# Clinical prediction of violence among inpatients with schizophrenia using the Chinese modified version of Violence Scale: A prospective cohort study

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## ARTICLE INFO

## ABSTRACT

Background: A standard measure to assess and predict violence is important for psychiatric services. No prospective study has examined the history of violence and heterogeneity of violence in predicting specific types of violence among inpatient with schizophrenia.
Objectives: This study aimed to prospectively examine the accuracy of prediction of types of violence using the Chinese modified version of Violence Scale (VS-CM) among inpatients with schizophrenia based on their past history of violence and the real occurrence of violence during hospitalization.
Design: A prospective cohort study design.
Setting and participants: A total of 107 adult patients with schizophrenia spectrum disorders, consecutively admitted to an acute psychiatric ward of a university hospital in Taiwan, were recruited.
Method: In addition to data about demographics and clinical illness, count records of the history of violence within one month prior to admission by interview and the actual occurrence of violence during the whole course of hospitalization by participant observation were collected using the VS-CM. Multivariate logistic analysis and area under the Receiver Operating Characteristic curve (AUC) analysis were applied to examine the predictive ability of the VS-CM.
Results: A patient's history of violence assessed by the VS-CM predicted the actual occurrence of violence during hospitalization with the Odds Ratio of 17.5 ($p = 0.001$). The predictive accuracy of the VS-CM had high sensitivity (97.0%), moderate positive predictive value (71.4%), and high negative predictive value (87.5%); however, the specificity was relatively low (35.0%). The AUC was 79.5% using the total scale of the VS-CM and 70.7–74.5% using the subscales in predicting corresponding types of violence.
Conclusion: The VS-CM is a valid and reliable measure of potential violence. It can be applied to assess and predict specific types of violence among inpatient with schizophrenia.

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## What is already known about this topic?

- Incidents of violence by psychiatric patients are prevalent and a measure for assessment and prediction is important for psychiatric services.
- A history of violence is a good predictor, but there is limited prospective study which examines the issue of predictive accuracy of a measure of risk for violence.
- Criminological and forensic research has demonstrated some evidence that violence may be predicted by identifying particular types of offenses.

## What this paper adds

- Using the Chinese modified version of Violence Scale (VS-CM), potential violence toward property, other persons, and self can be differentiated and different histories of violence can be helpful in predicting specific risks of violence in clinical settings.
- The VS-CM yields high sensitivity, relatively low specificity, moderate positive predictive value, and high negative predictive value in the prediction of risk of violence and different types of violence among inpatients with schizophrenia.
- The VS-CM is a useful clinical tool for risk assessment and it could be utilized as a standard measure of potential violence in psychiatric services.

## 1. Introduction

The risk of violence and its prevention are important issues for psychiatric services. Evidence has shown an incidence rate of 62.6% for aggressive behavior among inpatient schizophrenics (Chen et al., 2011) and there were 5.7 incidents of violence per week on acute psychiatric wards (Foster et al., 2007). Risk assessment and prediction of violence are necessary for appropriate psychiatric care.

Violence can be expressed in many forms including verbal or physical patterns with differential targets, such as outward violence toward property and other persons, and inward violence toward the self (Volavka and Citrome, 2008). The accuracy of prediction of violence varies depending on what constitutes an episode of violence. One common problem in studies of violence has been a lack of a unified definition of violence for the purpose of measurement (Barratt and Slaughter, 1998; Bo et al., 2011; Morrison, 1988). A standard measure for assessment with a clear operational definition of violence is crucial in a clinical setting. AUC analysis has been applied in medicine to describe the accuracy of a screening test for detecting a disease. Buchanan (2008) stressed that AUC analysis is applicable for the prediction of violence by psychiatric patients, for it is less dependent on the base rate of violence than are other statistics; however, the method has not been applied in previous studies of violence.

The original Violence Scale (VS) was a satisfactory measure for assessing the frequency of aggressive acts (Morrison, 1993). The Chinese modified version of Violence Scale (VS-CM) was translated from the VS and rearranged the items from the randomly ordered sequence into the graded-severity order. Besides, the scaling of the VS-CM was modified from the Likert scale of the VS into the count scale for practical application in psychiatric settings (Chen and Hwu, 2009). It has three subscales of specific types of violence (toward property, other persons, and self) with a comprehensive description of aggressive behaviors, and it provides practical examples as criteria to define and measure counts of overt aggressive acts by clinical observation (Chen and Hwu, 2009). It has been applied to explore the clinical manifestations of violence in an acute psychiatric ward (Chen et al., 2011); however, its predictive accuracy for violence has not been determined. There is only limited evidence that a history of violence predicts inpatient violence during the whole course of hospitalization, although it has been reported to be a good predictor of subsequent aggressive behavior (Bobes et al., 2009; Lanza, 1996; McNiel and Binder, 1989; Tardiff et al., 1997; Walsh et al., 2004). Criminological and forensic research has demonstrated some evidence that violence could be predicted by identifying particular types of offenses from the histories; however, few data are available for psychiatric samples (Buchanan, 2008). Moreover, it is necessary to focus on a particular group of psychiatric patients to study violence. Patients with schizophrenia have been shown to have a relatively high risk of violence (Tam et al., 1996; Walsh et al., 2004). Nevertheless, the contribution of schizophrenia to violence is heavily debated and the conclusions still vary across studies (Bo et al., 2011). In previous studies of the accuracy of prediction of violence, the participants were usually from a global group of mental disorders or forensic patients (Dolan et al., 2008; Douglas et al., 1999, 2003; Hartvig et al., 2006; Suchy and Bolger, 1999). These nosological problems did limit comparisons among the studies of violence (Bo et al., 2011).

This study aimed to prospectively examine the accuracy of prediction of types of violence by using the VS-CM in inpatients with schizophrenia based on their past history of violence and the real occurrence of violence during their whole course of hospitalization in an acute psychiatric ward.

## 2. Methods

### 2.1. Setting and participants

Adult patients over the age of 16, consecutively admitted to the 35-bed acute psychiatric ward of a university-affiliated teaching hospital in Taiwan were the potential study sample. Those with a primary diagnosis of schizophrenia spectrum disorder, including schizophrenia, schizoaffective disorder, or schizotypal personality disorder according to the criteria of the Diagnostic and Statistical Manual, 4th edition (American Psychiatric Association, 1994) at admission were asked to participate, and those whose diagnoses were confirmed at discharge became the final sample ($n = 107$). Any patients with mental retardation, antisocial personality disorder, organic brain syndromes, or alcohol or substance abuse were excluded.