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Estimation of cutoff for the Severity of Dependence Scale (SDS) for opiate dependence by ROC analysis

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Background. The Severity of Dependence Scale (SDS) is a five-item scale that has been reported to be a reliable and valid screening instrument for dependence in several types of substances. Optimal cutoff points on the SDS indicative of clinically significant dependence have been determined for a large range of substance types, however, to date no data have been reported on its performance in a population with opiate dependence.

Sample. A structured interview was administered to 315 opiate-dependent patients in treatment.

Method. The diagnostic performance of the SDS was measured via Receiver Operating Characteristic (ROC) analysis according to the DSM-IV diagnosis of heroin dependence, as measured by section 12 of the Schedule for Clinical Assessment in Neuropsychiatry (SCAN).

Results. ROC analysis revealed the SDS to be a test of high diagnostic utility for the measurement of opiate dependence (Area Under Curve = 0.8875). The cut-off point on the SDS at which there is optimal discrimination between the presence and absence of a diagnosis of heroin dependence was found to be 5 (i.e. a score of 5 or more). This score provides the best trade-off between sensitivity (83.15%) and specificity (84.51%). Similar results were found for heroin current consumption (AUC = 0.8325; cut-off = 5; sensitivity = 77.94 and specificity = 77.33).

Conclusion. The SDS can be recommended as an effective short instrument for the discrimination of the degree of dependency and heroin consumption in the clinical area.

Key words:

Severity of dependence scale, opiates, heroin

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Estimación de un punto de corte para la Escala de Severidad de la Dependencia (SDS) para la adicción a opiáceos mediante análisis ROC

Contexto. La escala de severidad de la dependencia (SDS) es una escala de cinco ítems que ha mostrado su fiabilidad y validez como instrumento de cribado de la dependencia en varios tipos de sustancias. El punto de corte óptimo de la SDS indicativo de la significación clínica de la dependencia ha sido determinado para un rango amplio de drogas, pero a día de hoy no se ha informado del valor del mismo para el caso de la dependencia a opiáceos.

Muestra. Se ha administrado una entrevista estructurada a 315 personas con dependencia a opiáceos en tratamiento.

Método. La capacidad diagnóstica de la SDS ha sido evaluada a través de análisis de la curva característica operativa del receptor (ROC) tomando como estándar el diagnóstico de dependencia según criterios DSM-IV a través de la sección 12 del SCAN.

Resultados. El análisis ROC presenta la SDS como una prueba de alta utilidad diagnóstica para la valoración de la dependencia de opiáceos (Área Bajo la Curva = 0,8875). El punto de corte óptimo de la SDS para la discriminación entre la presencia y ausencia de diagnóstico de dependencia de opiáceos ha sido de 5 (una puntuación mayor o igual a 5), el cual presenta el mejor balance comparativo entre la sensibilidad (83,15%) y la especificidad (84,51%). Similares resultados se han encontrado para el consumo actual de heroína (ABC = 0,8325; Punto de corte = 5; Sensibilidad = 77,94% y Especificidad = 77,33%).

Conclusión. La escala SDS puede ser recomendada como un instrumento breve efectivo para la discriminación del grado de dependencia y consumo de heroína en el ámbito clínico.

Palabras claves:

Escala de severidad de la dependencia, opiáceos, heroína

INTRODUCTION

Measurement of substance dependence is a central question within the addiction setting. The theory that expresses this construct is developed based on the concept of the alcohol dependence syndrome given in the works of Edward and Gross,¹ whose adaptation to the remaining psychoactive substances has provided a basis for the ICD-10 and DSM-IV nosological systems. Both taxonomies have adapted the concept of dependence as a combination of inter-related physical, psychological and behavioral symptoms. The operationalization of these symptoms has made it possible to develop many measurement instruments which, to a greater or lesser degree, cover the contents specified in them.

Since the decade of the 80s of the past century, a joint program has been under development in collaboration between the WHO and the ADAMHA (Alcohol, Drug Abuse, and Mental Health Administration). Its objective has been to develop psychiatric examination instruments based on the ICD and DSM nosological systems and to use these instruments internationally. These instruments are: the CIDI (Composite International Diagnostic Interview) and the SCAN (Schedules for Clinical Assessment in Neuropsychiatry). Each one of them has sections aimed at the evaluation of substance dependence disorders. Both structured interviews have very adequate psychometric characteristics, but they require great time dedication for their administration, which is not very adequate within the clinical action setting. However, both instruments are considered as a gold standard for the diagnostic evaluation of psychiatric disorders and, therefore, of addictive disorders.

Notwithstanding, the need to have short but adequate instruments for the evaluation of the dependence construct has given rise to some interesting alternatives. One of the currently-used scales to measure this construct is the Severity of Dependence Scale (SDS). This scale was developed by the Gossop group²⁻³ and its objective is to measure the psychological components of the dependence. It is made up of 5 items that provide a dimensional evaluation and defines

the persons on a continuum according to the severity grade.

The scale has been tested for the evaluation of severity associated to different substances: opiate,²⁻⁴ cocaine,⁵ amphetamines,⁶ benzodiazepines,⁷ cannabis,⁸⁻⁹ and alcohol.^{4,10} In every case, the SDS has shown appropriate psychometric characteristics and has been considered a useful instrument to be used within the clinical setting.

The SDS scale has been proposed both as an instrument that aids in the diagnoses as well as one for the measurement of the outcome.¹¹⁻¹² It makes it possible to obtain a global evaluation index of dependence severity that ranges from 0 to 15, in such a way that the greater the score, the greater the intensity of the severity. Within the health care setting, it is of interest to know what cutoff score should be used to consider that the severity is clinically important, the current diagnosis of dependence being a possible gold standard.

Some of the studies mentioned⁴⁻¹⁰ have used the technique of analyzing the curve of the receiver operating characteristics, usually called the (Receiver Operating Characteristic) analysis, based on the signal detection theory.¹³⁻¹⁴ This type of analysis provides a good index of the capacity of a diagnostic test to discriminate between alternate states of health when the results are measured on the ordinal scale, by interval (as is the case of the SDS scale) or continuum. It makes it possible to evaluate the diagnostic accuracy of an instrument, that is, its capacity to correctly classify the subjects in clinically relevant subgroups. They are also useful to compare different diagnostic procedures and to select decision thresholds, that is, cutoffs between the positive and negative results of the test.¹⁵⁻¹⁹ (Table 1)

Several of the studies that have used the SDS have provided evidence on its utility to establish diagnoses of dependence/non-dependence based on cutoffs (CO) using the diagnostic results provided after the application of the CIDI as a "gold standard." The ROC curves have been evaluated for different types of dependence (amphetamines, benzodiazepines, cocaine, cannabis), observing different

Table 1 Cutoff scores for different substances and results of the ROC analysis

Studies	Substance	Sample size	AUC ROC	Cutoff score	Sensitivity	Specificity
Topp y Mattick, 1997	Amphetamines	327	0.82	4	71.3	77.1
Kaye y Darke, 2002	Cocaine	142	0.86	3	67.0	93.0
de las Cuevas et al, 2000	Benzodiazepines	100	0.99	7	97.9	94.2
Swift et al, 1998	Cannabis	200	0.77	3	64.0	82.0
Martin et al 2006	Cannabis	100	0.85	4	65.1	94.3
Lawrinson et al 2007	Alcohol	90	0.85	3	72.0	86.0

cutoffs according to the substance originating the dependence. Table 1 shows the cutoffs and results of the ROC analysis for the combination of studies performed. It can be noted in it that, up to now, no operating cutoff has been reported for the case of opiate dependence in the clinical population.

The purpose of the present study is to analyze the diagnostic behavior of the SDS scale when applied in a clinical sample of persons under treatment for opiate use. More specifically, the objectives were:

1. To evaluate the diagnostic utility of the SDS as an opiate dependence measure, and
2. To determine the optimal cutoff.

METHODS

Design

Cross-sectional observational study

- *Sample and Procedure*

Three Drug Addict Treatment Centers (DATC) participated in the study. They were initially requested to provide a sample of 100 participants. A final sample of 336 cases was obtained, 315 of which were analyzable.

All the participants were receiving treatment for opiate dependence disorder according to the DSM-IV diagnostic criteria, most of them (88.9%) being included in methadone programs.

Consent to participate was requested from the entire sample recruited, obtaining the initial collaboration of 336 cases, although 8 subjects refused to continue participating once the evaluation protocol had been initiated.

In each center, a clinician experienced in diagnostic evaluation was in charge of conducting the clinical interview with the participants of his/her DATC. The clinician performed the evaluation of the diagnosis of dependence according to the SCAN criteria, administered the severity dependent scale (SDS) and compiled the data on characterization and clinical history. Since 1998, these three centers have been developing a common line of investigation, so that their resources are homogenous and their methodology is consolidated.

- *Instruments*

In order to cover the study objectives, the Addiction Severity Scale was used in its version adapted to Spanish by González-Saiz and Salvador-Carulla,²⁰ and other variables of interest obtained through the ad hoc questionnaire.

The Severity of Dependence Scale (SDS)²⁻³ was designed to provide a short and easy to administer (self-applied) scale that could be used to measure the degree of

dependence experienced by users of different types of drugs. It is made up of 5 items with Likert-type answers with 4 grades with values going from 0 to 3 points. A total score was obtained from the sum of the points offered for each one of the items, with a possible range from 0 to 15 points, so that the greater the score the more severe the dependence. No correction algorithm has been proposed to compensate for loss (no response) of some of their items, so that it was necessary to answer all of them.

In their adaptation to Spanish, González-Saiz and Salvador-Carulla²⁰ used a translation-back translation procedure and in the analyses of the psychometric characteristics, they found an adequate test-retest reliability (intraclass correlation of 0.72) but a moderate internal consistency (Cronbach alpha of 0.55), low current validity criterion (Pearson's correlation of 0.48 with the definition index for the diagnosis of Opiate Dependence Disorder according to the DSM-III-R criteria), as well as a bifactorial structure contrary to the unidimensionality proposed by the authors of the scale.

Recent studies on clinical samples (under treatment)²¹ and non-clinical samples (recruited in the street)²² have shown psychometric evaluation data of the SDS through two analytic strategies based on the Classical Test Theory and the Item Response Theory. The adequate metric behavior of the scale has been corroborated from both analytic perspectives and it has been suggested that its use in the clinical setting as a screening measure of the grade of dependence is pertinent as well as its possible use as an indicator of results.²¹ (Table 2)

The diagnostic evaluation of dependence was conducted by three experienced clinicians who applied the SCAN criteria for its evaluation. Section 12 of the SCAN is made up of a total of 111 items for the combination of psychoactive substances other than alcohol.²³⁻²⁴ The specific items of dependence (Table 2) have been considered in the examination and diagnosis of "current dependence" and for the case of heroin use, during the last month. Three or more positive items occurring simultaneously make up the Dependence criterion.²⁴ In this way, the diagnostic variable of current dependence, called "SCAN," adopts two values: 0 to designate absence of dependence or "no case," and value 1 that would define the presence of dependence or "case." A preliminary study with 10 subjects evaluated by the three clinicians showed an inter-rater agreement of 0.90 and Kappa values between 0.90 and 0.93.

Prevalence of opiate usage during the last three months was also evaluated through the ratio between the number of urine controls with positive results and the total number of controls performed with immunoassay techniques. This procedure allows us to obtain an index ranging from 0 to 1, which when multiplied by one hundred, provides us with the percentage (prevalence) of urines with positive result. A new nominal dichotomic

Table 2		Relación de ítems que componen el constructo de dependencia incluidos en la Sección 12 del SCAN
Items	Examination area	
20	Drug craving	
21 y 22	Incapacity to control usage	
24, 32 y 43	Persistence in consumption in spite of evidence of lesions (social, psychic and/or physical spheres)	
27	Priority given to activities related with the drugs	
28	Time used in activities related with the drugs	
29	Narrowing of the drug usage guidelines	
30	Tolerance	
35	Discontinuation symptoms	
36	Drug usage to relieve abstinence symptoms	

* Three or more items simultaneously have a diagnostic criterion of dependence

variable called "Active Heroin Use" (AHU) was constructed through this indicator, proceeding in the following way: an error of 0.1 was considered in the estimation by test calibration, so that those participants who had a negative results in all the controls or a prevalence of positive results less than 9.99% were considered as "absence use," and therefore, all those with a prevalence of use equal to or greater than 10% were considered as "active use."

- Statistical analyses

Descriptive statistics have been obtained for the variables of interest and the collaborating inter-site differences were calculated based on the hypothesis testing of contrasts: Chi square for the nominal variables and analysis of variance for the continuous variables.

To evaluate the grade of association of the SDS with the prevalence of opiate usage (continuous measurement) and/or with the SCAN diagnosis (dichotomized variable), the analyses of the product-moment correlation (r) and the biserial correlation (r_b) were performed, respectively. Furthermore, the coefficients of association were found between the dichotomized variables 'SCAN' vs 'Active Use', calculating the tetrachoric correlation (r_t), the Phi (Φ) coefficient, and the contingency coefficient (CC).²⁵ A similar procedure was conducted for the calculation of the association of the "time in treatment" and the "number of year of usage" regarding the variables of interest.

The ROC (Receiver Operating Characteristics) curves¹⁸⁻¹⁹ were used to determine the cutoff of the SDS score that provides the best values for the sensitivity and specificity indicators. Two conditions were used as gold standard criteria: 1) if they complied with or did not comply with the opiate dependence criteria at that point in time present through the application of section 12 of the SCAN, and 2) opiate usage during the last month (active

usage vs absent usage). For each case, the area under the curve (AUC), 95% confidence interval and asymptotic significance value were calculated, offering the graphic representation characteristic of the ROC curve jointly for both criteria considered. Equally, sensitivity values (proportion of true positives or cases) and specificity (proportion of true negatives or no-cases) were obtained for each one of the possible values of the scale. Furthermore, a series of Chi square tests were performed for each one of the 15 points of the scale in order to determine the optimal cutoff, represented by the higher Chi square value.

The STATA v. 8 program was used for the statistic analyses (Table 3).

RESULTS

Characterization of the sample

From the initially recruited sample ($n= 336$), 21 participants (6,3%) were excluded from the principal analysis (8 because they requested leaving the study and 13 because they showed clear signs of falsifying their answers). The loss of cases was observed with similar prevalence in the three collaborating centers ($\chi^2= 0.037$; $p= 0.982$ / Table 3).

For the remaining descriptive variables (Table 3), no statistically significant differences were observed among the three Drug Addict Treatment Centers (DATCs), showing a very similar user profile. They were mostly men (80.8%), had a mean age of 34.1 years [Range: 19-57; Standard Deviation (SD): 5.2], were mainly single (56,2%), and did not have active employment (55.2%). Mean years from the time they initiated opiate consumption was 15.9 (SD: 5.3) years and mean time in treatment was 25.9 (SD: 22.2) months (Range: 0-48).

A total of 28.2% ($n=89$) of the sample fulfilled the current dependence criterion according to the SCAN; 21.6% ($n=68$) were classified as active heroin users, and the average score on the SDS was 3.3 [SD= 3.2; Range: 0-14]. There were no statistically significant differences for any of these variables among the DATCs (Table 3).

Concordance-Association between variables

The association of the SDS with frequency of use ($r= 0.489$) and with the SCAN ($r_b= 0.533$) was statistically significant ($p<0.001$). The association between the diagnostic outcome through SCAN and the dichotomization of opiate consumption (absent versus active) has revealed statistically significant association coefficients ($r_t= 0.754$; $\Phi= 0.848$) and a contingency coefficient of 0.64.

The correlations observed between the variables of "years of consumption" and "time in treatment" with

Table 3		Characterization variables of the sample and principal variables of the study. Contrast of differences between the three collaborating Drug Addict Treatment Centers (DATC)					
		DATC-1 (n=118)	DATC-2 (n=107)	DATC-3 (n=111)	Total (336)	Contrast Test ³	Value 'p'
Lost Cases ¹		7 (5.9)	7 (6.5)	7 (6.3)	21 (6.3)	0.037	0.982
Analyzable Cases (n)		111	100	104	315		
SOCIODEMOGRAPHIC VARIABLES							
Gender: Men ¹		91 (82.7)	84 (84.0)	78 (75.7)	253 (80.8)	2.256	0.277
Age (in years fulfilled) ²		33.7 (5.8)	33.8 (4.6)	34.8 (5.1)	34.1 (5.2)	1.356	0.259
Civil Status ¹							
Single		71 (64.0)	55 (55.0)	51 (49.0)	177 (56.2)		
Married		26 (23.4)	22 (22.0)	31 (29.8)	79 (25.1)	99.395	0.153
Separated		10 (9.0)	19 (19.0)	14 (13.5)	43 (13.7)		
Widow(er)		4 (3.6)	4 (4.0)	8 (7.7)	16 (5.1)		
Occupation ¹							
Without occupation		58 (52.3)	58 (58.0)	58 (55.8)	174 (55.2)	0.721	0.697
Active		53 (47.7)	42 (42.0)	46 (44.2)	141 (44.8)		
USAGE VARIABLES							
Time under treatment (in months) ²		28.4 (24.6)	25.4 (21.1)	23.84 (20.6)	25.9 (22.2)	1.004	0.368
Years of usage ²		15.5 (5.5)	15.9 (5.0)	16.3 (5.3)	15.9 (5.3)	0.400	0.671
PRINCIPAL VARIABLES							
SCAN -Positive: Cases diagnosed of Dependence ¹		28 (25.2)	28 (28.0)	33 (31.7)	89 (28.3)	1.223	0.570
Mean proportion of controls with positive urine ²		11.6 (27.1)	16.6 (33.1)	12.2 (26.8)	13.4 (29.0)	0.417	0.659
Positive Consumption: Cases with active heroin usage ¹		22 (19.8)	22 (22.0)	24 (23.1)	68 (21.6)	0.353	0.838
Severity of the Dependence: Total score on the SDS ²		3.3 (3.3)	3.2 (3.2)	3.4 (3.2)	3.3 (3.2)	0.099	0.905

¹. [n(%)] – Number of cases (Percentage)
². [M (SD)] – Mean (Standard Deviation)
³. Contrast test: Chi square for categorial variables; Snedecor F -analysis of variance – for continuous variables

frequencies of positive controls was $r = -0.03$ ($p = 0.550$) and $r = -0.13$ ($p = 0.016$); with the variable "AHU," it was $r_b = -0.02$ ($p = 0.730$) and $r_b = -0.13$ ($p = 0.004$); with the variable SCAN, it was $r_b = -0.05$ ($p = 0.246$) and $r_b = -0.18$ ($p < 0.001$); and with the global score of the SDS, it was $r = -0.29$ ($p < 0.001$) and $r = -0.18$ ($p = 0.001$) (in all the cases, regarding the first two 2 variables). (Figure 1)

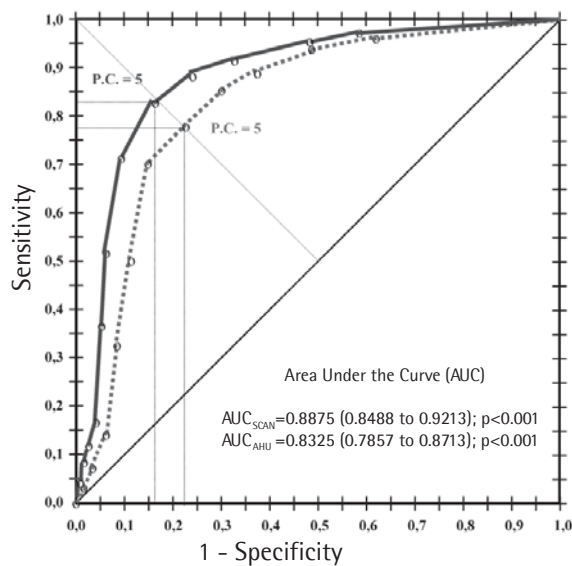
ROC Analysis

The ROC curves obtained for the SDS scale are shown in figure 1. They demonstrate its capacity to discriminate between whether it is or is not diagnostic of dependence using the SCAN (continuous upper curve) and/or to discriminate between active consumption or non-active consumption of heroin (discontinuous lower curve). The diagonal of the figure represents the condition of null discrimination and any curve that is moves away from that

diagonal and that includes a greater area with growth towards the upper left angle will indicate greater diagnostic utility.

The area under the curve (AUC) when the standard pattern used was the SCAN was 0.89. When the AHU criteria were used, it was 0.83. In both cases, this indicates an adequate accuracy of the SDS to discriminate between being or not being diagnostic of dependence and of detecting or not detecting active heroin consumption.

Table 4 shows the values of sensitivity, specificity and the corresponding likelihood ratio tests (chi square) for each one of the possible successive cutoffs on the SDS scale. The highest chi square value shows the SDS score that maximizes the discrimination between the presence or absence of case. When the SCAN is used as standard, the maximum chi square value is 130.74, that being located in the value of 5 of the SDS, it provides a sensitivity of 83.15 and specificity of 84.51.

**Gold Standard:**

SCAN	Active Heroin Usage (AHU)
0.- Negative (n=226)	0.- Negative (n=247)
1.- Positive (n=89)	1.- Positive (n=68)
Prevalence: 28.2%	Prevalence: 21,5 %

Figure 1 ROC curve for the SDS scale using as gold standard the diagnosis of dependence (SCAN) or active heroin usage (AHU)

On its part, when the AHU standard is used, the maximum value of the Chi squared is 76.32. It is located in the value of 5 of the SDS and provides a sensitivity and specificity of 77.94 and 77.13, respectively. In both cases, therefore, the optimal cutoff for the scale is located at the value 5, that represents the best comparative balance between the sensitivity and specificity values (Table 4).

DISCUSSION

The SDS is a short instrument that is easy to administer for the subjective evaluation of the grade of severity of substance dependence perceived by the responding subject. The purpose of the present study has been to evaluate the diagnostic utility of the SDS as a measure of opiate dependence. The ROC analyses performed verify this proposal, indicating high discriminatory capacity of the scale. The results obtained are very similar to those found in other studies for the evaluation of dependence on other substances (cocaine, amphetamines, cannabis or alcohol), which collaborates the utility of the scale.

The analyses conducted have made it possible to conclude that the SDS has greater discriminatory utility for

the classification of the current dependencies (AUC = 0,89) than for the detection of active heroin consumption (AUC = 0.83), although the diagnostic utility of the scale has been considered high in both cases.¹⁶⁻¹⁹ Using the example of active heroin consumption, this index would be interpreted as follows: an individual randomly selected from the group with recent heroin consumption has a higher score on the SDS than one randomly selected from the group of no consumption 83.25% of the times.

In the diagnostic cases whose results are not dichotomic (case vs. no case) and when the decision is based on a continuous measurement, as is the case of the use of scales such as the SDS, a cutoff must be established. In such case, the sensitivity and specificity become intimately and inversely related. A change in the cutoff will always produce improvement in one of these characteristics, but always at the expense of the deterioration of the other. If the cutoff is established at a low value, sensitivity improves and a greater number of cases would be detected with heroin dependence or active consumption. However, specificity would decrease, so that it would inadequately classify persons who do not have dependents or active consumption. Therefore, the question is where the optimal cutoff should be established. As we have seen, the chi square tests for each one of the possible tetrachoric tables associated to the cutoff makes it possible to make a decision since the test that reaches the maximum value would be in the situation in which the highest grade of discrimination is reached between sensitivity and specificity. Another criterion to take into account, which usually coincides with the maximum value of the Chi Square, but that can be observed directly, consists in choosing that point in which the sensitivity and specificity are mutually maximized, that is, where they are balanced. In our study, both whether the SCAN criterion was adopted as a reference, or the active heroin use criterion was used, the optimal cutoff was established at 5. The sensitivity for this point on the SCAN is 0.8315, which in turn is interpreted as follows: 83.15% of the persons diagnosed of current dependence have a score equal to or greater than 5 on the SDS. On its part, the specificity value was 0.8451, which is interpreted as though 84.51% of the persons not diagnosed of current dependence would have values lower than 5 points on the SDS scale. A similar reading can be made for the case of active heroin use, which, in its cutoff, shows a sensitivity of 77.94% and specificity of 77.13%. In other words, it correctly classifies in three out of every four cases both those who have active heroin use (among those who score 5 or more) and those who are abstinent (among those who have scores under 5).

Although the criterion proposed to establish the optimal cutoff is, as we have seen, that which maximizes the instrument classification characteristics, based on the objectives of the study, it is sometimes convenient to prioritize one characteristic or another. For example, if we perform a screening study, of detection of possible cases, because it is important to intervene

Score SDS (>) –	SCAN (n=315) (+89: 28.25%)			AHU (n=315) (+68: 21.58%)		
	Sensitivity	Specificity	χ^2	Sensitivity	Specificity	χ^2
0	100.00	0.00	---	100.00	0.00	---
1	97.75	42.04	62.30	97.06	38.46	41.79
2	95.51	53.10	77.25	94.12	48.58	49.68
3	92.13	68.58	106.07	89.71	62.75	65.17
4	88.76	76.55	119.64	85.29	70.04	70.00
5	83.15	84.51	130.74	77.94	77.33	76.32
6	71.91	90.71	121.87	70.59	85.02	70.13
7	52.81	93.81	81.53	50.00	89.07	44.89
8	35.96	95.13	46.88	33.82	91.90	25.19
9	17.98	96.46	16.68	14.71	94.33	5.35
10	7.87	97.79	4.92	7.35	97.17	2.54
11	3.37	98.67	1.28	2.94	98.38	0.45
12	1.12	99.12	0.37	1.47	99.19	0.22
13	0.00	99.56	0.66	0.00	99.60	0.48
14	0.00	100.00	---	0.00	100.00	---
15	0.00	100.00	---	0.00	100.00	---
Area (IC95%)	0.8875	(0.8488 a 0.9213)		0.8325	(0.7857 a 0.8713)	
Standard Error	0.0205				0.0257	

early, then it is better to increase sensitivity (capture all those that are), reducing the cutoff point, even though this would mean an increase in the rate of false positives (considering those persons who are healthy as case). If, on the contrary, what we want is to assure that a specific condition is not present, that is, rule out a diagnosis, then a cutoff should be chosen that reduces the amount of false negatives (cases that are not considered as such) and thus the cutoff value would have to be increased.

In the clinical setting, it is of interest to both classify correctly and to know what the cutoff score would be to propose that the case has greater severity. With the results of the present study, we can propose that persons under treatment for opiate addiction who have scores greater than 5 points would be considered to have a severity condition of dependence and/or be at risk of active heroin use, while those whose score is below 5 would be in a situation of greater stability that could be interpreted as a therapeutic success.

CONCLUSIONS

The utility of the SDS as a diagnostic measure of current heroin dependence has been statistically validated in the present study. The optimal cutoff, both to discriminate and to determine the presence of current dependence as well as

active heroin usage is at a value of 5, so that a person who obtains a score of 5 or greater on the SDS has a high likelihood of being correctly classified in the mentioned conditions. Therefore, the SDS scale can be recommended as a short, effective instrument for the discrimination of the grade of dependence and consumption of heroin in the clinical setting.

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