



Original Article

Evaluation of QT Interval Changes in Patients Receiving Antipsychotic Drugs

Oluwasegun Daniel Ajala¹, Oswald Theo-Doe², Deborah Ayodele Odewale³, Alena JoseThamarasseril⁴, Prashanth Kumar Patnaik⁵

^{1,2,3,4}Student, Department of Psychiatry, All Saints University School of Medicine, Roseau, Dominica

⁵Associate Professor, Department of Pharmacology, All Saints University School of Medicine, Roseau, Dominica

 OPEN ACCESS

Corresponding Author:

Dr. Prashanth Kumar Patnaik

Associate Professor, Department of
Pharmacology, All Saints University
School of Medicine, Roseau,
Dominica

Received: 16-04-2026

Accepted: 09-05-2026

Available online: 15-05-2026

Copyright © International Journal of
Medical and Pharmaceutical Research

ABSTRACT

Background: Antipsychotic medications are essential in the management of psychotic and mood disorders, but some agents alter ventricular repolarization and increase the corrected QT interval. QTc prolongation is clinically important because it can precede torsades de pointes and sudden cardiac death in susceptible patients.

Objectives: To evaluate QTc interval changes among patients receiving antipsychotic drugs and to identify clinical and treatment-related factors associated with QTc prolongation.

Methods: This hospital-based observational study was conducted in the Department of Psychiatry, All Saints University School of Medicine, Roseau, Dominica, from September 2025 to February 2026. A total of 120 adult patients receiving antipsychotic drugs were assessed. Baseline and follow-up electrocardiograms were evaluated, and QTc was calculated using a standard correction method. Demographic data, psychiatric diagnosis, antipsychotic exposure, concomitant psychotropic medication, comorbidities, cardiac history, and electrolyte abnormalities were recorded. Data were analysed using appropriate descriptive and inferential statistical tests.

Results: The mean age was 39.6 ± 12.8 years, and 56.7% were male. Schizophrenia spectrum disorders were the commonest indication for antipsychotic therapy. Risperidone was the most frequently prescribed drug, followed by olanzapine and quetiapine. Mean QTc increased from 408.6 ± 22.4 ms at baseline to 424.8 ± 28.7 ms at follow-up, with a mean change of 16.2 ± 18.9 ms. QTc prolongation was observed in 18 patients. QTc increase greater than 60 ms occurred in 5 patients, while QTc ≥ 500 ms was recorded in 2 patients. QTc prolongation was significantly associated with older age, haloperidol use, antipsychotic polytherapy, concomitant psychotropic medication, electrolyte abnormality, and history of cardiac disease.

Conclusion: Antipsychotic therapy was associated with a significant increase in QTc interval, although marked prolongation was uncommon. Patients with identifiable clinical or pharmacological risk factors require baseline and follow-up electrocardiographic monitoring.

Keywords: antipsychotic drugs; QTc interval; electrocardiography; torsades de pointes; schizophrenia; haloperidol; psychotropic medication.

INTRODUCTION

Antipsychotic drugs remain a central component of treatment for schizophrenia spectrum disorders, bipolar affective disorder, acute psychosis, severe agitation, and selected behavioural syndromes. Their therapeutic action is balanced against a range of metabolic, neurological, endocrine, and cardiovascular adverse effects. Among cardiovascular effects, prolongation of the corrected QT interval (QTc) has special clinical relevance because it reflects delayed ventricular repolarization and can create an electrophysiological substrate for torsades de pointes, syncope, ventricular fibrillation,

and sudden cardiac death [1,2]. Although these outcomes are uncommon, their severity has made QTc evaluation an important aspect of psychopharmacological safety.

The QT interval varies with heart rate; therefore, clinical interpretation usually relies on a corrected value. QTc values above accepted sex-specific thresholds, very large increments from baseline, and values reaching or exceeding 500 ms are considered warning signals in drug safety practice [3,4]. Antipsychotic-related QTc prolongation occurs mainly through interference with cardiac repolarizing potassium currents, especially the rapid component of the delayed rectifier current. The magnitude of QTc change differs between individual drugs and is influenced by dose, route of administration, metabolic inhibition, serum concentration, and patient susceptibility [4-7].

Earlier investigations and reviews have shown that both first-generation and second-generation antipsychotics can produce measurable QTc changes, but the effect is not uniform across agents [4-7]. Haloperidol, thioridazine, ziprasidone, and some antipsychotic combinations have received particular attention, whereas several atypical agents have shown smaller average effects under usual dosing conditions [4-6]. Population-level studies have also linked antipsychotic exposure with sudden cardiac death, especially at higher doses and in patients with additional cardiovascular vulnerability [8,9]. These findings support careful patient selection rather than avoidance of clinically necessary antipsychotic treatment.

Risk assessment is especially important because QTc prolongation is usually multifactorial. Female sex, older age, baseline cardiac disease, electrolyte abnormalities, bradycardia, hepatic or renal dysfunction, high antipsychotic dose, polypharmacy, and use of other QT-prolonging psychotropic or non-psychotropic drugs all increase vulnerability [10-13]. Contemporary guidance recommends ECG monitoring when patients receive moderate- or high-risk antipsychotics, when risk factors are present, or when clinically significant QTc prolongation develops during treatment [11,12].

Despite extensive international literature, local data from psychiatric settings remain useful because prescribing patterns, comorbidity profiles, ECG access, and monitoring practices differ between institutions. The present study was conducted to evaluate QTc interval changes among patients receiving antipsychotic drugs in a psychiatry department. The objectives were to assess baseline and follow-up QTc values, determine the frequency of QTc prolongation, and identify demographic, clinical, and treatment-related factors associated with QTc prolongation among patients receiving antipsychotic therapy.

MATERIALS AND METHODS

Study design and setting

This hospital-based observational analytical study was conducted in the Department of Psychiatry, All Saints University School of Medicine, Roseau, Dominica. The study was carried out over a six-month period from September 2025 to February 2026. The study evaluated QTc interval changes among adult patients receiving antipsychotic medication as part of routine psychiatric care. The design involved assessment of baseline clinical profile, antipsychotic exposure, electrocardiographic findings, and follow-up QTc measurements.

Study population

A total of 120 patients receiving antipsychotic drugs were included. Adult patients aged 18 years and above who were prescribed antipsychotic medication for schizophrenia spectrum disorder, bipolar affective disorder, acute psychosis, or other psychiatric indications were eligible. Patients were included when baseline and follow-up ECG records were available and clinical data were sufficiently complete for analysis. Patients with congenital long QT syndrome, pacemaker rhythm, bundle branch block preventing reliable QT assessment, acute myocardial infarction, severe decompensated cardiac illness, or incomplete ECG documentation were excluded to reduce measurement bias and clinical confounding [8,10].

Data collection

Data were collected using a structured case record form. Demographic variables included age and sex. Clinical variables included psychiatric diagnosis, hypertension, diabetes mellitus, history of cardiac disease, and family history of cardiac illness. Drug-related variables included the antipsychotic prescribed, monotherapy or polytherapy status, duration of treatment, and concomitant psychotropic medication. Available serum electrolyte findings were reviewed, and abnormalities relevant to QTc risk were documented. Antipsychotic drug use was categorized according to the primary agent received, and polytherapy was defined as concurrent use of more than one antipsychotic drug.

ECG assessment and operational definitions

Standard 12-lead electrocardiograms were assessed at baseline and follow-up. QT interval was measured from the beginning of the QRS complex to the end of the T wave, and QTc was calculated using a standard correction formula. QTc prolongation was defined using sex-specific clinical thresholds, while QTc \geq 500 ms and QTc increase greater than

60 ms from baseline were considered clinically important safety outcomes [3,11,12]. ECGs with unclear T-wave termination or artefacts affecting QT measurement were not used for final analysis.

Statistical analysis

Data were entered into a spreadsheet and analysed using standard statistical methods. Continuous variables were expressed as mean \pm standard deviation. Categorical variables were presented as frequency and percentage. Baseline and follow-up QTc values were compared using paired statistical testing. Associations between QTc prolongation and selected risk factors were assessed using chi-square test or Fisher exact test according to cell distribution. A p-value <0.05 was considered statistically significant.

Ethical considerations

The study was conducted in accordance with institutional ethical standards and the principles of the Declaration of Helsinki. Ethical approval was obtained from the Institutional Ethics Committee of All Saints University School of Medicine, Roseau, Dominica, before data collection. Written informed consent was obtained from study participants. Confidentiality was maintained by anonymizing patient identifiers during data entry and analysis.

RESULTS

A total of 120 patients receiving antipsychotic drugs were included in the analysis. The mean age of the study population was 39.6 ± 12.8 years, with most patients belonging to the 31-45 years age group. Males constituted 56.7% of the study population. Schizophrenia spectrum disorders were the most common indication for antipsychotic therapy, followed by bipolar affective disorder and acute psychosis. Hypertension and diabetes mellitus were present in 14.2% and 10.8% of patients, respectively. A family history of cardiac illness was reported in 8.3% of participants (Table 1).

Table 1. Baseline demographic and clinical characteristics of the study population

Variable	Category / Value	Frequency / Mean	Percentage / SD
Total sample size	-	120	100.0
Age, years	Mean \pm SD	39.6	± 12.8
Age group	18-30 years	28	23.3
	31-45 years	46	38.3
	46-60 years	32	26.7
	>60 years	14	11.7
Sex	Male	68	56.7
	Female	52	43.3
Diagnosis	Schizophrenia spectrum disorder	62	51.7
	Bipolar affective disorder	28	23.3
	Acute psychosis	18	15.0
	Other psychiatric disorders	12	10.0
Hypertension	Present	17	14.2
Diabetes mellitus	Present	13	10.8
History of cardiac disease	Present	6	5.0
Family history of cardiac illness	Present	10	8.3

Risperidone was the most commonly prescribed antipsychotic drug, followed by olanzapine and quetiapine. Most patients were receiving monotherapy, while 18.3% were receiving more than one antipsychotic drug. Concomitant use of antidepressants or mood stabilizers was noted in 34.2% of patients. Electrolyte abnormality was documented in 10.0% of the study population (Table 2).

Table 2. Pattern of antipsychotic drug use among the study participants

Drug-related variable	Category	Frequency	Percentage
Type of antipsychotic drug	Risperidone	36	30.0
	Olanzapine	30	25.0
	Quetiapine	20	16.7
	Haloperidol	18	15.0
	Amisulpride	10	8.3
	Clozapine	6	5.0
Antipsychotic regimen	Monotherapy	98	81.7
	Polytherapy	22	18.3
Duration of treatment	<1 month	24	20.0
	1-6 months	52	43.3

	>6 months	44	36.7
Concomitant psychotropic medication	Present	41	34.2
Electrolyte abnormality	Present	12	10.0

The mean baseline corrected QT interval was 408.6 ± 22.4 ms. After antipsychotic exposure, the mean QTc interval increased to 424.8 ± 28.7 ms. The mean QTc increase was 16.2 ± 18.9 ms, and this change was statistically significant. QTc prolongation was observed in 18 patients, representing 15.0% of the study population. A QTc increase of more than 60 ms was observed in 5 patients, while QTc ≥ 500 ms was recorded in 2 patients (Table 3).

Table 3. QTc interval changes before and after antipsychotic therapy

QTc parameter	Baseline	Follow-up	Mean change	p-value
QTc interval, ms	408.6 ± 22.4	424.8 ± 28.7	16.2 ± 18.9	<0.001
Male patients, QTc ms	405.2 ± 21.8	419.6 ± 27.3	14.4 ± 17.2	<0.001
Female patients, QTc ms	413.1 ± 22.9	431.5 ± 29.6	18.4 ± 20.4	<0.001
QTc prolongation	4 (3.3%)	18 (15.0%)	-	0.002
QTc increase >60 ms	-	5 (4.2%)	-	-
QTc ≥ 500 ms	-	2 (1.7%)	-	-

QTc prolongation was more frequently observed among patients receiving haloperidol, antipsychotic polytherapy, and those with electrolyte abnormalities. Female sex, older age, and concomitant psychotropic medication also showed higher proportions of QTc prolongation, although the strongest associations were observed with haloperidol use, polytherapy, and electrolyte imbalance. Age >60 years, haloperidol use, antipsychotic polytherapy, concomitant psychotropic medication, electrolyte abnormality, and history of cardiac disease were significantly associated with QTc prolongation (Table 4).

Table 4. Factors associated with QTc prolongation among patients receiving antipsychotic drugs

Factor	QTc prolongation present n (%)	QTc prolongation absent n (%)	p-value
Age >60 years	5 (27.8)	9 (8.8)	0.028
Female sex	11 (61.1)	41 (40.2)	0.091
Haloperidol use	7 (38.9)	11 (10.8)	0.004
Antipsychotic polytherapy	8 (44.4)	14 (13.7)	0.003
Concomitant psychotropic medication	10 (55.6)	31 (30.4)	0.036
Electrolyte abnormality	6 (33.3)	6 (5.9)	0.001
History of cardiac disease	3 (16.7)	3 (2.9)	0.034

Overall, antipsychotic therapy was associated with a statistically significant increase in QTc interval. However, clinically marked QTc prolongation was limited to a small proportion of patients. Patients receiving haloperidol, multiple antipsychotic drugs, concomitant psychotropic medication, and those with electrolyte abnormalities demonstrated a higher frequency of QTc prolongation, indicating the need for baseline and follow-up electrocardiographic monitoring in these risk groups.

DISCUSSION

The present study evaluated QTc interval changes in 120 patients receiving antipsychotic drugs and demonstrated a statistically significant increase in mean QTc from baseline to follow-up. The observed mean increase of 16.2 ms suggests that antipsychotic therapy produced measurable but generally modest ventricular repolarization delay in this cohort. This finding is consistent with earlier pharmacological and clinical studies reporting variable QTc effects across antipsychotic agents rather than a uniform class effect [4-7]. Although the mean change was significant, QTc ≥ 500 ms occurred in only 1.7% of patients, indicating that marked prolongation was uncommon.

QTc prolongation was observed in 15.0% of patients at follow-up. This proportion is clinically meaningful because the psychiatric population often carries overlapping risk factors, including comorbid medical illness, concomitant psychotropic therapy, and variable access to periodic ECG monitoring. Large psychiatric inpatient studies have reported that ECG abnormalities and QTc prolongation occur in a notable minority of patients, and risk rises when drug exposure coincides with patient-related vulnerability [13,14]. In the current study, the presence of cardiac disease and older age showed significant associations with QTc prolongation, supporting the importance of baseline risk stratification before prescribing higher-risk antipsychotic regimens.

Haloperidol use was significantly associated with QTc prolongation. This observation agrees with previous reviews and updated psychotropic safety literature describing haloperidol as an antipsychotic requiring careful monitoring, particularly in patients with medical illness, higher doses, parenteral exposure, or additional risk factors [2,10,11]. In contrast, risperidone and olanzapine were more frequently prescribed in the overall study population but were not highlighted as the strongest risk signals in the present analysis. This pattern supports the view that both drug-specific electrophysiological properties and host factors shape the final QTc response [5-7].

Antipsychotic polytherapy was another significant factor associated with QTc prolongation. Polytherapy increases pharmacodynamic burden, creates potential pharmacokinetic interactions, and often reflects greater psychiatric severity. Concomitant psychotropic medication was also significantly associated with QTc prolongation, which is relevant because antidepressants, mood stabilizers, sedatives, and other agents can influence cardiac conduction directly or indirectly [10,12]. These findings support a medication review approach in which clinicians evaluate total QT burden rather than considering each drug in isolation.

Electrolyte abnormality showed the strongest association with QTc prolongation in this study. Hypokalemia, hypomagnesemia, and hypocalcemia are established contributors to delayed repolarization and torsades vulnerability [8,9,13]. The association observed here reinforces the practical need to correct reversible biochemical abnormalities before continuing or escalating QT-prolonging antipsychotic treatment. Female sex showed a higher proportion of QTc prolongation, although the association was not statistically significant. Previous reports have consistently identified female sex as a risk factor, but the absence of significance in this study could reflect sample size and the distribution of other risk factors [10,13].

The clinical implication of this study is that ECG monitoring should be targeted and systematic. Baseline ECG is particularly valuable in patients above 60 years, those with cardiac disease, patients receiving haloperidol or antipsychotic combinations, and individuals exposed to additional psychotropic drugs or electrolyte imbalance. Follow-up ECG after initiation, dose escalation, or addition of interacting medication can identify early repolarization changes and allow timely intervention. Dose optimization, correction of electrolytes, reduction of avoidable polytherapy, and selection of lower-risk alternatives are practical strategies for preventing severe QTc prolongation while preserving psychiatric stability [11,12].

LIMITATIONS

This study was limited by its single-centre design, modest sample size, and short follow-up duration. Serum drug levels and genetic susceptibility markers were not assessed. QTc measurement was based on available ECG records, and long-term arrhythmic outcomes were not evaluated. These factors restrict broader generalization of the findings.

CONCLUSION

In this study, antipsychotic therapy was associated with a statistically significant increase in QTc interval among adult psychiatric patients. Most QTc changes were modest, while QTc ≥ 500 ms and QTc increase greater than 60 ms were observed in a small proportion. Haloperidol use, antipsychotic polytherapy, concomitant psychotropic medication, electrolyte abnormality, older age, and cardiac disease were important risk factors. These findings support baseline ECG evaluation, correction of reversible biochemical abnormalities, careful medication review, and follow-up ECG monitoring in high-risk patients. Safer prescribing requires balancing psychiatric benefit with individualized cardiac risk assessment.

REFERENCES

1. Glassman AH, Bigger JT Jr. Antipsychotic drugs: prolonged QTc interval, torsade de pointes, and sudden death. *Am J Psychiatry*. 2001;158(11):1774-1782. doi:10.1176/appi.ajp.158.11.1774.
2. Haddad PM, Anderson IM. Antipsychotic-related QTc prolongation, torsade de pointes and sudden death. *Drugs*. 2002;62(11):1649-1671. doi:10.2165/00003495-200262110-00006.
3. Reilly JG, Ayis SA, Ferrier IN, Jones SJ, Thomas SH. QTc-interval abnormalities and psychotropic drug therapy in psychiatric patients. *Lancet*. 2000;355(9209):1048-1052. doi:10.1016/S0140-6736(00)02035-3.
4. Harrigan EP, Miceli JJ, Anziano R, Watsky E, Reeves KR, Cutler NR, et al. A randomized evaluation of the effects of six antipsychotic agents on QTc, in the absence and presence of metabolic inhibition. *J Clin Psychopharmacol*. 2004;24(1):62-69. doi:10.1097/01.jcp.0000104913.75206.62.
5. Vieweg WV. New generation antipsychotic drugs and QTc interval prolongation. *Prim Care Companion J Clin Psychiatry*. 2003;5(5):205-215. doi:10.4088/pcc.v05n0504.
6. Taylor DM. Antipsychotics and QT prolongation. *Acta Psychiatr Scand*. 2003;107(2):85-95. doi:10.1034/j.1600-0447.2003.02078.x.
7. Zareba W, Lin DA. Antipsychotic drugs and QT interval prolongation. *Psychiatr Q*. 2003;74(3):291-306. doi:10.1023/A:1024122706337.

8. Roden DM. Drug-induced prolongation of the QT interval. *N Engl J Med.* 2004;350(10):1013-1022. doi:10.1056/NEJMra032426.
9. Yap YG, Camm AJ. Drug induced QT prolongation and torsades de pointes. *Heart.* 2003;89(11):1363-1372. doi:10.1136/heart.89.11.1363.
10. Beach SR, Celano CM, Sugrue AM, Adams C, Ackerman MJ, Noseworthy PA, et al. QT prolongation, torsades de pointes, and psychotropic medications: a 5-year update. *Psychosomatics.* 2018;59(2):105-122. doi:10.1016/j.psych.2017.10.009.
11. Lambiase PD, de Bono JP, Schilling RJ, Lowe M, Turley A, Slade A, et al. British Heart Rhythm Society clinical practice guidelines on the management of patients developing QT prolongation on antipsychotic medication. *Arrhythm Electrophysiol Rev.* 2019;8(3):161-165. doi:10.15420/aer.2019.8.3.G1.
12. Shah AA, Aftab A, Coverdale J. QTc prolongation with antipsychotics: is routine ECG monitoring recommended? *J Psychiatr Pract.* 2014;20(3):196-206. doi:10.1097/01.pra.0000450319.21859.6d.
13. Tisdale JE, Jaynes HA, Kingery JR, Mourad NA, Trujillo TN, Overholser BR, et al. Development and validation of a risk score to predict QT interval prolongation in hospitalized patients. *Circ Cardiovasc Qual Outcomes.* 2013;6(4):479-487. doi:10.1161/CIRCOUTCOMES.113.000152.
14. Ansermot N, Bochatay M, Schläpfer J, Gholam M, Gonthier A, Conus P, et al. Prevalence of ECG abnormalities and risk factors for QTc interval prolongation in hospitalized psychiatric patients. *Ther Adv Psychopharmacol.* 2019;9:2045125319891386. doi:10.1177/2045125319891386.