=182$) as complementary analysis. The Kaiser-Meyer-Olkin coefficient was 0.97, verifying a good fit of the data to the factor analysis. The two-factor solution was selected by means of psychological interpretability, replication and simple structure criteria. The two-factor structure, which accounted for 69% of common variability in the EFA performed on all women, and 49% of variability in the EFA performed in the group of IPV victims, is presented in Table 4. The scale-loading pattern of each factor was comparable between samples. However, in the IPV sample factor loadings were lower than in the whole sample. Factor 1 represented a

Table 2 Socio-demographic characteristics of the validation study sample

Socio-demographics		All women ($N=405$)		IPV victims ($n=182$)		Non-abused women ($n=223$)		Chi-square test		
		n	%	*n*	%	*n*	%	χ^2	*d.f.*	*Sig.*
Nationality	Spain	357	88.1	156	85.7	201	90.1	1.87	1	0.17
	Other	48	11.9	26	14.3	22	9.9			
Educational level	Primary	136	33.6	79	43.4	57	25.6	21.29	2	<0.001
	Secondary	155	38.3	70	38.5	85	38.1			
	University	114	28.1	33	18.1	81	36.3			
Marital status	Married	209	51.6	48	26.7	161	72.2	116.66	3	<0.001
	Single	81	20	37	20.6	44	19.7			
	Separated/ Divorced	111	27.4	95	52.8	16	7.2			
	Widow	2	0.5	0	0	2	0.9			
Number of children	None	89	22	23	12.6	66	29.6	20.51	2	<0.001
	One	138	34.1	61	33.5	77	34.5			
	Two or more	178	44	98	53.8	80	35.9			
Employment status	Employed	249	61.5	100	60.2	149	70.3	19.98	4	0.001
	Unemployed	51	12.6	35	21.1	16	7.5			
	Housewife	55	13.6	20	12	35	16.5			
	Student	4	1	0	0	4	1.9			
	Retired	19	4.7	11	6.6	8	3.8			
Monthly household income	<1.300 eur.	115	28.4	94	52.8	21	9.5	100.78	2	<0.001
	≈1.300 eur.	95	23.5	41	23	54	24.4			
	>1.300 eur.	189	46.7	43	24.2	146	66.1			
		Mean	SD	Mean	SD	Mean	SD	*t*	*d.f.*	*Sig.*
Age		38.9	10.3	39.8	11.2	38.2	9.5	−1.509	403	0.13

Table 3 Mean and standard deviations of ISA scores

ISA scores	IPV victims (n=182)		Non-abused women (n=223)		T-Test	
	Mean	SD	Mean	SD	t	*Sig.*
ISA global scores	43.83	21.30	2.54	4.31	−25.72	<0.001
ISA-P scores	23.69	23.31	0.64	1.98	−13.30	<0.001
ISA-NP scores	53.19	23.73	3.43	5.99	−27.58	<0.001

IPV: intimate partner violence; ISA-NP: subscale ISA non-physical; ISA-P: subscale ISA physical

measure of non-physical abuse (ISA-NP), and included all the original items considered as "markers" of non-physical abuse (1, 2, 5, 6, 8, 9, 10, 14–16, 18–20, 26, 29), as well as items 4, 11, 12, 19, 21, 22, 25, 27 and 28. Factor 2 represented a measure of physical abuse (ISA-P), and also included the original items considered "markers" of physical abuse (items 7, 13, 17, 23, 24, 30) as well as item 3.

Cronbach's alfa coefficients were 0.98 for the ISA global scale, 0.98 for the ISA-NP, and 0.88 for the ISA-P. Corrected item-scale correlations were higher than 0.4. In addition, all the items showed the highest correlation with the scale assigned, with the exception of item 30, which maintained the highest correlation with the ISA-NP. Both subscales were highly correlated (r=0.74, p<0.001). Table 5 shows the internal consistency of the ISA with respect to all the women as well as a complementary analysis in the group of IPV victims only. Cronbach's alfa coefficients in the IPV sample ranged from 0.83 to 0.94.

Table 4 Exploratory factor analysis of the ISA with all women and with the group of IPV victims

items	All women (N=405)			IPV victims (N=182)		
	F1: ISA-NP	F2: ISA-P	h^2	F1: ISA-NP	F2: ISA-P	h^2
1	0.906	−0.023	0.795	0.655	−0.001	0.429
2	0.841	0.005	0.712	0.651	−0.016	0.416
3	0.035	0.670	0.479	−0.143	0.757	0.514
4	0.596	0.185	0.529	0.521	0.135	0.341
5	0.879	−0.071	0.700	0.738	−0.132	0.491
6	0.749	0.074	0.635	0.547	0.138	0.373
7	0.086	0.805	0.743	0.203	0.698	0.632
8	0.685	0.084	0.549	0.563	0.057	0.344
9	0.845	0.014	0.728	0.698	−0.026	0.474
10	0.964	−0.109	0.809	0.804	−0.166	0.577
11	0.727	0.176	0.719	0.602	0.212	0.500
12	0.854	0.026	0.758	0.656	0.107	0.493
13	0.001	0.695	0.483	0.141	0.545	0.374
14	0.754	0.058	0.626	0.550	0.028	0.314
15	0.858	−0.028	0.707	0.647	−0.026	0.407
16	0.894	−0.168	0.639	0.706	−0.207	0.435
17	−0.084	0.826	0.602	0.019	0.684	0.477
18	0.801	−0.163	0.505	0.659	−0.209	0.377
19	0.806	0.073	0.729	0.586	0.112	0.404
20	0.853	0.051	0.785	0.714	0.057	0.543
21	0.715	0.073	0.582	0.585	0.031	0.356
22	0.858	0.095	0.848	0.697	0.161	0.594
23	0.105	0.773	0.711	0.228	0.677	0.622
24	0.094	0.701	0.583	−0.055	0.759	0.549
25	0.897	0.000	0.803	0.806	−0.010	0.644
26	0.887	0.020	0.811	0.664	0.077	0.484
27	0.698	0.231	0.743	0.676	0.208	0.602
28	0.794	0.154	0.808	0.671	0.188	0.577
29	0.918	0.032	0.881	0.869	0.007	0.760
30	0.456	0.483	0.717	0.445	0.499	0.609

IPV: intimate partner violence; ISA-NP: subscale ISA non-physical; ISA-P: subscale ISA physical; h^2: communality

Table 5 Internal consistency of the ISA in all women and in the group of IPV victims

Item	All women (N=405)						IPV victims (N=182)					
	ISA global		ISA-P		ISA-NP		ISA global		ISA-P		ISA-NP	
	r item-scale	α-item	r item-scale	α-item	r item-scale	α-item	r item-scale	α-item	r item-scale	α-item	r item-scale	α-item
1	0.86	0.97	0.62		0.88	0.97	0.58	0.94	0.30		0.60	0.94
2	0.82	0.97	0.59		0.83	0.98	0.58	0.94	0.28		0.61	0.94
3	0.50	0.97	0.64	0.86	0.47		0.28	0.94	0.57	0.81	0.19	
4	0.70	0.97	0.57		0.69	0.98	0.56	0.94	0.36		0.54	0.94
5	0.80	0.97	0.53		0.81	0.98	0.60	0.94	0.24		0.64	0.94
6	0.78	0.97	0.59		0.76	0.98	0.58	0.94	0.37		0.54	0.94
7	0.65	0.97	0.75	0.85	0.60		0.56	0.94	0.67	0.79	0.44	
8	0.71	0.97	0.55		0.71	0.98	0.54	0.94	0.33		0.55	0.94
9	0.83	0.97	0.61		0.83	0.97	0.63	0.94	0.34		0.64	0.94
10	0.86	0.97	0.57		0.87	0.97	0.64	0.94	0.24		0.68	0.94
11	0.83	0.97	0.67		0.81	0.98	0.66	0.94	0.46		0.64	0.94
12	0.85	0.97	0.61		0.85	0.97	0.66	0.94	0.37		0.65	0.94
13	0.49	0.97	0.56	0.87	0.46		0.42	0.94	0.48	0.82	0.36	
14	0.77	0.97	0.59		0.77	0.98	0.51	0.94	0.33		0.51	0.94
15	0.81	0.97	0.59		0.81	0.98	0.57	0.94	0.30		0.59	0.94
16	0.74	0.97	0.49		0.76	0.98	0.54	0.94	0.20		0.58	0.94
17	0.50	0.97	0.60	0.87	0.44		0.37	0.94	0.51	0.82	0.29	
18	0.65	0.97	0.41		0.65	0.98	0.48	0.94	0.13		0.51	0.94
19	0.83	0.97	0.62		0.83	0.97	0.58	0.94	0.36		0.57	0.94
20	0.87	0.97	0.66		0.87	0.97	0.70	0.94	0.42		0.71	0.93
21	0.74	0.97	0.55		0.73	0.98	0.55	0.94	0.30		0.55	0.94
22	0.91	0.97	0.70		0.90	0.97	0.73	0.94	0.47		0.72	0.93
23	0.65	0.97	0.74	0.85	0.59		0.57	0.94	0.67	0.79	0.46	
24	0.59	0.97	0.73	0.85	0.54		0.36	0.94	0.63	0.80	0.25	
25	0.87	0.97	0.62		0.87	0.97	0.73	0.94	0.36		0.75	0.93
26	0.88	0.97	0.63		0.88	0.97	0.65	0.94	0.35		0.63	0.94
27	0.84	0.97	0.72		0.82	0.98	0.73	0.94	0.52		0.71	0.93
28	0.88	0.97	0.72		0.88	0.97	0.71	0.94	0.51		0.70	0.93
29	0.92	0.97	0.68		0.92	0.97	0.81	0.94	0.42		0.83	0.93
30	0.78	0.97	0.71	0.85	0.76		0.68	0.94	0.58	0.81	0.62	
Global		0.97		0.87		0.98		0.94		0.83		0.94

IPV: intimate partner violence; ISA-NP: subscale ISA non-physical; ISA-P: subscale ISA physical

Validation of the ISA for Detection of Intimate Partner Violence

The AUC value for ISA global score was 0.99 (95% CI: 0.98–0.99), indicating an excellent validity for detecting IPV (Fig. 1). For the ISA global score, 12 was the optimal cutoff for detecting IPV, with a sensitivity of 95.1 (95% CI: 91.6–98.5), a specificity of 94.8 (95% CI: 91.6–98.0), a PPV of 79.9% and a NPV of 98.9%.

For the ISA subscales, AUC values ranged from 0.90 (95% CI: 0.86–0.93) for ISA-P to 0.98 (95% CI: 0.98–0.99) for ISA-NP, indicating a good to excellent validity for detecting physical IPV and for all cases of IPV, respectively (Fig. 1). For the ISA-P, 7 was the optimal cut-off for detecting physical IPV (N=66 cases versus N=339 controls), attaining a sensitivity of 92.2 (95% CI: 84.8–99.5), a specificity of 78.0 (95% CI: 73.5–82.5), a PPV of 19.3%, and a NPV of 99.4%. For the ISA-NP, 14 was the optimal cut-off for detecting IPV (N=182 cases versus N=223 controls), attaining a sensitivity of 94.5 (95% CI: 9.0–98.1), a specificity of 93.3 (95% CI: 89.8–96.8), a PPV of 75.2% and a NPV of 98.7%.

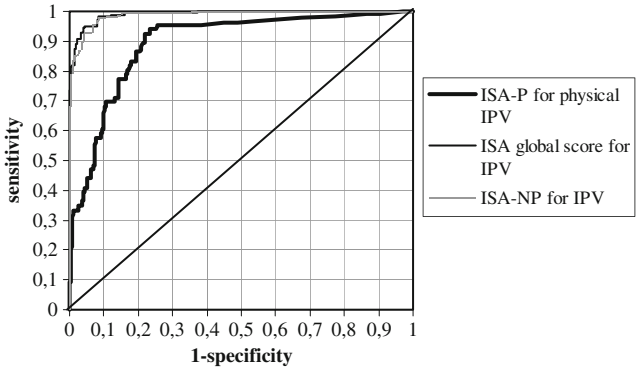

Fig. 1 Receiver operating characteristic (ROC) curves of the ISA global score, ISA-P and ISA-NP

Discussion

In the present study, we validated for the first time the Spanish version of the ISA against a "gold standard" or external criteria of "case" (women victims of IPV), using a case-control design. The Spanish ISA showed good psychometric properties for the detection of physical and psychological IPV in our population.

The Confirmatory Factor Analysis did not replicate the structure found by the original authors in our Spanish sample (Hudson and McIntosh 1981). Consequently, Exploratory Factor Analyses were performed in order to assess the underlying structure of the Spanish version of the ISA. Two factors, ISA-P (physical) and ISA-NP (non-physical), were identified, both in all women as well as solely in the sample of IPV victims, although with slightly different item distribution for to each factor in comparison to the original study (Hudson and McIntosh 1981), or studies from El Salvador (Sierra et al. 2007) and China (Tang 1998). Original items considered "markers" of physical IPV (items 7, 13, 17, 23, 2 4, 30), as well as item 3, which refers to alcohol consumption, comprised the Spanish ISA-P factor. Therefore, the physical abuse component of this factor was undoubtedly established. The remaining items comprised the ISA-NP factor, characterized by a non-physical abuse component, with items that refer to unreasonable demands, controlling behavior, isolation and verbal abuse, as well as one item about sexual abuse. The items that comprise the ISA-NP factor are very heterogeneous and refer to several types of psychological maltreatment, including emotional / verbal abuse as well as dominance / isolation / controlling behavior. Regarding this, several authors have identified a structure of the ISA which is composed of three factors; the third factor assesses controlling behavior (Campbell et al. 1994; Cook et al. 2003; Eliason 2005), considered related but distinct to the emotional/verbal abuse factor (intimidation and derision). In our sample all of these items were grouped in a single factor. More research is needed using confirmatory factor analyses to increase knowledge about the different types of IPV covered by the ISA.

Internal consistencies for the subscales ISA-P and ISA-NP were excellent, as well as the Cronbach's alfa for the ISA global score. Excellent reliability coefficients were found both in the global sample as well as solely in IPV victims. These results, as well as the highest correlation between the two subscales (r=0.74), suggest that the ISA could be simplified by using a single score (the ISA global score). The original authors, as well as several subsequent studies, suggest a possibility for the one-dimensional solution of ISA for future validation studies (Eliason 2005). This verifies the widespread views of psychological and physical IPV, conceptualized as a continuum rather than as independent dimensions (Cascardi et al. 1995; Coker et al. 2000; Follingstad et al. 1990; Ratner 1993; Walker 1984).

In contrast with previous studies that considered the ISA global score secondary, we propose the global score as the more valid and accurate measure of IPV due to its excellent psychometric properties. A cut-off score of 12 proposed for detecting IPV optimized both sensitivity and specificity near to 95%. Differences in the case selection method employed could explain the lower Spanish cut-off scores proposed for ISA-P (7) and ISA-NP (14) subscales compared with previously reported scores (Hudson and McIntosh 1981; Tang 1998). The original authors recruited cases from protective shelters only, selecting the most severely abused women. In contrast, in our study cases were recruited from Domestic Violence Centers as well as from Primary Care Centers, improving the breadth of representation of the sample. On the other hand, our results were similar to those of the previous Spanish validation that reported the same threshold of the ISA-NP, although a cut-off score slightly greater for the ISA-P (Plazaola Castaño et al. 2006) was identified.

Limitations of the Study

Several cautions must be taken into account. Although 7.6% of the sample was from Latin American countries and the ISA achieved adequate comprehensibility in this population, the translation of the ISA has employed expressions not used outside of Spain ("Me dice que no puedo apañarme o arreglarme sin él", "Pone pegas a que me relacione con mis amigas"), therefore the utility of this translation with other Spanish speaking populations remains to be determined. The weighting system used is unique to Spain; therefore, this may be taken into account if the item weights are used in Latin American populations. Finally, the weighted score system adds complexity in computing the scores (Eliason 2005; Plazaola Castaño et al. 2006). Nevertheless, computer-based programs could simplify the scoring process (Eliason 2005).

Conclusions

This study provides a Spanish version of the ISA, a widely used tool for detecting and measuring the intensity of IPV. The Spanish version of the ISA includes a computer-based program which will be available online. This validation provides item weights and clinical cut-off scores for an ISA global score and for both subscales, established against external criteria of IPV using a case-control design. Regarding cut-off scores, we propose the use of an ISA global score threshold of 12 as the most valid and reliable measure for Spanish woman at risk of IPV. The sample includes a large number of clinically diagnosed cases of IPV. Results replicated the good psychometric properties determined in the original study. Additionally, the ISA showed excellent psychometric properties in a sample of IPV victims. ISA is a good tool to improve the detection of this under-recognized problem in female populations.

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Appendix A: Spanish version of Index of Spouse Abuse

Este cuestionario ha sido diseñado para valorar aspectos negativos en el trato que Ud, recibe en su relación de pareja, No se trata de un examen, no hay respuestas verdaderas o falsas. Conteste cuidadosamente a cada afirmación marcando con una "X" la respuesta elegida:

Mi pareja:		Nunca	Raras veces	De vez en cuando	Frecuen-temente	Muy Frecuen-temente
1.	Me menosprecia					
2.	Exige obediencia a sus caprichos					
3.	Se pone de mal humor y se enfada si le digo que ha bebido demasiado					
4.	Me obliga a tener relaciones sexuales que me desagradan					
5.	Se enfada mucho si no tiene la comida, las tareas domésticas o la ropa lista cuando él quiere					
6.	Es celoso y desconfía de mis amigos					
7.	Me da puñetazos					
8.	Me dice que soy fea y poco atractiva					
9.	Me dice que no puedo apañarme o arreglarme sin él					
10.	Se comporta como si yo fuera su sirvienta					
11.	Me insulta y me avergüenza delante de los demás					
12.	Se enfada mucho si no le doy la razón					
13.	Me amenaza con un arma					
14.	Es tacaño en darme dinero para la casa					
15.	Me subestima intelectualmente					
16.	Quiere que me quede en casa para cuidar a los hijos					
17.	Me pega tan fuerte que tengo que ir a Urgencias					
18.	Piensa que no debo trabajar o estudiar					
19.	Es una persona poco amable					
20.	Pone pegas a que me relacione con mis amigas					
21.	Exige sexo sin importarle mi consentimiento					
22.	Me grita y me insulta					
23.	Me golpea en la cara y en la cabeza					
24.	Se vuelve agresivo cuando bebe					
25.	Siempre está mandándome					
26.	Desprecia mis sentimientos					
27.	Se comporta conmigo como un matón					
28.	Me amenaza					
29.	Me trata como si fuese una burra o imbécil					
30.	Se comporta como si quisiera matarme					

Appendix B: Scoring procedure

a) ISA global score:

   1- To compute a product score (*P*) by multiplying the item score (*I*) by the item weight (*W*): $P=(I)(W)$
   2- To compute the minimum possible sum-score (MIN) by adding up all the item weights: $MIN=\sum W$
   3- Computing the ISA global score (*S*): $S=(\sum P-MIN)(100)/[(MIN)(4)]$

b) ISA-P score:

   1- To compute a product score (*P*) by multiplying each physical item score (*I*) by the item weight (*W*): $P=(I)(W)$ (items 3,7,13,17,23,24,30)
   2- Computing the ISA-*P* score: $ISA\text{-}P=(\sum P/576-1) * 25$

c) ISA-NP score:

   1- To compute a product score (*P*) by multiplying each non-physical item score (*I*) by the item weight (*W*): $P=(I)(W)$ (items 1,2,4,5,6,8,9,10,11,12,14,15,16,18–22, 25–29)
   2- Computing the ISA-NP score: $ISA\text{-}NP=(\sum P/1241-1) *25$

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