Sensitivity and specificity of the Overt Aggression Scale in schizophrenic patients

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Sensibilidad y especificidad de la Escala de Agresión Explícita en pacientes con esquizofrenia

Summary

Introduction. *Research focused on the assessment of violent behavior in schizophrenic patients has been hindered by the lack of clinical instruments adapted to the Mexican psychiatric population. This study aimed to obtain sensitivity and specificity data as well as the most adequate cutoff point of the Overt Aggression Scale (OAS).*

Method. *137 schizophrenic patients were included. A clinical evaluation was performed with the PANSS subscale of excitability and the OAS. Diagnosis of violent behavior was obtained with the PANSS and clinical consensus of two psychiatrists.*

Results. *66.4% of the sample was considered as non-violent patients. A cutoff point of 7 points in the OAS showed sensitivity of 0.80 and specificity of 0.97, with adequate positive and negative predictive power.*

Discussion. *The objective assessment of violent behavior in schizophrenic patients can contribute to the development of new lines of research. Adaptation of the OAS for the assessment of violent behavior will encourage the development of better strategies for the detection and intervention of violent behavior in schizophrenia.*

Key words: *Violent behavior. Schizophrenia. Sensivity. Specificity. Overt Aggression Scale.*

Resumen

Introducción. *La investigación enfocada a la evaluación de la conducta violenta en esquizofrenia se ha visto limitada por la carencia de instrumentos de medición adaptados a población psiquiátrica mexicana. El objetivo del presente estudio fue la obtención de los datos de sensibilidad y especificidad y el establecimiento del punto de corte más adecuado de la Escala de Agresión Explícita (EAE).*

Método. *Se incluyeron 137 pacientes con el diagnóstico de esquizofrenia. Se realizó una evaluación clínica con la PANSS y la EAE. El diagnóstico de conducta violenta se obtuvo por medio de la subescala de excitabilidad de la PANSS y el consenso clínico de dos psiquiatras.*

Resultados. *El 66,4 % de la muestra fue considerado como pacientes no violentos. Un punto de corte de 7 puntos en la EAE mostró una sensibilidad del 0,80 y una especificidad de 0,97, con un adecuado poder predictivo positivo y negativo.*

Discusión. *La evaluación objetiva de la conducta violenta en pacientes con esquizofrenia puede contribuir al desarrollo de líneas de investigación. El contar con este instrumento específico y objetivo para la evaluación de la conducta violenta permitirá crear mejores estrategias para la detección e intervención de la conducta violenta en esquizofrenia.*

Palabras clave: *Conducta violenta. Esquizofrenia. Sensibilidad. Escala de Agresión Explícita.*

INTRODUCTION

Violent behavior arises as an emotional reaction precipitated by stimuli that generate rage[1] or as a behavior deliberately aimed at causing physical injury to persons or properties[2].

The results of several clinical studies in the psychiatry area have shown that schizophrenia is one of the main diagnoses associated with violence, considering the diagnosis as one of the causes that provokes the violent behavior[3-9]. It has been reported that the prevalence of violent behavior in patients with schizophrenia varies from 40 to 50 %[4,5,10].

However, there are contradictory results on this posture, which indicate that the association existing between schizophrenia and violence is limited to several risk factors that these individuals have[11-17].

These results suggest that there is no clear association between violent behavior and diagnosis of schizophrenia[5-8,18] and that these differences may be found in the definition of violent behavior and the form that is assessed.

Research focused on aggression and violence has been limited by the lack of measurement instruments adapted to the Mexican psychiatric population. Adaptation of assessment instruments is necessary when the population that is going to be studied differs from the original

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study population in terms of culture and language[19,20]. The procedure for the adaptation of these instruments should be rigorous and it is not enough to obtain the translation of the instrument to the language of the study population[21].

Some instruments used in the evaluation of violent behavior not only are not adapted to the Mexican psychiatric population but also present several measurement difficulties as they are used in schizophrenic patients. In the case of self-report instruments, patients with schizophrenia sometimes cannot answer these questionnaires in a reliable way since they may not remember committing the violent acts and the instruments that assess the violent behavior based on a clinical interview do not discriminate the different types of violent behavior[22].

One of the instruments that eliminates these measurement deficiencies is the Overt Aggression Scale (OAS)[23], which is administered by means of a clinical interview and incorporates the different types of aggression, their severity and the types of intervention for their control, making it possible to record and quantify the aggression objectively. The OAS has been adapted for its use in the Mexican psychiatric population and has shown adequate reliability and validity in this population[22].

However, the objective assessment of violent behavior makes it necessary to make an exact distinction between those patients who are violent and those who are not violent. Thus the objective of this study was to obtain sensitivity and specificity data and establish the best cutoff for the OAS.

METHOD

Subjects

A total of 137 patients diagnosed of schizophrenia according to the DSM-IV diagnostic criteria[24] who consecutively came to the Out-patient clinic and Hospitalization Services of the National Institute of Psychiatry Ramón de la Fuente were included.

The sample consisted of 86 men (62.8%) and 51 women (37.2%), with an average age of 29.3 ± 8.1 years (16-53 years). Patients with the following diagnoses were included: paranoid schizophrenia (n = 119, 86.8%), undifferentiated schizophrenia (n = 11, 8.0%) and disorganized schizophrenia (n = 7, 5.2). A total of 81.8% (n = 112) of the patients were evaluated in the out-patient clinic services and the remaining 18.2% (n = 25) were hospitalized.

Instruments

The initial diagnosis was made with the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID)[25]. Sociodemographic data were recorded for each patient with a previously designed format. The collection of information was performed by direct questioning of the patient and their family. Psychotic symptoms were evaluated with the Positive and Negative Syndrome Scale for Schizophrenia (PANSS)[26].

The Overt Aggression Scale (OAS) was used for evaluation of aggression. This is designed to assess the severity of aggressive behaviors by observation and description of the patients' aggression episodes. The scale is made up of 4 main areas: *a)* verbal aggression, *b)* aggression against objects, *c)* aggression against self, and *d)* physical aggression against others. There are four severity grades to classify aggressive behavior in each one of these areas. Verbal aggression includes behaviors that go from shouting with anger to making clear threats of violence towards others or towards the subject himself; aggression against objects includes actions such as hitting the door to throwing objects; the area of aggression against self includes behaviors that go from hair pulling without any physical injury to self-mutilation and deep cuts caused by the subject himself; and physical aggression against others includes making threatening gestures towards others up to direct attacks against other persons that cause severe physical harm. In addition, it quantifies the duration of aggressive episodes, the time of day (morning or afternoon) when the behavior occurs and the type of intervention used by the responsible medical staff. The interventions used go from «none», in which the patient becomes calm by himself to the use of physical limitations or in which the harm caused by the patient requires medical treatment for other persons. The total OAS score is obtained from the sum of the scores obtained in each one of the areas and the most restrictive intervention that was used in the patient[22,23]. The OAS has shown adequate reliability, validity and time stability in the Mexican psychiatric population[22].

Procedure

Informed consent to participate in the study was requested from each patient. In the case of agitated patients in whom consent was difficult to obtain, informed consent was requested from the patient's family. Once their participation was approved in the study, evaluation of the study was performed.

The diagnosis of violent behavior was obtained through the evaluation of aggressiveness symptoms on the excitability subscale (items of excitation, hostility, lack of cooperation and deficient control of impulses on the Positive and Negative Syndrome Scale for Schizophrenia [PANSS]). This subscale is taken in agreement with the factorial analysis of the scale that groups it into 5 factors[27-29] and the clinical consensus of two psychiatrists experienced in psychotic disorders. The OAS was applied by a previously trained and independent evaluator blinded to the diagnosis of violence established by the psychiatrists.

Statistical analysis

The general description of the sociodemographic and clinical characteristics was performed with fre-

quencies and percentages for categorical variables and with means and standard deviations (±) for continuous variables. Pearson's correlation was performed for the total score of the OAS and the PANSS excitability subscale.

Sensitivity and specificity data of the OAS were obtained from a cutoff of 5 to a cutoff of 10 points. ROC curves were performed to establish the effects of sensitivity and specificity on the predictive and negative power of the instrument. For this, prevalence of the violent behavior in schizophrenia reported in epidemiological studies was used.

RESULTS

Clinical characteristics

The general scores of the PANSS were: *a)* positive subscale, 20.9 ± 8.1 (8-42 points); *b)* negative subscale, 19.3 ± 7.2 (7-38 points); *c)* cognitive subscale, 17.1 ± 6.3 (7-36 points); *d)* excitability subscale, 7.2 ± 3.6 (4-24 points), and *e)* anxiety/depression subscale, 8.1 ± 3.1 (4-18 points), with a total PANSS of 72.6 ± 22.7 (32-139 points).

The general scores of the OAS were distributed in the following way: *a)* verbal aggression, 1.34 ± 1.29 (0–4 points); *b)* aggression against self, 0.25 ± 0.69 (0-3 points); *c)* aggression against objects, 0.88 ± 1.10 (0-4 points); *d)* physical aggression against others, 0.64 ± 1.07 (0-4 points), and *e)* intervention used, 1.41 ± 1.67 (0-9 points). The global score of the scale was 4.51 ± 4.59 (0-17 points). The OAS showed a high correlation (r = 0.45; p = 0.000) with the PANSS Excitability subscale.

Distribution of cases according to diagnosis of violence and results of the OAS

According to the diagnosis of violence, 66.4 % of the sample was considered as non-violent patients, while 33.6 % was considered as violent. Table 1 shows the distribution of the subjects according to the cutoff with an OAS score of 5 to 10 and the violence diagnosis established by clinical interview.

TABLE 1. Distribution of cases according to the diagnosis of violence and OAS results

Cutoff	*True positives n (%)*	*False positives n (%)*	*False negatives n (%)*	*True negatives n (%)*
Point 5	39 (28.5)	14 (10.2)	7 (5.1)	77 (56.2)
Point 6	37 (27.0)	6 (4.4)	9 (6.6)	85 (62.0)
Point 7	37 (27.0)	3 (2.2)	9 (6.6)	88 (64.2)
Point 8	30 (21.9)	3 (2.2)	16 (11.7)	88 (64.2)
Point 9	27 (19.7)	0	19 (13.9)	91 (66.4)
Point 10	27 (19.7)	0	19 (13.9)	91 (66.4)

Sensitivity, specificity indicators case rates and predictive values

Table 2 shows the indicators of sensitivity, specificity, rate of cases and predictive values of the Overt Aggression Scale with the cutoffs of 5-10. Based on these indicators, it can be observed that the cutoff of 7 points is that which presents the most adequate data of sensitivity and specificity, as well as a stable behavior in relationship with the remaining indicators.

Effects of sensitivity and specificity in the predictive power of the OAS

Figure 1 shows the sensitivity and specificity effects in the OAS positive and negative predictive power, considering a 50 % prevalence of violent behavior in schizophrenia.

DISCUSSION

The objective evaluation of violent behavior in patients with schizophrenia may contribute to the development of clinical research lines in this area. Distinction of the violent patients from the non-violent ones should not only be based on clinical observation or on instruments that do not evaluate this phenomenon specifically. Counting on an instrument with adequate clinimetric characteristics and adequate sensitivity and specificity is very useful to distinguish those patients who are violent from those who are not.

Adaptation of an instrument that evaluates violent behavior is necessary because aggression or violence do not have an exclusively biological basis[18] and largely depend on the sociocultural patterns of the specific population being studied[19].

Several studies that use the Overt Aggression Scale to determine if a patient is violent or not used arbitrary criteria or the average score of the sample evaluated to make this distinction[30,31]. This provides contradictory results and makes it difficult to generalize the presence

TABLE 2. Indicators of sensitivity, specificity, cases and predictive values rates

Cutoff	*Sensitivity*	*Specificity*	*FPR*	*FNR*	*ECR*	*PPV*	*NPV*
Point 5	0.85	0.85	0.15	0.15	0.15	0.74	0.92
Point 6	0.80	0.93	0.07	0.20	0.11	0.86	0.90
Point 7	**0.80**	**0.97**	**0.03**	**0.20**	**0.09**	**0.93**	**0.91**
Point 8	0.65	0.97	0.03	0.35	0.14	0.91	0.85
Point 9	0.59	1	0	0.41	0.14	1	0.83
Point 10	0.59	1	0	0.41	0.14	1	0.83

FPR: false positive rate; FNR: fase negative rate; ECR: erroneous classification rate; PPV: positive predictive value; NPV: negative predictive value.

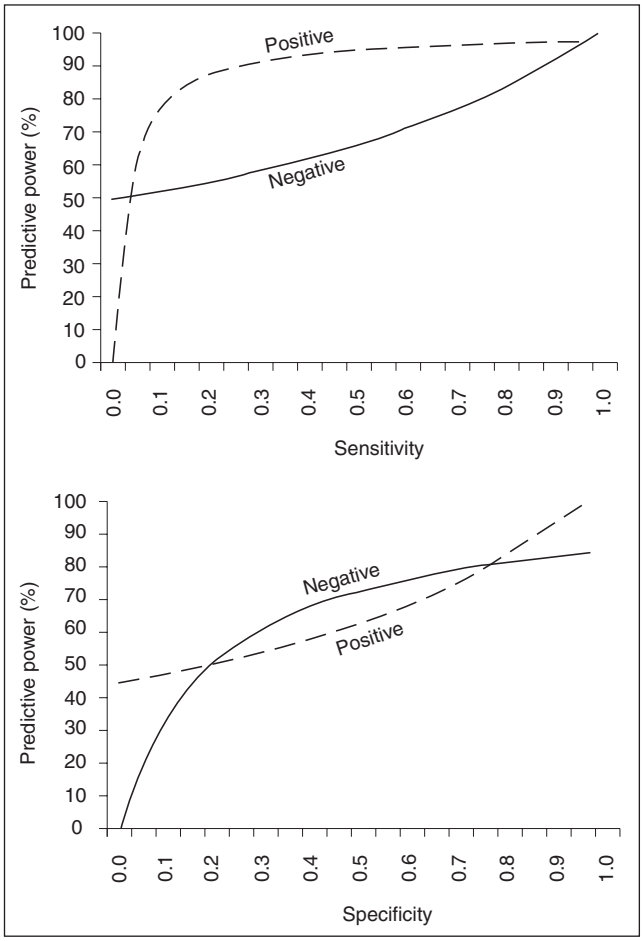

Figure 1. Effects of sensitivity and specificity in the OAS predictive power.

and severity of the violent behavior in the psychiatric disorders.

Even though the scale has reliability data and adequate validity in the Mexican psychiatric population[22], it does not have specific data to be able to objectively distinguish violent from non-violent patients

In the present study, a 7 point cutoff of the OAS showed adequate sensitivity values (0,80) and specificity values (0.97), which indicates that a categorization of the presence or absence of violent behavior in patients with schizophrenia can be made after this score. Furthermore, and using the violent behavior prevalence data from several epidemiological studies[4,5,10], it was observed that the Overt Aggression Scale positive and negative predictive power was adequate to use in other populations of patients with schizophrenia.

The concept of violence is a central aspect of the stereotype that has been formed on the individuals who suffer schizophrenia. Stigma of dangerousness in these patients is increasing[32] and is a trait that deteriorates the life of persons with schizophrenia[33-37]. Due to the importance and impact that the manifestation of violent behaviors has in those subjects who suffer schizophrenia, it is necessary to perform specific studies on this phenomenon to determine if the violence is inherent to the syndromatic picture of schizophrenia or if it is secondary to the presence of several risk factors, such as genetic vulnerability, personality and substance abuse[18].

The results of this study show that the Overt Aggression Scale has an adequate clinimetric behavior to be used in patients with schizophrenia in our country. Having this specific and objective instrument to evaluate the presence and severity of violent behavior in schizophrenia would make it possible to create better detection and intervention strategies in the future, reducing the risk of its presentation and, therefore, reducing the stigma associated with this suffering.

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