

Background

- Type 2 diabetes mellitus (T2DM) significantly increases the risk of cardiovascular disease (CVD), particularly in older individuals with frailty and multimorbidity.
- Traditional frailty assessment tools are often complex and time-consuming, highlighting the need for EMR-based frailty indices to identify at-risk patients more efficiently.
- This study aims to investigate the association between frailty, as measured through electronic medical records (EMRs), and major adverse cardiovascular events (MACE) in T2DM patients.

Methods

1. Data preparation

- Observational medical outcomes partnership common data model (OMOP-CDM) database at Ajou University School of Medicine (AUSOM)
- Inclusion criteria
 - 1) 40 years and older
 - 2) Diagnosed with type 2 diabetes mellitus (T2DM)
 - 3) No history of major adverse cardiovascular events (MACE) ; myocardial infarction, cardiovascular disorders, acute ischemic heart disease, chronic ischemic heart disease and acute myocardial infarction.

2. Outcome

- Occurrence of MACE

3. Sensitivity analysis

- Dividing the participants into two age groups : 65 years and younger and 66 years and older.

3. Frailty index calculation

- Electronic medical record (EMR) data was used to calculate the Electronic Frailty Index (eFI).
- The eFI was calculated by summing binarized variables, resulting in a score ranging from 0 to 1.
- This score was divided by the number of variables per patient, excluding missing values.
- The maximum value of eFI was divided into thirds, stratifying patients into three groups based on each interval.
- Patients were categorized as normal, pre-frailty, or frailty based on their FI score.

4. Statistical Analysis

- Cox proportional hazards regression model
- Kaplan-Meier survival curves
- Log-rank test

Conclusions

- This study shows an association between increasing eFI and the occurrence of MACE in patients with T2DM aged 40 years or older.
- The eFI used in this study has the advantage of not requiring separate frailty testing, and it showed the feasibility of using eFI in OMOP-CDM to screen for CVD risk groups in patients with T2DM.

Acknowledgement

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Results

- The risk of MACE was significantly higher in the frailty group compared to the normal group (Hazard Ratio [HR]: 1.68, 95% Confidence Interval [CI]: 1.38-2.04; P < 0.05) and in the pre-frailty group compared to the normal group (HR 1.44 (1.35-1.55); P < 0.05).

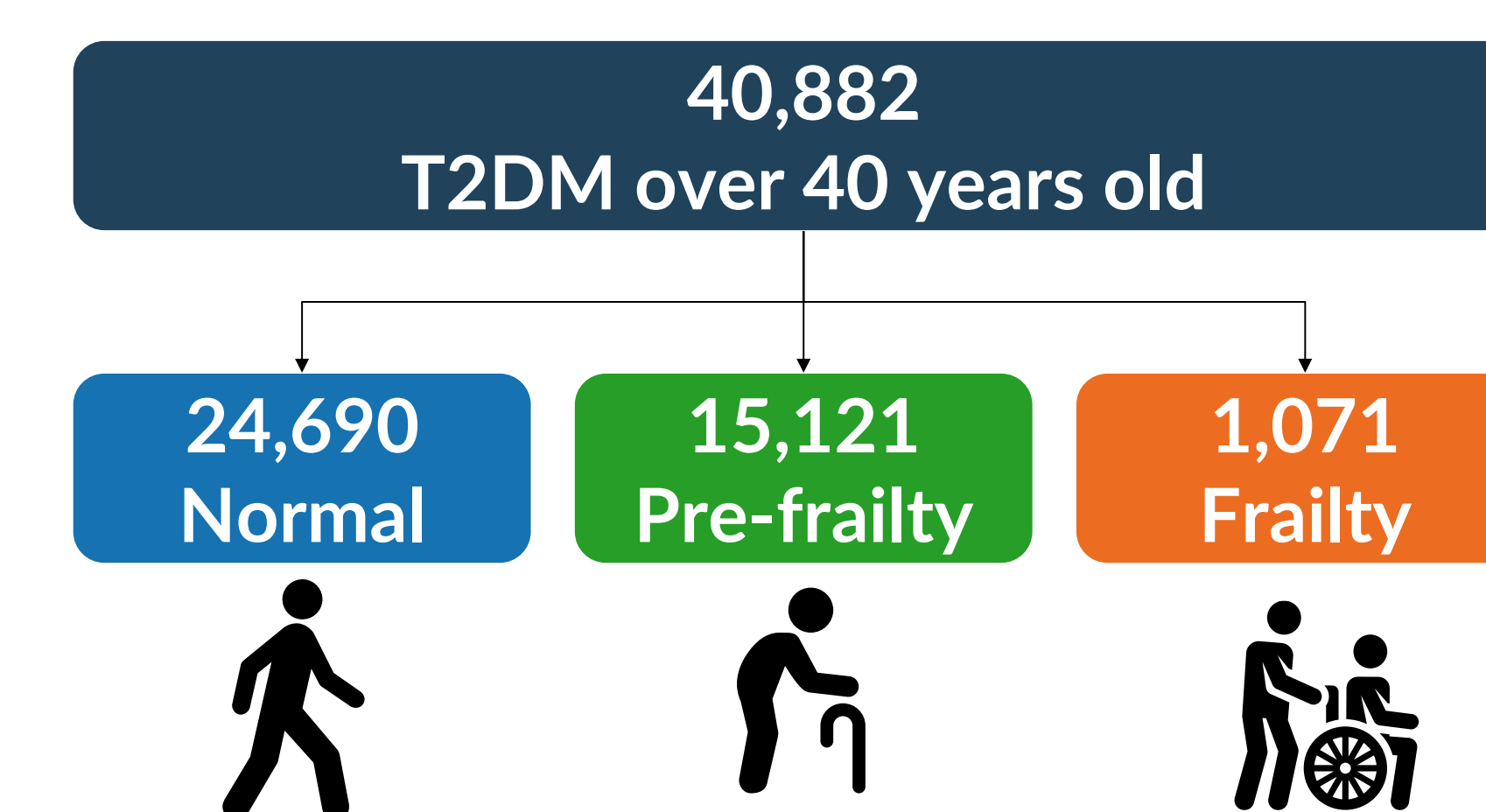


Figure 1. Classification of T2DM patients based on electronic Frailty Index

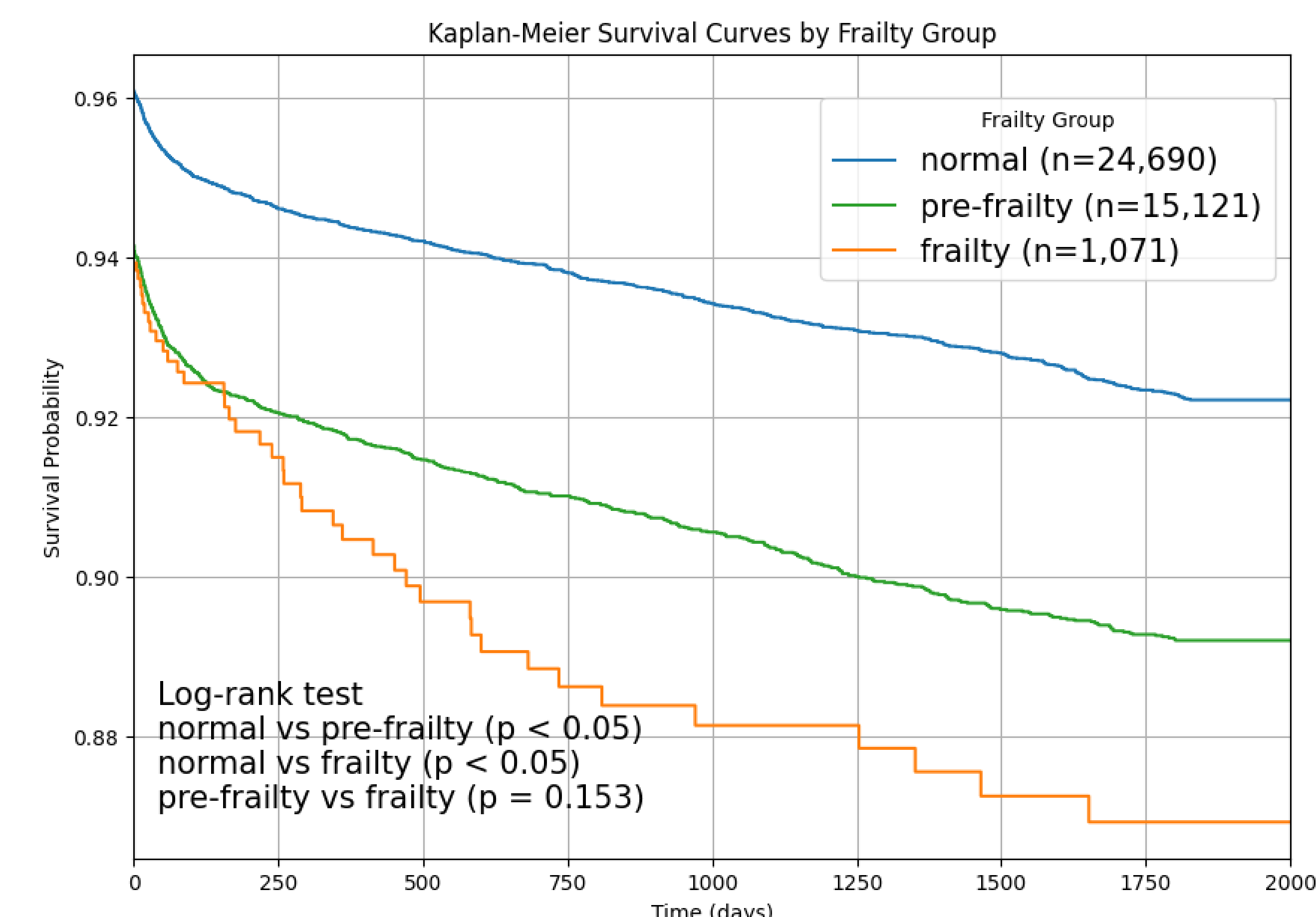


Figure 2. Survival probability curve for normal, pre-frailty, and frailty groups

Age	Frailty category	N	Hazard ratio (95%, CI)
Below 65	Normal	15,714	1.0 (ref)
	Pre-Frailty	8,028	1.26 (1.13-1.40)
	Frailty	505	1.28 (0.90-1.83)
Over 65	Normal	8,976	1.0 (ref)
	Pre-Frailty	7,093	1.46 (1.33-1.61)
	Frailty	566	1.70 (1.34-2.16)

Table 1. Hazard ratio for MACE in Subgroup