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Study of Prevalance of QTc Interval Prolongation in ECG among Diabetic Population in DAE Hospital

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ABSTRACT

This is the study of prevalence of QTc interval prolongation in ECG among diabetic population who presented to our institution (DEPARTMENTOFATOMICENERGYHOSPITAL). The **prevalence of this abnormality is about 44 percent among diabetic population with raised hba1c levels**. **QTc interval is normally less than 450 ms for men and less than 460 ms for women.** Hence by measuring the QTc interval in ECG we can assess the cardio vascular risk and sudden death in diabetic patients at an earlier stage for intervention and management. Study methodology- This is a **retrospective study** done in our institution from **September 2024- February 2025 of 100** patients after obtaining ethical clearance and informed consent from all patients with DM on medications. Results- In our study out of 100 patients **80 were females and 20 of them were males**. And about 55 out of 80 female patients were >60 years and 10 out of 20 male patients were >60 years. **QTc prolongation was found in 16 females and 6 males out of which hba1c levels were >7 in 12 females and 4 males.** Those patients on **both OHA and insulin. And duration of diabetes was >10 years**. Other risk factors like hyper tension, dyslipidemia, obesity were present in 35 females and 20 males. Hence **QTc prolongation was more in females and other factors like duration of diabetes, increased hba1c attributed to it.** Conclusion- **Both type 1 and type 2 DM are risk factors of sudden cardiac death but type 1 patients there is more of genetic factors involved. In type 2 DM patients QTc prolongation is a cause of death because of ion cannel defects and ventricular arrythmias**. Hence **duration of diabetes hba1c levels and tight control of sugars with other risk factors contribute to increase of risk**. So, early detection with simple ECG record will help in early management.

Keywords: *QTc interval in ECG, sudden cardiac death, diabetic population raised hba1c levels.*

1. INTRODUCTION

QTc prolongation is an important ECG finding which predisposes to sudden cardiac death in diabetic patients due to ventricular arrhythmias and ion channel defects. The **prevalence of this abnormality is about 44 percent among diabetic population with raised hba1c levels**. **QTc interval is normally less than 450 ms for men and less than 460 ms for women.** This interval can be affected by various factors like drugs, arrythmias, diabetes and various congenital heart problems. In India diabetes being the major problem, is the cause of QTc prolongation in ECG. Various factors like old age, increased duration of diabetes and uncontrolled sugar levels with complications like neuropathy result in QTc prolongation in diabetes. The risk factors like hypertension, obesity, dyslipidemia also contribute to added risk. Hence by measuring the QTc interval in ECG we can assess the cardio vascular risk and sudden death in diabetic patients at an earlier stage for intervention and management.

2. AIM

The aim is to study the prevalence of QTc interval prolongation which is a marker of sudden cardiac death in diabetic population with uncontrolled sugar levels and raised Hba1c

3. STUDY METHODOLOGY

This is a **retrospective study** done in our institution from **September 2024-Feb 2025 of 100 patients** after obtaining ethical clearance and informed consent from all patients with DM on medications after taking ECG record initially and comparing with ECG record after 6 months of treatment (lifestyle, OHA and insulin) and measuring the sugar levels and Hba1c record in consideration with risk factors like obesity, hypertension, dyslipidemia.

4. RISK FACTORS

Various risk factors like hyper tension, dyslipidemia, cardio vascular disease and confounding factors like age, sex duration of diabetes, hba1c levels, tight control of sugars with insulin and OHA were taken in consideration with ECG record. ECG record initially and after control of sugars with treatment were compared for QTc prolongation after excluding the drugs and various cardiac conditions causing it, so that early intervention and management can be done and results were predicted as positive QTc prolongation and absent.

5. INCLUSION CRITERIA

In this study we included patients with diabetes mellitus on medications with risk factors like hypertension, dyslipidemia, obesity and cardio vascular disease.

6. EXCLUSION CRITERIA

Patients who were having some congenital heart defects like cardiomyopathy, CHB, structural heart defects, those who were on anti-arrhythmic drugs, diuretics, CKD patients with deranged K levels, cancer patients on chemotherapy, old debilitated patients were excluded.

7. RESULTS

In our study out of **100 patients 80 were females and 20 of them were males**. And about 55 out of 80 female patients were >60 years and 10 out of 20 male patients were >60 years. Other risk factors like hypertension, dyslipidemia, obesity were present in 35 females and 20 males. **QTc prolongation was found in 16 females and 6 males out of which hba1c levels were >7 in 12 females and 4 males.** These patients on **both OHA and insulin. And duration of diabetes was >10 years**. Hence **QTc prolongation was more in females and other factors like duration of diabetes, increased Hba1c attributed to it.**

Table 1- Prevalence of QTc prolongation according to sex.

Male	Female
20	80

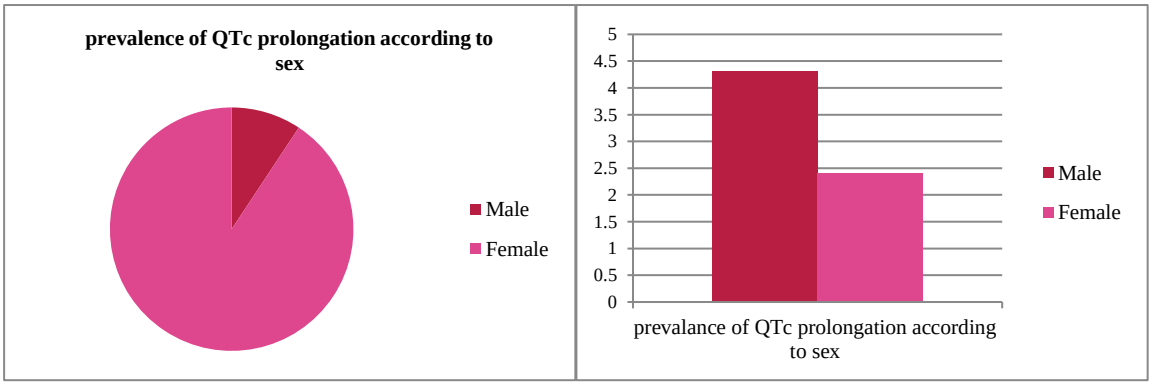
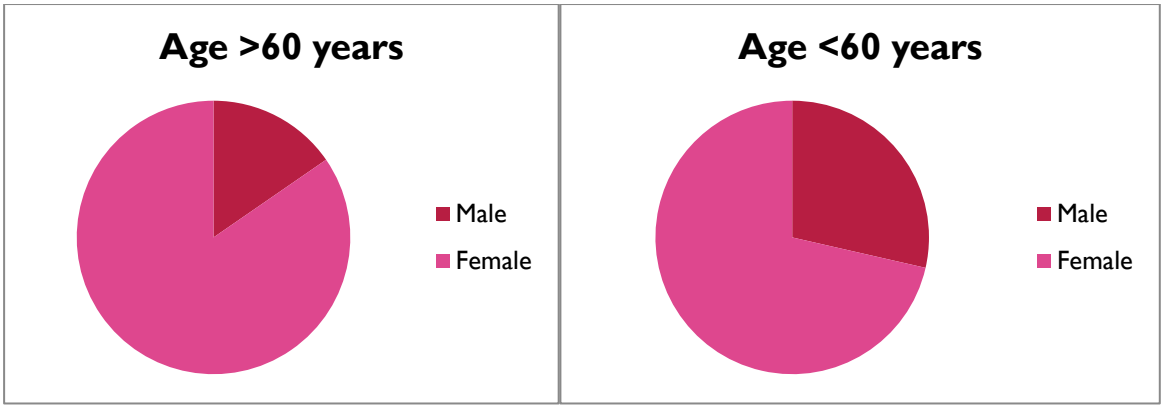


Table 2– Prevalence of QTc prolongation according to age.

Sex	Age>60years	Age<60years
Male	10	10
Female	55	25



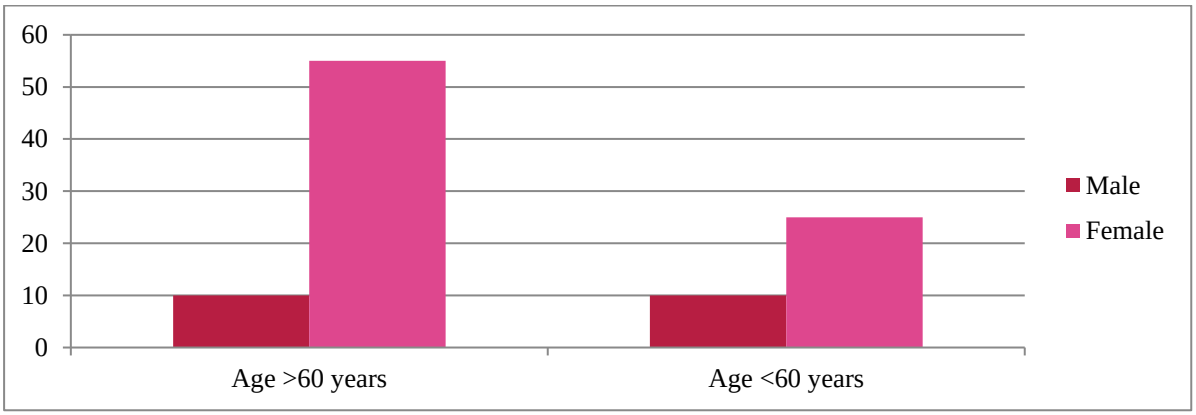
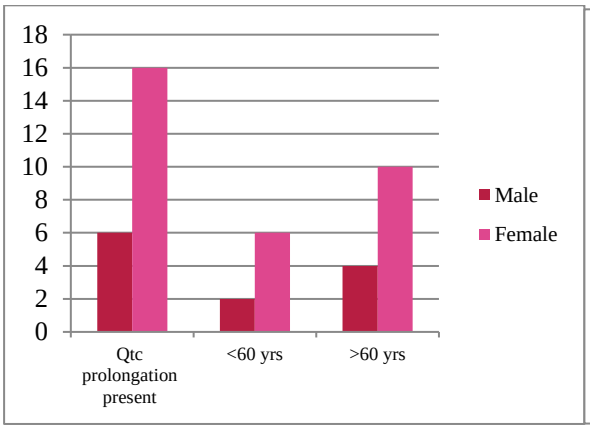
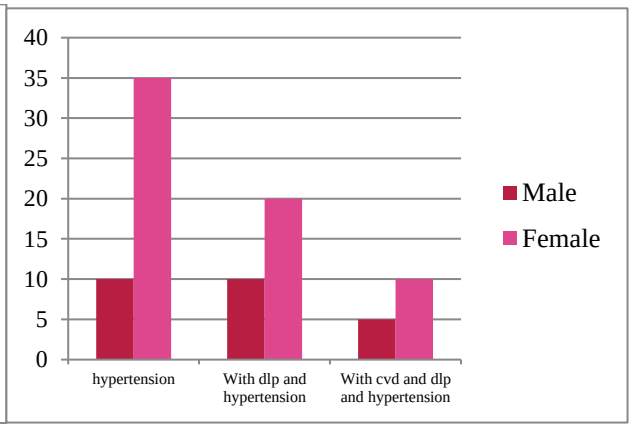
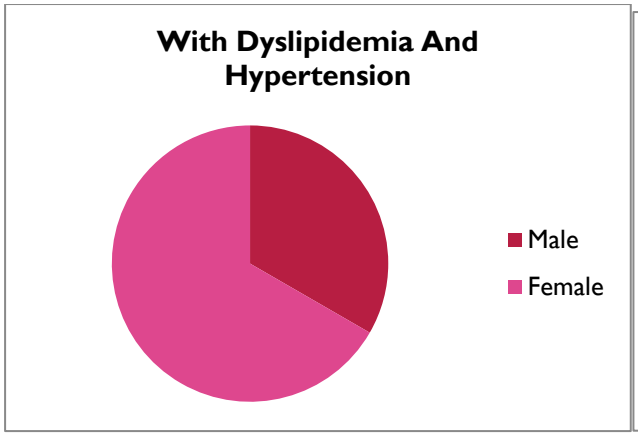


Table 3-Risk factor prevalence.

Sex	Hypertension	With Dyslipidemia And Hypertension	With Cvd, Dyslipidemia And Hypertension
Male	10	10	5
Female	35	20	10







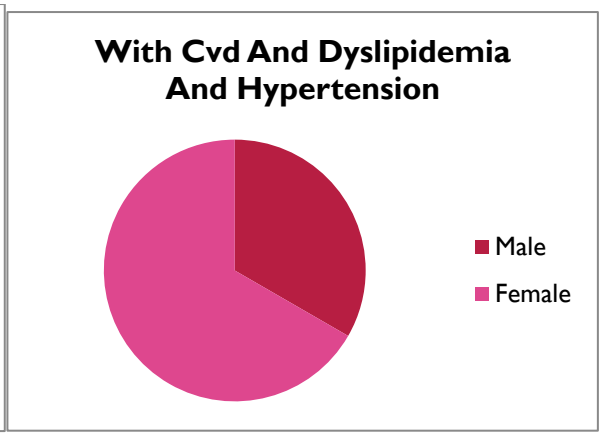
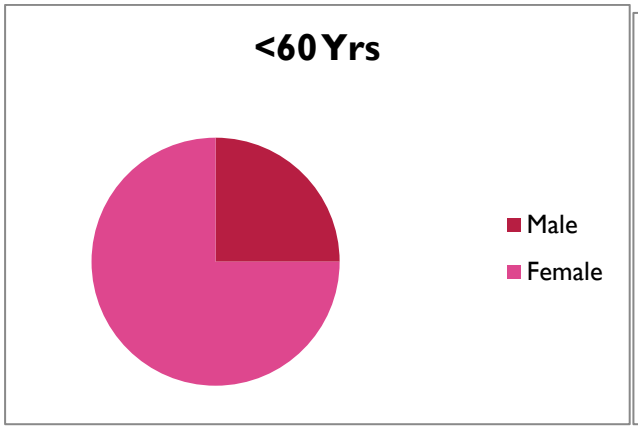
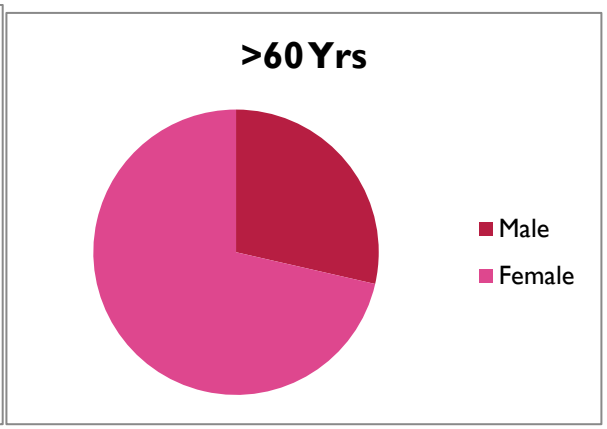
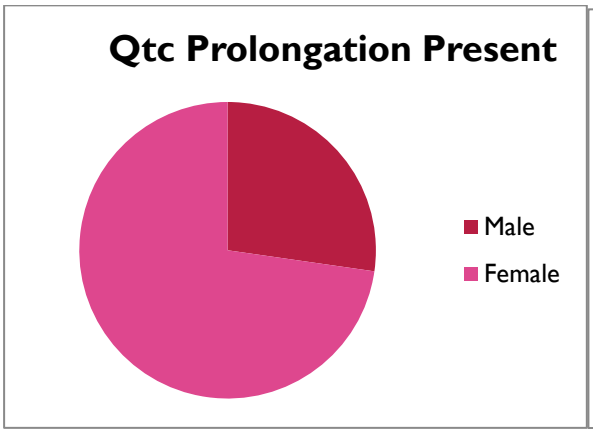


Table4-QTc prolongation with age and sex.

Sex	Qtc Prolongation Present	<60Yrs	>60Yrs
Male	6	2	4
Female	16	6	10







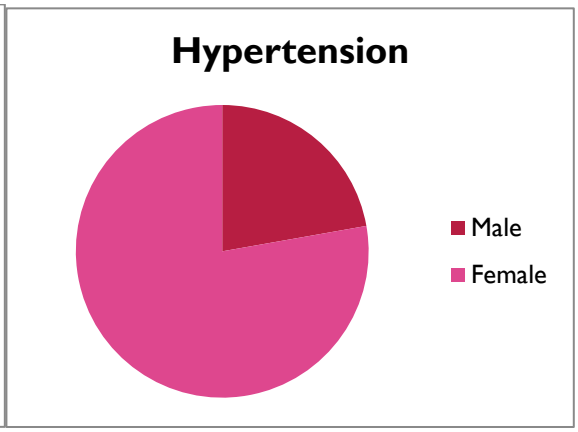
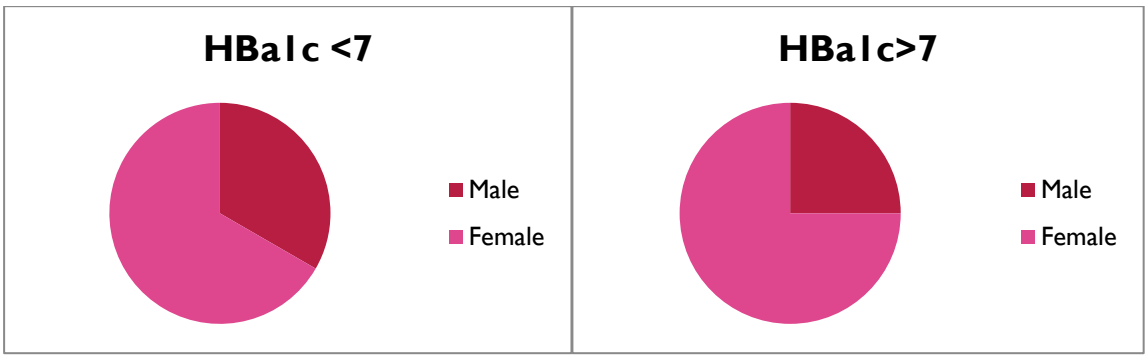


Table 5–With Hba1c and sex with QTc prolongation.

Sex	HBa1c<7	HBa1c>7
Male	2	4
Female	4	12



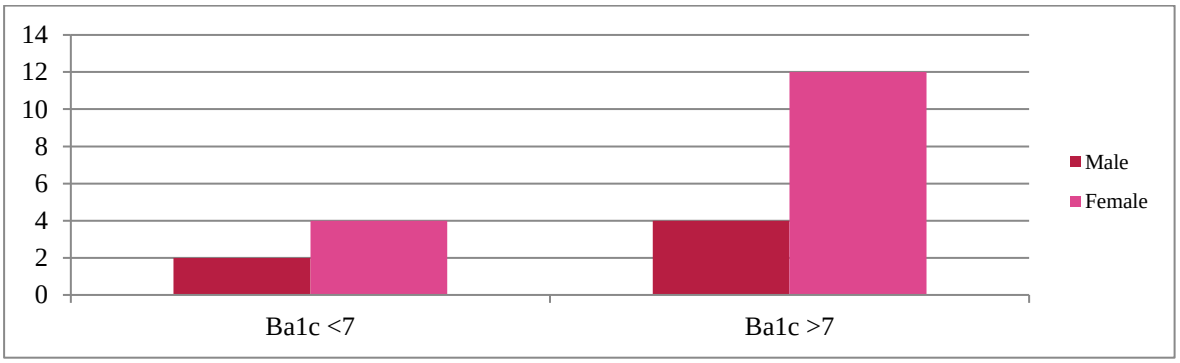
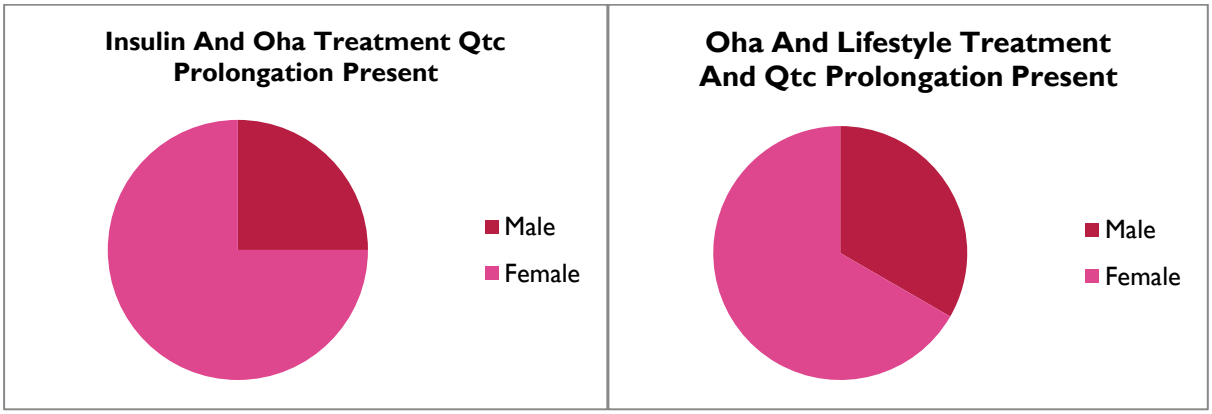
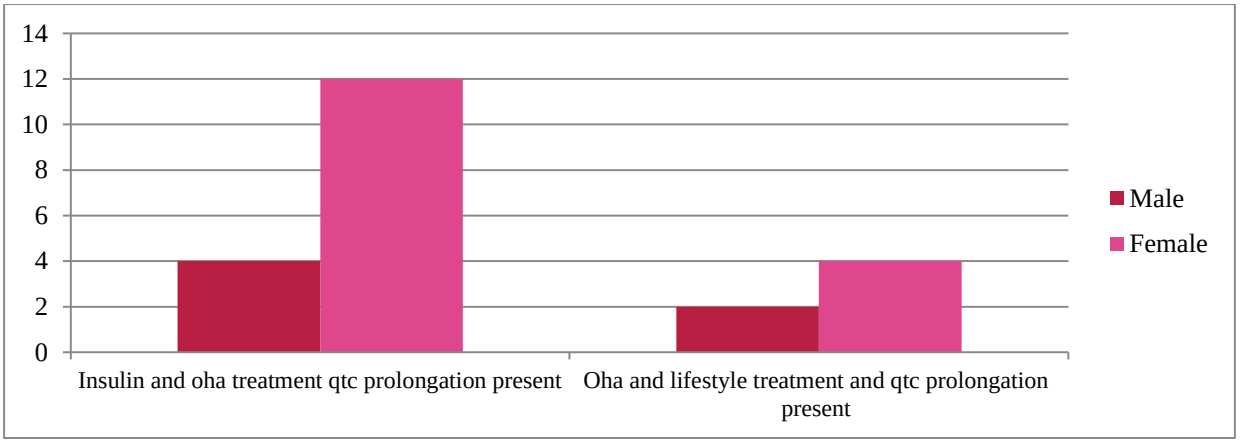


Table 6- QTc prolongation with treatment with insulin and OHA and sex.

Sex	Insulin And Oha Treatment Qtc Prolongation Present	Oha And Lifestyle Treatment And Qtc Prolongation Present
Male	4	2
Female	12	4





8. DISCUSSION

In India, **diabetes being the major problem, is the cause of QTc prolongation in ECG**. Various factors like old age, increased duration of diabetes and uncontrolled sugar levels with complications like neuropathy result in QTc prolongation in diabetes. The risk factors like hypertension, obesity, dyslipidemia also contribute to added risk. Hence by measuring the QTc interval in ECG we can assess the cardio vascular risk and sudden death in diabetic patients at an earlier stage for intervention and management. **A simple test like ECG record can give us a clue for cardio vascular risk of diabetic patients on treatment and a monitor of their sugars and Hba1c record along with that will help us to intervene early in these patients for better management**. Hence study of prevalence of QTc prolongation in ECG is a simple and useful marker of cardio vascular risk in diabetic patients.

9. COMPARISON WITH NATIONAL STUDY

In our study it was found **that QTc prolongation was more in females than males and >60 years were affected which was in line with national study. It was also found that duration of diabetes, increased hba1c levels, presence of other risk factors also added to the risk which was also in line with national study.**

10. COMPARISON WITH INTERNATIONAL STUDY

As in international study older **female** preponderance was seen in our study. But **the risk factor preponderance was distributed in both sexes IT was found that 6 out of 20 males had QTc prolongation (0.3%). Whereas in females 16 out of 35 had QTc prolongation (0.4%) which was in line with international study.**

11. LIMITATIONS

Some drugs like anti-arrythmics, tricyclic antidepressants, diuretics, chemotherapy drugs also cause QTc prolongation, there by we can't use this as sole marker of sudden cardiac death in these patients with DM as risk factors and drugs also contribute to the added risk.

12. CONCLUSION

Both type 1 and type 2 DM are risk factors of sudden cardiac death but type 1 patients there is more of genetic factors involved. In type 2 DM patients QTc prolongation is a cause of death because of ion cannel defects and ventricular arrythmias. Hence **duration of diabetes hba1c levels and tight control of sugars with other risk factors contribute to increase of risk**. So, early detection with simple ECG record will help in early management.

13. IMPLICATIONS TO COMMUNITY

QTc prolongation in both males and females is a simple test which can be used to mark the cardiac risk in diabetic patients with raised hba1c levels with complications thus paving way for early intervention and management.

REFERENCES

[1] Li S, Wang J, Zhang B, Li X, Liu Y. Diabetes Mellitus and Cause Specific Mortality: A Population- Based Study. Diabetes Metab J [Internet] 2019; 43: 319– 341.

[2] DOI: 10.4093/dmj.2018

[3] Cubeddu L X. QT Prolongation and Fatal Arrhythmias: A Review of Clinical Implications and Effects of Drugs.

Am J Ther [Internet]. 2003

[4] Lazzerini P E, Capecchi P L, Laghi-Pasini F. Assessing QT interval in patients with auto immune chronic inflammatory diseases: perils and pitfalls. Lupus SciMed. 2016; 3: e000189.

[5] Naas A A, Davidson N C, Thompson C, Cummings F, Ogston S A, Jung R T, et al. QT and QTc dispersion are accurate predictors of cardiac death in newly diagnosed non-insulin dependent diabetes: cohort study. BMJ. 1998

[6] Lu Z, Lense L, Sharma M, Shah A, Luu Y ,Cardinal L, et al. Prevalence of QT prolongation and associated L V E F changes in diabetic patients over a four- year PERIOD

[7] Giunti S, Bruno G, Lillaz E, Gruden G, Lolli V, Chaturvedi N, Fuller J H, Veglio M, Cavallo – Perin P; EURO DIABID DM Complications Study Group.

[8] Ninkovic V M, Ninkovic S M, Miloradovic V, Stanojevic D, Babic M, Giga V, Dobric M, Trenell M I, Lalic N, Seferovic P M, Jakovl jevic D G

[9] Gallego M, Zayas-Arrabal J, Alquiza A, Apellaniz B, Casis O. Electrical features of diabetic myocardium–cardio vascular safety considerations in diabetes

[10] Møller M. QT interval in relation to ventricular arrhythmias and sudden cardiac death in post myocardial infarction patients. Act a Medica Scandinavica

[11] SawickiP T, Dähne R, Bender R, et al. Prolonged QT interval as a predictor of mortality in diabetic nephropathy. Diabetologia 1996;

[12] Jermendy G ,Koltai M Z ,Pogatsa G. QT prolongation in type 2 (non-insulin-dependent) diabetic patients with cardiac autonomic neuropathy. Acta Diabetol 1990;

[13] Bednar M M, Harrigan E P, Anziano R J, et al. The QT interval. Prog Cardio vasc Dis 2001;