Supplementary Table 2. Cardiovascular outcomes of lean MASLD compared to non-lean MASLD

Country (year)	BMI criteria	Study design (period)	Asian population (%)	LM, n (%M)	NLM, n (%M)	Age of LM vs. NLM (year)[a]	MASLD diagnosis method	Median follow-up (year)	CVD-related complications (LM vs. NLM)	Risk modifiers	Ref.	NOS
Australia, Italy, Spain, and UK (2021)	Lean: BMI <25 Non lean: BMI ≥ 25	R (1990–2016)	0.0	195 (75)	1,144 (63)	45 (19) vs. 49 (20)	Histology	7.8	↔ CVD events ↓ T2DM	NA	4	11
Austria (2021)	Lean: BMI <25 Non lean: BMI ≥25	R (1997–2017)	0.0	39 (58)	257 (74)	47.6±13.7 vs. 49.8±13.3	Histology	8.4	↔ CVD events	NA	6	9
Brazil (2020)	Lean: BMI <25 Non lean: BMI ≥25	R (2004–2016)	0.0	349 (88)	2,536 (92)	44±9 vs. 45±8	US	2.4	↔ Dyslipidemia ↔ FBS	NA	25	8
China (2018)	Lean: BMI <25 Non lean: BMI ≥25	R (2012–2016)	100.0	356 (100)	470 (100)	45.6±10.8 vs. 44.8±10.8	US	4.0	↑ Serum uric acid	NA	26	8
China (2022)	Lean: BMI <23 Non lean: BMI ≥23	P (2006–2019)	100.0	1,543 (75)	21,654 (78)	53.6±11.4 vs. 52.8±11.5	US	14.4	↓ CVD	Older age and HTN were positively associated with CVD in LM.	7	8
China (2023)	Lean: BMI <25 Non lean: BMI ≥25	P (2018–2020)	100.0	160 (85)	685 (90)	45 (14) vs. 41 (15)	US	2.0	↔ T2DM	Increased waist circumference was positively associated with T2DM in LM.	27	8
France (2023)	Lean: BMI <25 or <23 if Asian Non lean: BMI ≥25 or ≥23 if Asian	P (2012–2019)	36.3	3,664 (44)	22,089 (70)	45.1±0.4 vs. 54.9±0.1	FLI	3.6	↑ CKD ↓ CVD events	NA	8	8
Hong Kong (2017)	Lean: BMI <25 Non lean: BMI ≥25	P (2006–2015)	100.0	72 (46)	235 (59)	54.0±11.0 vs. 51.0±12.0	Histology	4.1	↔ CAD ↔ CVD events	NA	9	8
India (2023)	Lean: BMI <23 Non lean: BMI ≥23	R (2000–2022)	100.0	127 (76)	924 (66)	34.0 (20) vs. 40.4 (16)	TE and histology	4.3	↔ CAD ↔ HTN ↔ T2DM	NA	10	9
Japan (2016)	Lean: BMI <23 Non lean: BMI ≥23	R (1994–2013)	100.0	139 (86)	591 (87)	42.6±7.6 vs. 42.2±7.0	US	12.8	↓ T2DM	NA	28	8

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Supplementary Table 2. Continued

Country (year)	BMI criteria	Study design (period)	Asian population (%)	LM, n (%M)	NLM, n (%M)	Age of LM vs. NLM (year)[a]	MASLD diagnosis method	Median follow-up (year)	CVD-related complications (LM vs. NLM)	Risk modifiers	Ref.	NOS
Japan (2020)	Lean: BMI <25 Non lean: BMI ≥25	R (1975–2012)	100.0	102 (68)	121 (65)	43.7±14.1 vs. 42.9±14.3	Histology	19.5	↔ HTN ↔ T2DM	NA	11	9
Japan (2020)	Lean: BMI <25 Non lean: BMI ≥25	R (1976–2019)	100.0	170 (61)	276 (59)	53.0 (18-85) vs. 52.0 (18-87)	US and histology	4.6	↔ CVD events ↔ T2DM	NA	12	11
Japan (2021)	Lean: BMI <23 Non lean: BMI ≥23	R (2004–2015)	100.0	514 (79)	2,060 (83)	45.6 (8.3) vs. 44.6 (8.2)	US	6.0	↔ T2DM	Women were more likely to have T2DM than men in both LM and NLM.	29	8
Japan (2023)	Lean: BMI <23 Non lean: BMI ≥23	R (2017–2022)	100.0	219 (38)	362 (62)	58.0±12.0 vs. 59.0±11.0	US	3	↔ CVD events	NA	30	9
Japan (2023)	Lean: BMI <23 Non lean: BMI ≥23	R (1996–2022)	100.0	86 (50)	695 (53)	57.5 (18-80) vs. 54.0 (14-82)	Histology	6.5	↔ CVD events	Age at least 60 years was positively associated with CVD events in LM.	13	8
Japan (2024)	Lean: BMI <23 Non lean: BMI ≥23	R (2016–2021)	0.0	63,456 (10)	555,744 (90)	53.0 (14) vs. 51.0 (13)	FLI	4.2	↓ CVD events	Older age, T2DM, dyslipidemia, and smoking were associated with CVD events in both LM and NLM.	14	8
South Korea (2018)	Lean: BMI <25 Non lean: BMI ≥25	R (2000–2010)	100.0	420 (74)	504 (72)	48.1±9.2 vs. 47.3±8.8	US	5.1	↓ CVD ↔ HTN ↓ T2DM	Increased waist circumference was associated with T2DM in LM.	31	8
South Korea (2019)	Lean: BMI <23 Non lean: BMI ≥23	R (2003–2013)	100.0	2,262 (55)	13,580 (75.7)	50.8±8.7 vs. 50.2±8.8	US	4.0	↓ T2DM	Advanced liver fibrosis was associated with T2DM development in LM.	32	9
South Korea (2020)	Lean: BMI <25 Non lean: BMI ≥25	P (2001–2014)	100.0	459 (46)	1,104 (45)	53.9±8.5 vs. 52.3±8.2	LFS	12.0	↔ CKD	Increased waist-to-hip ration was associated with CKD in both LM and NLM.	33	10

Supplementary Table 2. Continued

Country (year)	BMI criteria	Study design (period)	Asian population (%)	LM, n (%M)	NLM, n (%M)	Age of LM vs. NLM (year)[a]	MASLD diagnosis method	Median follow-up (year)	CVD-related complications (LM vs. NLM)	Risk modifiers	Ref.	NOS
South Korea (2021)	Lean: BMI <25 Obese: BMI ≥25	R (2008–2011)	100.0	525 (11)	1,274 (27)	60.5±10.8 vs. 58.2±10.6	LFS	2.0	↑ CVD events	Significant liver fibrosis was associated with CVD risk development in LN.	34	8
Sri Lanka (2018)	Lean: BMI <23 Non lean: BMI ≥23	P (2007–2017)	100.0	84 (43)	620 (32)	61.3±6.3 vs. 59.4±7.4	US	7.0	↔ Dyslipidemia ↔ HTN ↓ T2DM	NA	35	9
UK (2024)	Lean: BMI <25 Non lean: BMI ≥25	R (2006–2023)	NA	3,038 (85)	147,258 (62)	58.0±8.0 vs. 57.4±8.0	FLI	13.0	↔ CAD ↓ CKD ↔ Stroke	NA	18	8
USA (2021)	Lean: BMI <25 Non lean: BMI ≥25	P (2002–2019)	6.9	161 (45)	233 (43)	55.0 (18) vs. 53.0 (20)	Histology	5.7	↔ CVD ↓ Dyslipidemia ↔ HTN ↔ T2DM	Older age and smoking were associated with CVD development in both LM and NLM.	36	9
USA (2022)	Lean: BMI <25 or <23 if Asian Non lean: BMI ≥25 or ≥23 if Asian	R (1996–2016)	4.2	414 (34)	4,420 (52)	51.5±18.0 vs. 51.8±14.6	Imaging	6.4	↔ CVD events	NA	22	9
USA (2023)	Lean: BMI <25 or <23 if Asian Non lean: BMI ≥25 or ≥23 if Asian	R (2012–2021)	4.9	2,137 (41)	16,457 (48)	51.0 (27) vs. 50.6 (21)	US, TE, histology	4.1	↔ CVD events ↓ T2DM	NA	24	8

%M, percent of males; BMI, body mass index; CAD, coronary artery disease; CKD, chronic kidney disease; CVD, cardiovascular disease; FBS, fasting blood sugar; FLI, fatty liver index; HTN, hypertension; LFS, liver fat score; LM, lean individuals with metabolic dysfunction-associated steatotic liver disease; MASLD, metabolic dysfunction-associated steatotic liver disease; NA, non-applicable; NLM, obese individuals with metabolic-dysfunction associated steatotic liver disease; NOS, Newcastle-Ottawa Scale; P, prospective study; R, retrospective study; T2DM, type 2 diabetes mellitus; TE, transient elastography; US, ultrasonography.

[a]Age of LM vs NLM (year) expressed by mean ± standard deviation or median (interquartile range or range).

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