

THE RELATIONSHIP BETWEEN SOCIODEMOGRAPHIC AND FORENSIC HISTORY AND THE VICTIMIZATION STATUS OF PATIENTS WITH SCHIZOPHRENIA

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BACKGROUND AND AIM: Schizophrenia causes significant functional impairment and cognitive disturbances that weaken safety judgment. Consequently, patients are highly vulnerable to abuse and unpredictable events, especially during psychotic exacerbations. Although research often emphasizes patient violence, the risk of criminal victimization in this population is 2 to 100 times higher than the general public, driven by factors like homelessness and symptomatology. Analyzing the complex interactions of these risk factors requires computational power beyond traditional statistics. Machine learning excels at detecting hidden patterns and parameter weights within such datasets. Algorithms like Support Vector Machines (SVM) can identify predictive associations that classical METHODS: may overlook. This study evaluates the utility of machine learning in predicting criminal victimization among patients with schizophrenia.

METHODS: (Ethics Committee Approval must be obtained and the number should be specified). Approved by the Erenköy Ethics Committee (No: 2025/15), this cross-sectional study collected sociodemographic characteristic, clinical history, and forensic background data from schizophrenia patients (18–65 years) via semi-structured interviews. During the interview and consent phase, information regarding patients whose response reliability was clinically doubted was obtained from their relatives. Machine learning models were developed in Python to predict victimization. SVM outperformed other algorithms and were optimized using 5-fold stratified cross-validation to handle class imbalance. Model performance was assessed via AUC-ROC metrics and feature importance analysis to identify risk factors.

RESULTS: The patient groups were analyzed in two categories: those who were victims of crime (n=50) and those who were not (n=50). No statistically significant differences were found between the groups regarding age, gender, educational status, or marital status ($p>0.05$).

The analysis process was conducted in a local computing environment using the Python programming language and its libraries. The research population consisted of 100 patients

diagnosed with F20–29 according to ICD-10 diagnostic criteria. The target variable of the model was defined as “criminal victimization (Present/Absent).” During the data preprocessing stage, scaling was applied for feature standardization, and missing data were addressed using appropriate imputer methods; subsequently, model objects were saved for future analysis. To predict the risk of criminal victimization, analyses were performed using SVM algorithms. The RBF (Radial Basis Function) kernel was preferred in the SVM model to identify complex and non-linear relationships, and the regularization parameter was set to $C=1.0$ to prevent overfitting. The probability estimation feature was activated for the percentage expression of risk scoring. The relationship between variables and victimization was examined using Point-Biserial correlation analysis. According to the findings, a history of childhood abuse emerged as the strongest predictor in the model ($r=0.472$, $p<0.001$). Additionally, the use of first-generation depot antipsychotics was identified as a risk-increasing factor ($r=0.229$). The discriminative power of the models was evaluated using the AUC-ROC metric. The SVM model demonstrated an “acceptable/good” level of performance with a mean AUC score of 0.768 and an overall accuracy rate of 71%.

CONCLUSIONS: This study investigated the predictability of criminal victimization risk in patients diagnosed with schizophrenia using sociodemographic and clinical data through machine learning algorithms. It has been frequently reported in the literature that individuals with severe mental disorders are at a higher risk of being victims of violence rather than perpetrators compared to the general population; this situation is often associated with substance use, homelessness, and exacerbating psychotic symptoms—specifically mania and positive symptoms. However, most existing research relies on traditional regression analyses and remains limited in explaining complex, non-linear relationships.

The SVM model developed in our study, which demonstrated the highest performance with an AUC score of 0.768, identified a history of childhood abuse as the strongest predictor of criminal

victimization in adulthood, contrasting with the acute clinical variables emphasized in the literature. This finding is consistent with studies suggesting that early-life traumas leave individuals vulnerable to revictimization in adulthood.

Furthermore, our analysis identified unemployment and the use of first-generation depot antipsychotics (AP) as moderately correlated factors, while high educational attainment was found to be weakly correlated.

In the literature, the impact of pharmacological treatment modalities on violent victimization presents a complex picture. Although some studies state that the type of prescribed medication is not directly associated with victimization, treatment non-adherence is known to be a significant risk factor(3). Indeed, it has been shown that structured processes ensuring treatment continuity reduce the risk of victimization by decreasing substance use and providing clinical stabilization. In this context,

methods ensuring treatment adherence are expected to serve a protective function. However, the findings of our study did not support this mechanism and failed to demonstrate that the use of depot antipsychotics is a protective factor against victimization. In contrast, polypharmacy—which likely indicates closer follow-up or better symptom control—was found to correlate with decreased criminal victimization.

The primary original contribution of this research lies in its association of victimization risk not only with immediate psychopathology but also with historical trauma burden, analyzing this relationship through a multivariate, machine learning-based model. Our findings indicate that in managing the risk of victimization in patients with schizophrenia, routinely screening for trauma history is as critical as symptom control.

Keywords: Artificial intelligence, crime victimization, forensic psychiatry, machine learning, schizophrenia