

Abstract

Schizophrenia is considered one of the most severe mental health disorders and is associated with numerous symptoms resulting from psychotic thought patterns. While schizophrenia is correspondent to a host of direct mental and social abnormalities, it is also related to numerous cardiovascular conditions. This study investigated the prevalence of cardiovascular terms within the inclusion criteria of schizophrenia clinical trials to identify potential disparities in the representative clinical trial population. The results indicated that there was a significant difference between the inclusion and exclusion of cardiology terms in schizophrenia clinical trials based on the inclusion of just 33 terms (3.3%) compared to the exclusion of 981 related terms (96.7%). These results suggest that cardiology terms are excluded from schizophrenia clinical trials at an overwhelming rate which could reduce the efficiency of treatment outcomes in patients with schizophrenia and comorbid cardiovascular conditions.

Background

Schizophrenia is one of the most severe mental health conditions to date and is often associated with an increased risk of cardiovascular disease (CVD) and CVD risk factors. Resultantly, schizophrenia patients tend to have a reduced lifespan which is commonly attributed to the prevalence of CVD (~17.4%) in schizophrenic populations. Research shows that schizophrenic patients are responsive to CVD treatments despite the increased prevalence (Nielsen et al., 2021, 136-145).

CVD and CVD risk factors tend to be more common in schizophrenic populations, however, there may be a greater emphasis on more serious cardiac events such as myocardial infarction (heart attack) and stroke. Schizophrenia is associated with an increased risk of stroke and an increased mortality rate post-stroke (Yung et al., 2020, 152-157). Contrarily, some research has found that there is no increase in hypertension prevalence among schizophrenic populations although hypertension is one of the leading CVD risk factors. While there may not be an increased risk of hypertension in schizophrenic populations, research has reported that schizophrenic patients tend to receive poor quality of care when being treated for hypertension (Ayerbe et al., 2018, 665-670).

The understanding of cardiovascular conditions concurrent with schizophrenia should be investigated further. This inquiry should include the outcomes of concurrent treatment in schizophrenic patients with comorbid cardiovascular conditions in clinical trials. Such clinical trials could eventually help reduce the risk of any major adverse effects of treatment in those with coexisting schizophrenia and cardiovascular conditions.

Methods

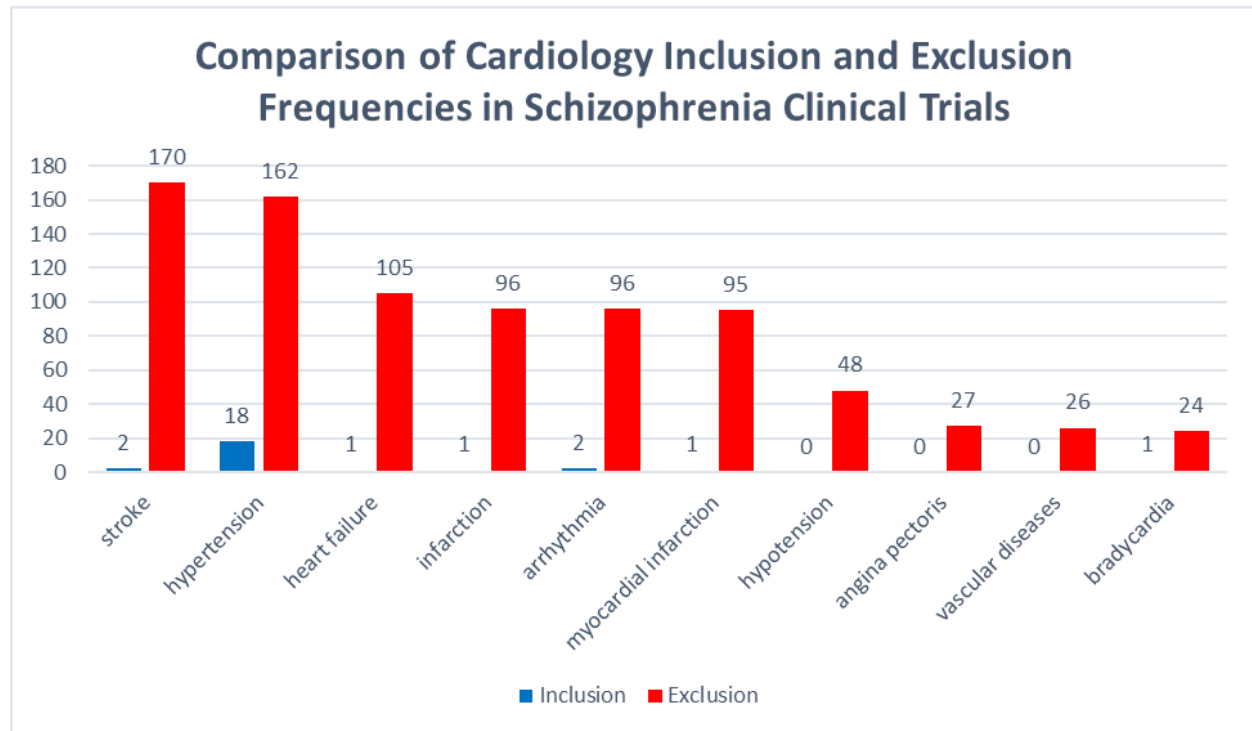
This study used clinicaltrials.gov to assess the inclusion and exclusion frequencies of cardiology terms in schizophrenia clinical trials using MeSHID D000012559. Data collected from the clinical trials repository were organized and tallied using Python 3.9.10 to examine the relationship

between terms individually and collectively. Once all data was organized, a statistical analysis was conducted using Microsoft Excel. The data were analyzed using a Pearson correlation, regression analysis, and t-test paired with two samples for means. The t-test results are represented in Figure 1 while inclusion and exclusion data are illustrated in Figure 2.

Figure 1. Results of the t-test comparing inclusion and exclusion frequencies. Statistical significance is marked as $p < .001$.

t-Test: Paired Two Sample for Means		
	Inclusion	Exclusion
Mean	0.942857143	28.02857143
Variance	9.349579832	2114.146218
Observations	35	35
Pearson Correlation	0.606895348	
Hypothesized Mean Difference	0	
df	34	
t Stat	-3.626105087	
P(T<=t) one-tail	0.000465924	
t Critical one-tail	1.690924255	
P(T<=t) two-tail	0.000931848	
t Critical two-tail	2.032244509	

Figure 2. Comparison of inclusion and exclusion frequencies of cardiology terms in schizophrenia clinical trials.



Results and Conclusion

Schizophrenia clinical trials have been completed abundantly since the 1990s yet those studies have failed to consistently include patients with comorbid cardiovascular conditions. This study found that 981 (96.7%) of 1014 cardiology terms were excluded from schizophrenia clinical trials compared to just 33 (3.3%) included. Cardiovascular terms were 29.3 times more likely to be excluded from clinical trials, led by terms such as hypertension (162), stroke (170), heart failure (105), infarction (96), and myocardial infarction (95). The Pearson correlation yielded a large effect (.607) while the regression analysis and two-tail t-test each found a significant relationship between the inclusion and exclusion of cardiology terms in schizophrenia clinical trials ($p < .001$).

Overall, there appears to be a clear relationship between schizophrenia and cardiovascular conditions and risk factors although patients with such co-existing conditions tend to be excluded from schizophrenia clinical trials. Given the historical increase in cardiovascular disease prevalence and mortality among schizophrenic populations, future clinical trials should address the treatment of co-existing schizophrenia and cardiovascular conditions to improve treatment outcomes and minimize major adverse cardiac events.

References

- Ayerbe, Luis, Ivo Forgnone, Juliet Addo, Ana Sigüero, Stefano Gelati, and Salma Ayis. "Hypertension risk and clinical care in patients with bipolar disorder or schizophrenia; a systematic review and meta-analysis." *Journal of affective disorders* 225 (2018): 665-670.
- Nielsen, René Ernst, Jytte Banner, and Svend Eggert Jensen. "Cardiovascular disease in patients with severe mental illness." *Nature Reviews Cardiology* 18, no. 2 (2021): 136-145.
- Yung, Nicholas Chak Lam, Corine Sau Man Wong, Joe Kwun Nam Chan, Philip Chi Fai Or, Eric Yu Hai Chen, and Wing Chung Chang. "Mortality in patients with schizophrenia admitted for incident ischemic stroke: a population-based cohort study." *European Neuropsychopharmacology* 31 (2020): 152-157.