Cataract in Type 1 Diabetes Mellitus Patients- a Nationwide Population-based Study
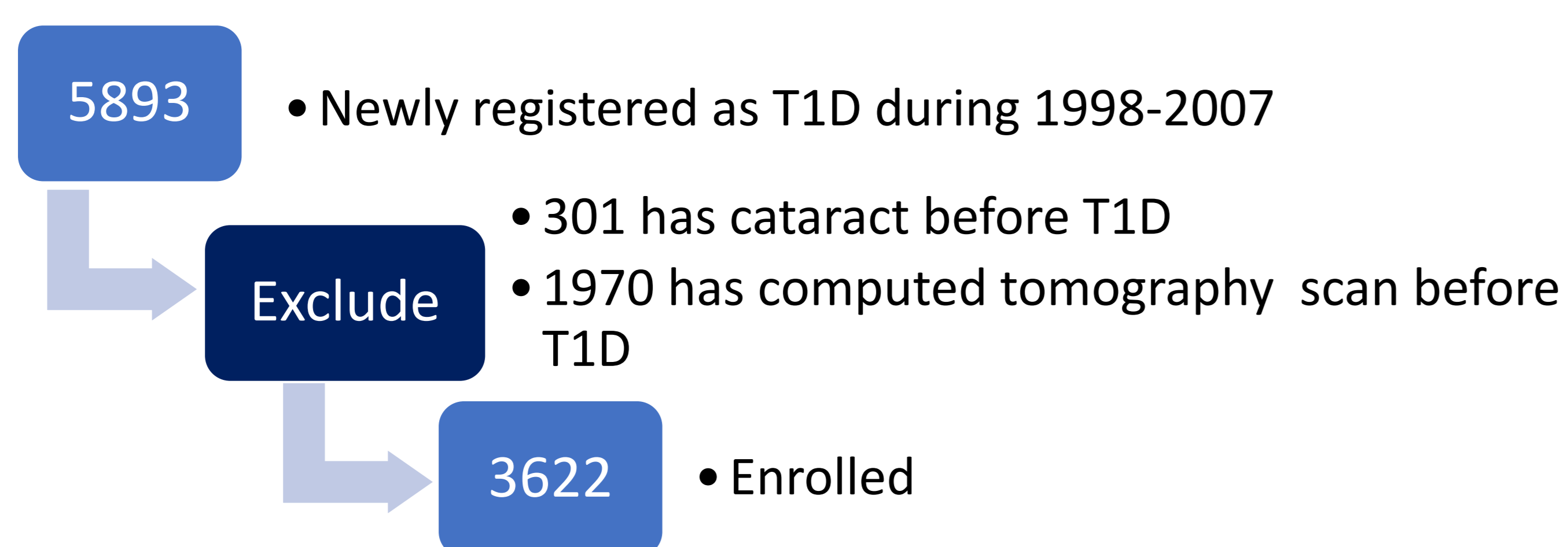
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Introduction and Objectives

While most ophthalmologic emphasis has been stressed on the influence of retinopathy on the young diabetic community, lesser known is the complication of cataract, which has resulted in 7.4%–15.3% of pediatric blindness [1,2]. The reported prevalence of cataract in type 1 diabetes patients varies markedly, ranging from 1% to 27%[3]. This study attempts to provide the epidemiology of cataract in the type 1 diabetes mellitus (T1D) population using data extracted from the National Health Insurance Research Database (NHIRD) in Taiwan. The NHIRD in Taiwan is a national health insurance program launched in 1995, and over 99% of Taiwan's population was enrolled, which provides a nation-wide scale for retrospective cohort study.

Methods

- 5893 • Newly registered as T1D during 1998-2007
- Exclude • 301 has cataract before T1D • 1970 has computed tomography scan before T1D
- 3622 • Enrolled

The same number of people were selected from Taiwan Longitudinal Health Insurance Database (LHID) 2000 by matching the age and gender with the T1D group, to serve as the model of general population.

Results

Table 1. The group selected from Longitudinal Health Insurance Database (LHID) had identical age (stratified by decades) and gender distribution as the enrolled T1D patients

	T1D	LHID	p value
Age, yrs (mean ± SD)	20.33±13.86	20.74±14.21	0.214
<10 (%)	918 (25.4)	918 (25.4)	1.000
10-19 (%)	1169 (32.3)	1169 (32.3)	
20-29(%)	717 (19.8)	717 (19.8)	
30-39 (%)	476 (13.1)	476 (13.1)	
40-49(%)	220 (6.1)	220 (6.1)	
50-59 (%)	74 (2.0)	74 (2.0)	
60+ (%)	48 (1.3)	48 (1.3)	
Male (%)	1752 (48.4)	1752 (48.4)	1.000
Total	3622	3622	

Table 2. The hazard ratio (HR) of cataract between type 1 diabetes (T1D) group and Longitudinal Health Insurance Database (LHID) group stratified by age of enrollment and gender. The hazard ratio was higher at younger age.

	T1D (n = 3622)		LHID (n = 3622)		Crude HR
	Cataract No (%)	Time to cataract, mo ± SD	Cataract No (%)	Time to cataract, mo ± SD	(95% CI)
Follow up (mo)	120.20 ± 42.22		133.02 ± 35.60		
Age of enrollment (yr)					
<10	17 (0.4)	73.51 ± 38.48	0 (0.0)	N/A	N/A
10-19	101 (2.8)	62.96 ± 47.12	0 (0.0)	N/A	N/A
20-29	102 (2.8)	52.36 ± 40.41	1 (0.02)	124.83 ± 0.00	112.6 (15.72, 807.2)*
30-39	94 (2.6)	64.62 ± 47.38	8 (0.2)	119.26 ± 58.73	13.75 (6.68, 28.31)*
40-49	69 (1.9)	61.29 ± 39.43	14 (0.4)	78.25 ± 45.89	6.10 (3.43, 10.85)*
50-59	40 (1.1)	51.05 ± 34.85	29 (0.8)	77.62 ± 43.55	1.79 (1.11, 2.89)*
60+	25 (0.7)	22.01 ± 25.34	32 (0.9)	44.34 ± 34.72	0.86 (0.51, 1.45)
Gender					
Male	176 (4.8)	56.49 ± 39.24	36 (1.0)	56.03 ± 38.28	5.20 (3.64, 7.45)*
Female	272 (7.5)	58.47 ± 45.74	48 (1.3)	79.74 ± 51.62	6.29 (4.63, 8.55)*
Total	448 (12.37)	57.69 ± 43.27	84 (2.32)	69.58 ± 47.61	5.81 (4.60, 7.33)*

*p< 0.001

Figure 1. Comparing the cumulative incidence of cataract between type 1 diabetes group and Longitudinal Health Insurance Database (LHID) group
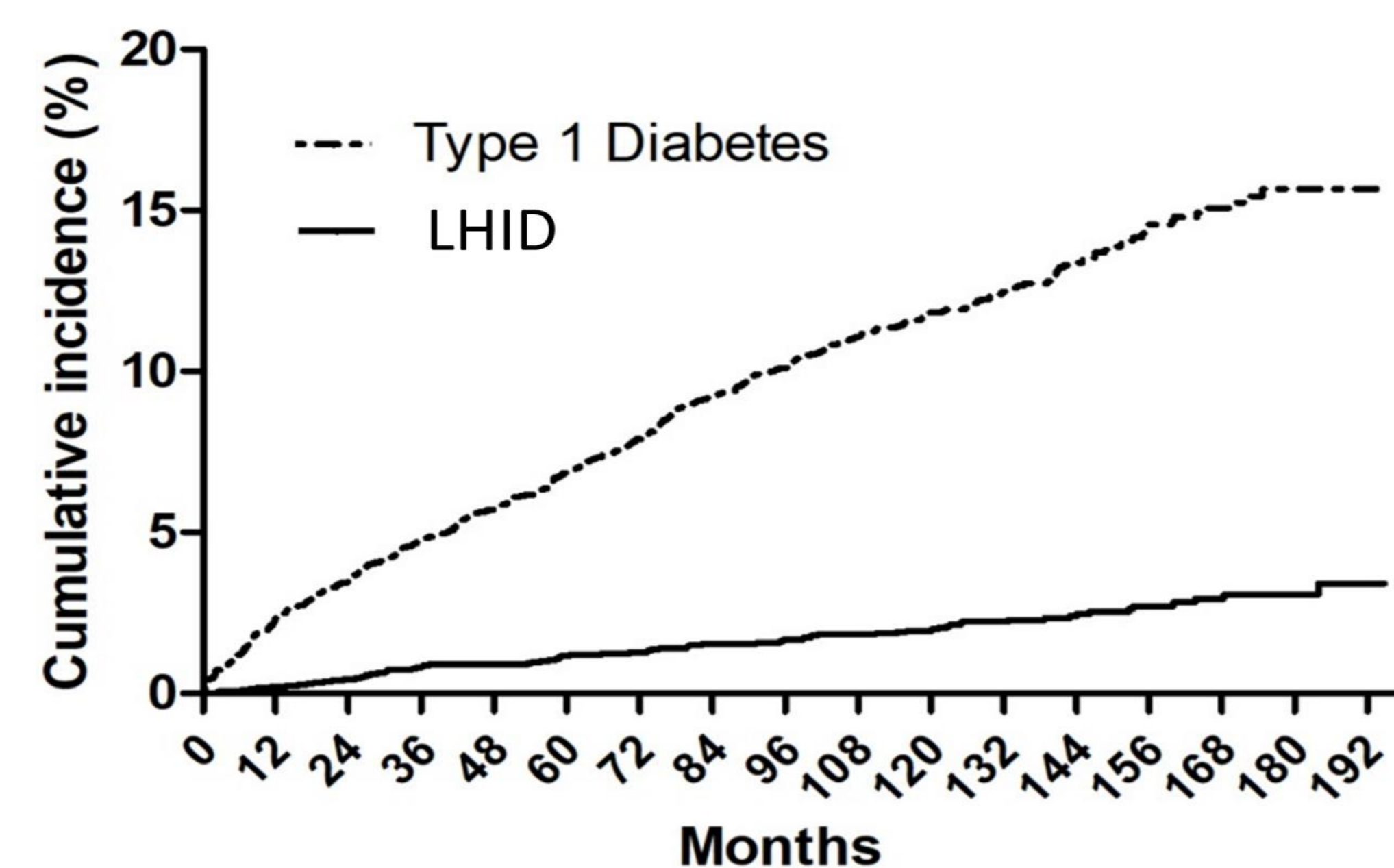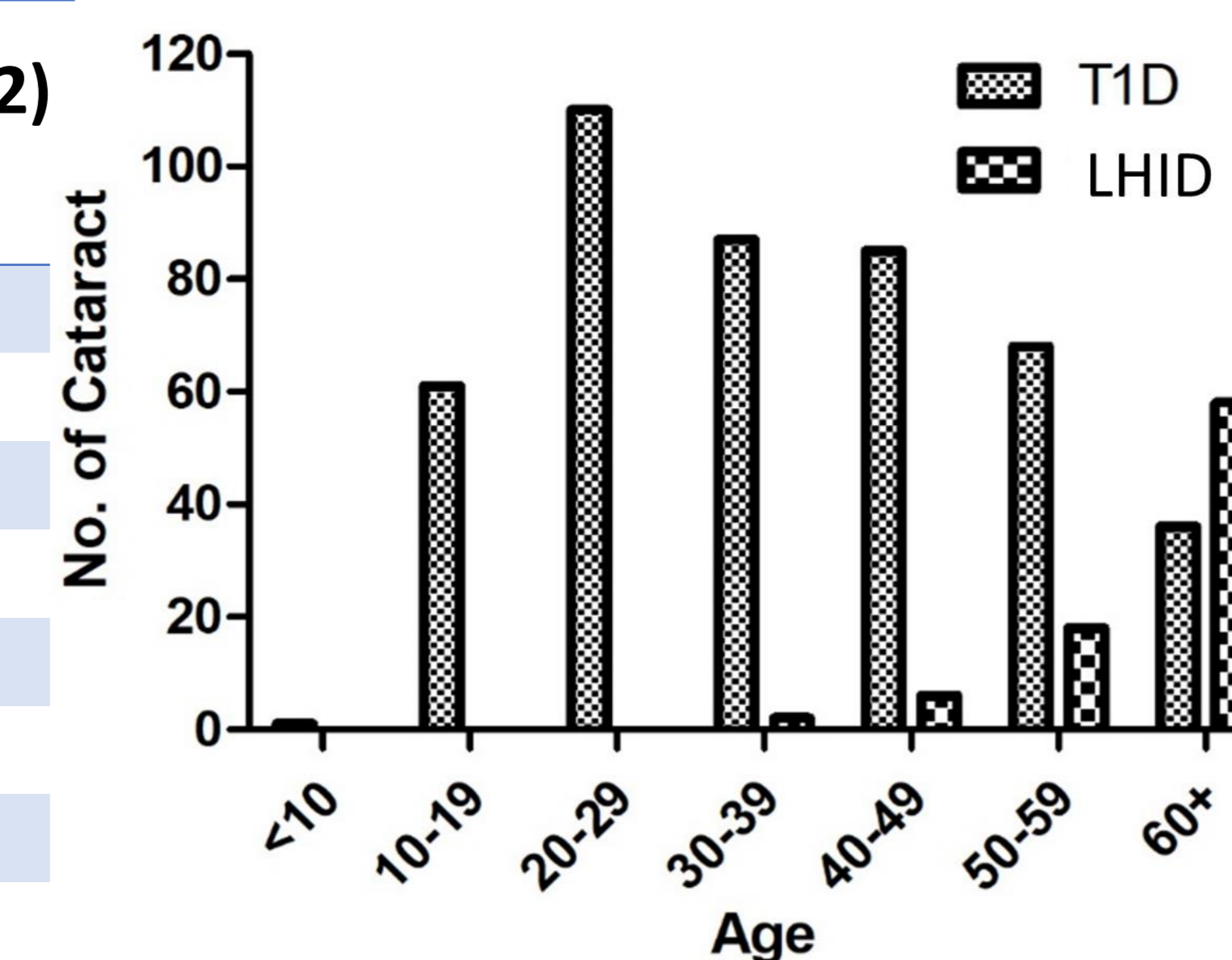

Table 3 & Figure 2. Age of cataract onset in type 1 diabetes (T1D) group and Longitudinal Health Insurance Database (LHID) group

Age of cataract onset, yrs	T1D (n = 3622) No(%)	LHID (n = 3622) No(%)
<10	1 (0.03)	0 (0.0)
10-19	61 (1.68)	0 (0.0)
20-29	110 (3.04)	0 (0.0)
30-39	87 (2.40)	2 (0.06)
40-49	85 (2.35)	6 (0.17)
50-59	68 (1.88)	18 (0.50)
60+	36 (0.99)	58 (1.60)
Total	448 (12.37)	84(2.32)

Conclusion

Compared to age- and gender-matched population without T1D, T1D patients have a higher risk of cataract. The overall hazard ratio was 5.81 (5.20 in males and 6.29 in females), and the ratio was even higher, more than 112.6, before age 30. The peak incidence of cataract in T1D group occurred during age 20-29, and it was not increased with aging. More effort should be made to clarify the contributing factors and provide protection early in T1D patients.

Reference

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