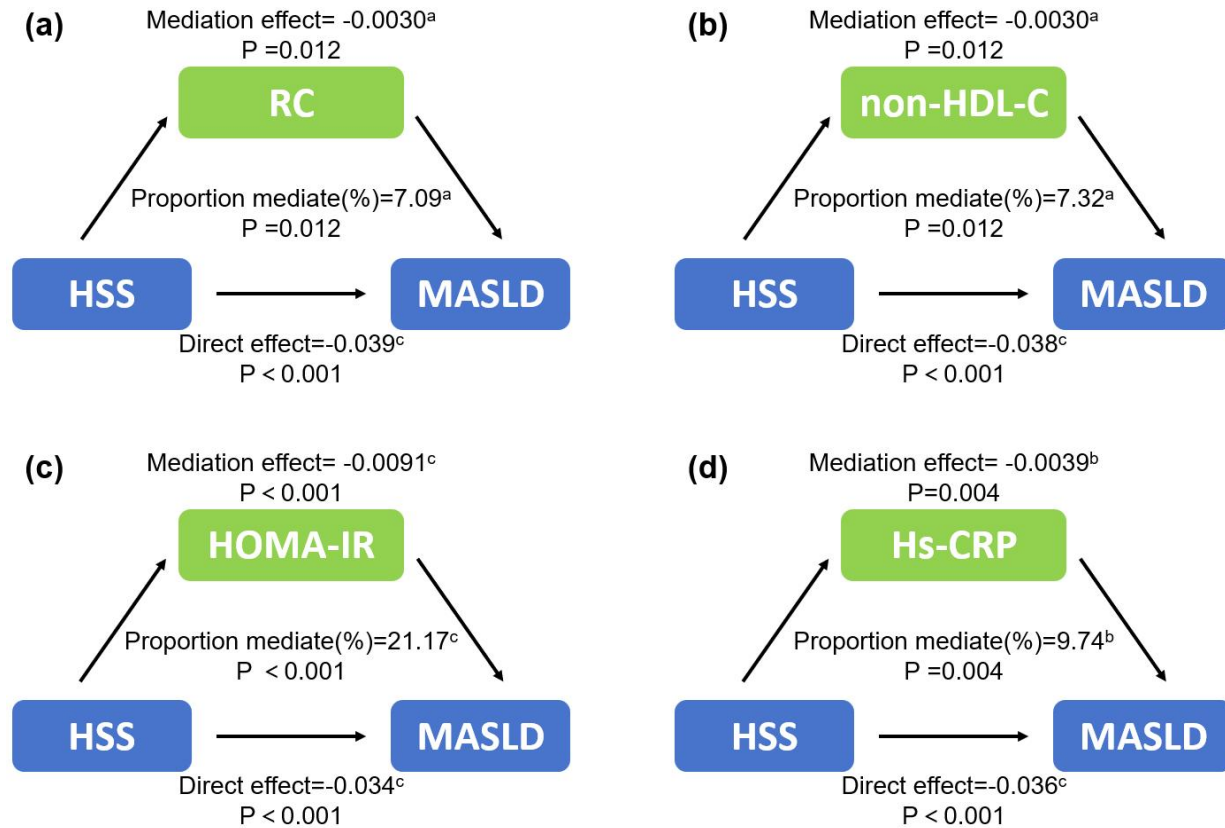
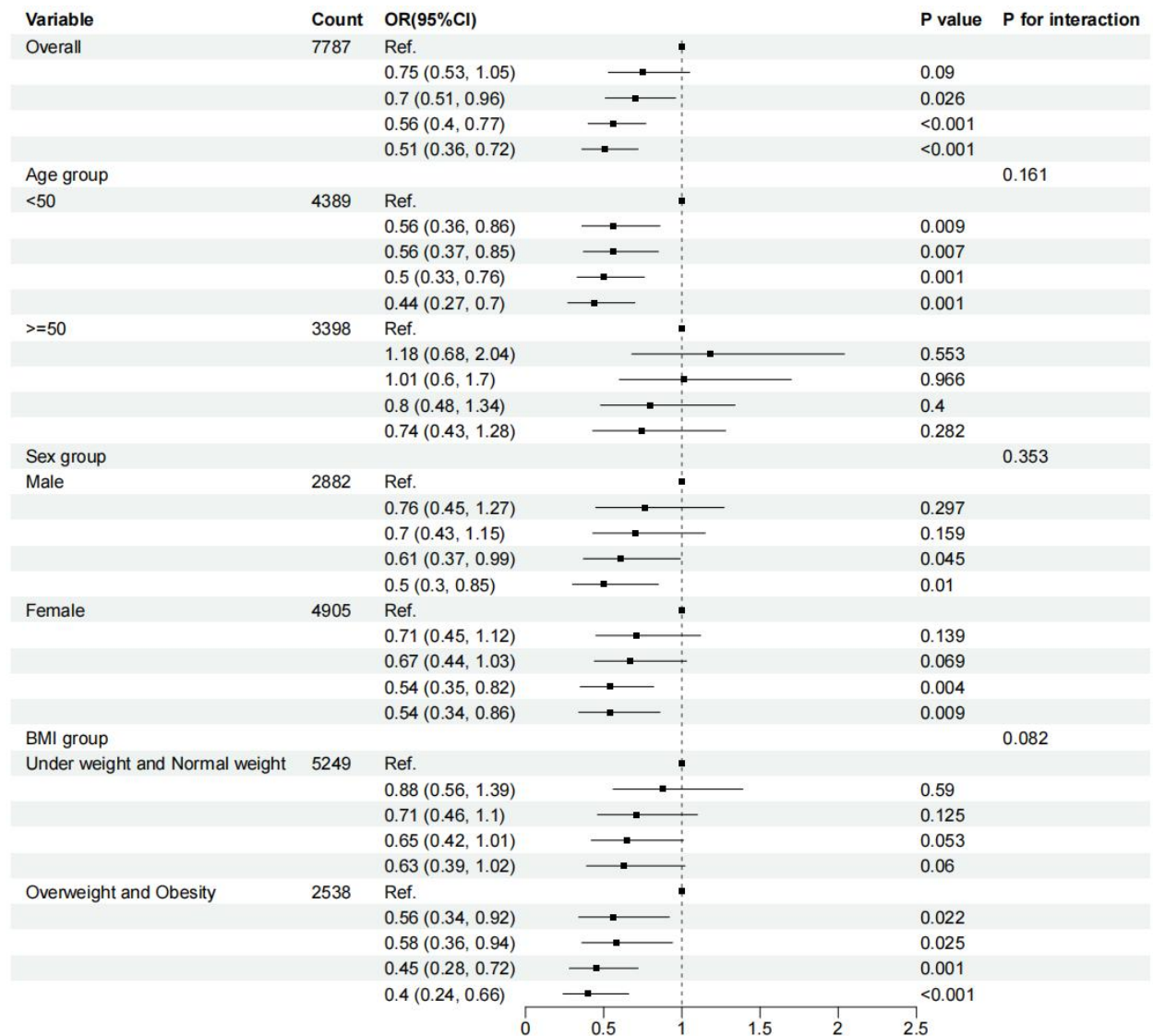


**Supplementary Figure 1 Mediating role of metabolic and inflammatory indicators in the healthy sleep score and metabolic dysfunction-associated steatotic liver disease relationship, with scores of 0–1 as the reference group.** A: Mediating role of RC in the HSS-MASLD association; B: Mediating role of non-HDL-C in the HSS-MASLD association; C: Mediating role of HOMA-IR in the HSS-MASLD association; D: Mediating role of hs-CRP in the HSS-MASLD association. Diabetes was not adjusted for in the covariates when homeostasis model assessment of insulin resistance was as the mediator. <sup>a</sup> $P < 0.05$ ; <sup>b</sup> $P < 0.01$ ; <sup>c</sup> $P < 0.001$ . MASLD: Metabolic dysfunction-associated steatotic liver disease; RC: Remnant cholesterol; Non-HDL-C: Non-high-density lipoprotein cholesterol; HOMA-IR: Homeostasis model assessment of insulin resistance; hs-CRP: High-sensitivity C-reactive protein; HSS: Healthy sleep score.

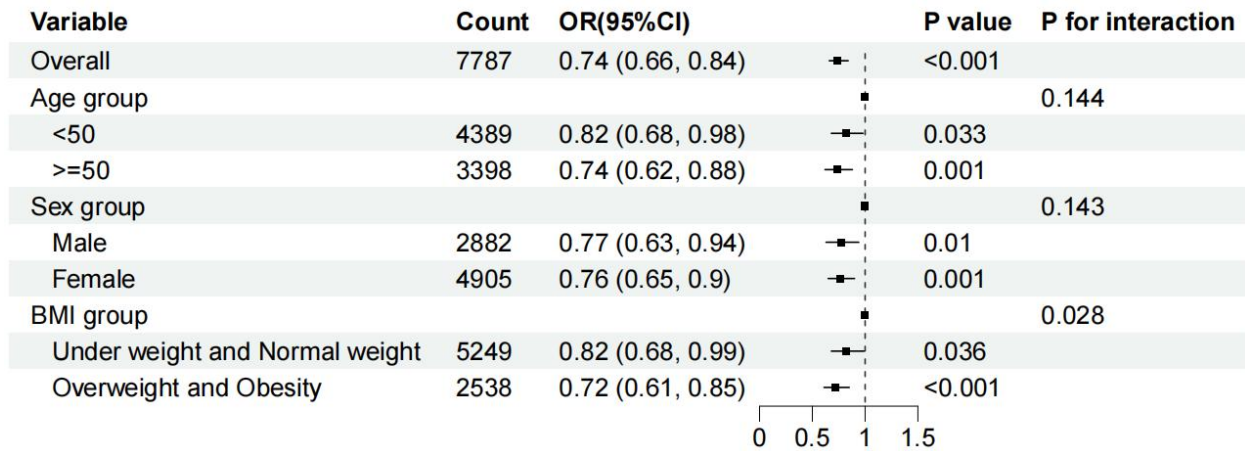


**Supplementary Figure 2 Mediating role of metabolic and inflammatory indicators in the healthy sleep score and metabolic dysfunction-associated steatotic liver disease relationship: Low sleep scores (0-3) vs high sleep scores (4-5).** A: Mediating role of RC in the HSS-MASLD association; B: Mediating role of non-HDL-C in the HSS-MASLD association; C: Mediating role of HOMA-IR in the HSS-MASLD association; D: Mediating role of hs-CRP in the HSS-MASLD association. Diabetes was not adjusted for in the covariates when homeostasis model assessment of insulin resistance was as the mediator. <sup>a</sup>*P* < 0.05; <sup>b</sup>*P* < 0.01; <sup>c</sup>*P* < 0.001. MASLD: Metabolic dysfunction-associated steatotic liver disease; RC: Remnant cholesterol; Non-HDL-C: Non-high-density lipoprotein cholesterol; HOMA-IR: Homeostasis model assessment of insulin resistance; hs-CRP: High-sensitivity C-reactive protein; HSS: Healthy sleep score.



**Supplementary Figure 3 Subgroup analysis of the association between healthy sleep score and metabolic dysfunction-associated steatotic liver disease, with scores of 0-1 as the reference group.** The comprehensive model was adjusted for age, gender, physical exercise, smoking, education, BMI, hypertension and diabetes. The model was adjusted for gender, physical exercise, smoking, education, BMI, hypertension and diabetes when age categories (<50, ≥50 years) was analyzed in group. The model was adjusted for age, physical exercise, smoking, education, BMI, hypertension and diabetes when sex categories (male, female) was analyzed in group. The model was adjusted for age, sex, physical exercise, smoking, education, hypertension and diabetes when BMI

categories (under weight and normal weight BMI  $\leq 24.9$ , overweight and obesity BMI  $> 24.9$ ) was analyzed in group. Data are presented as the logistic regression index (95% CI).



**Supplementary Figure 4 Subgroup analysis of the association between healthy sleep score and metabolic dysfunction-associated steatotic liver disease: Low sleep scores (0–3) vs high sleep scores (4–5).** The comprehensive model was adjusted for age, gender, physical exercise, smoking, education, BMI, hypertension and diabetes. The model was adjusted for gender, physical exercise, smoking, education, BMI, hypertension and diabetes when age categories ( $< 50$ ,  $\geq 50$  years) was analyzed in group. The model was adjusted for age, physical exercise, smoking, education, BMI, hypertension and diabetes when sex categories (male, female) was analyzed in group. The model was adjusted for age, sex, physical exercise, smoking, education, hypertension and diabetes when BMI categories (under weight and normal weight BMI  $\leq 24.9$ , overweight and obesity BMI  $> 24.9$ ) was analyzed in group. Data are presented as the logistic regression index (95% CI).

**Supplementary Table 1 Association between the individual components and total score of healthy sleep score with metabolic dysfunction-associated steatotic liver disease, using multiple imputation**

		Model 1*		Model 2**		Model 3***	
	<i>n</i>	OR(95%CI)	<i>P</i> value	OR(95%CI)	<i>P</i> value	OR(95%CI)	<i>P</i> value
Sleep patterns	7871						
Sleep 7-8 h/day	4766 (60.55%)	0.94(0.84,1.05)	0.291	0.95(0.85,1.07)	0.394	0.912(0.81,1.04)	0.184
Early chronotype	5508 (69.98%)	0.73(0.65,0.83)	<0.001	0.73(0.64,0.83)	<0.001	0.72(0.62,0.83)	<0.001
Never/rarely insomnia	5981 (75.99%)	0.98(0.86,1.11)	0.755	0.98(0.86,1.11)	0.754	0.83(0.72,0.97)	0.015
No apnea symptoms	7695 (97.76%)	0.57(0.41,0.78)	<0.001	0.57(0.42,0.79)	<0.001	0.68(0.47,0.98)	0.038
No excessive daytime sleepiness	2549 (32.38%)	0.89(0.79,1.00)	0.050	0.89(0.79,1.00)	0.050	0.83(0.72,0.95)	0.005
Healthy sleep score	7871	0.90(0.85,0.95)	0.001	0.90(0.85,0.95)	<0.001	0.85(0.80,0.91)	<0.001
0-2	1625(20.65%)	Ref.		Ref.		Ref.	
3	2512 (31.91%)	0.94(0.81,1.10)	0.444	0.95(0.81,1.10)	0.466	0.88(0.74,1.04)	0.141
4	2631 (33.43%)	0.78(0.67,0.91)	0.001	0.78(0.67,0.91)	0.002	0.71(0.59,0.84)	<0.001

		<b>Model 1*</b>		<b>Model 2**</b>		<b>Model 3***</b>	
	<i>n</i>	OR(95%CI)	<i>P</i> value	OR(95%CI)	<i>P</i> value	OR(95%CI)	<i>P</i> value
5	1103 (14.01%)	0.76(0.62,0.91)	0.004	0.76(0.63,0.92)	0.005	0.65(0.52,0.81)	<0.001
P for trend			0.001		0.001		

Data are presented as the logistic regression index (95% CI).

\*Model 1: adjusted for age and gender.

\*\*Model 2: adjusted for age, gender, physical exercise, smoking, education.

\*\*\*Model 3: adjusted for age, gender, physical exercise, smoking, education, BMI, hypertension and diabetes.

**Supplementary Table 2 Participant characteristics by Healthy Sleep Score**

	<b>Overall</b>	<b>0-2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<i>n</i>	7871	1625 (20.65%)	2512 (31.91%)	2631 (33.43%)	1103 (14.01%)
Age, year	47.27 ± 12.44	43.57 ± 12.60	46.34 ± 12.45	48.76 ± 11.94	51.02 ± 11.72
Sex (%)					
Male	2920 (37.10)	569 (35.02)	891 (35.47)	1001 (38.05)	459 (41.61)
Female	4951 (62.90)	1056 (64.98)	1621 (64.53)	1630 (61.95)	644 (58.39)
Education (%)					
Less than high school	3149 (40.01)	529 (32.55)	940 (37.42)	1098 (41.73)	582 (52.77)
Completed high school	1872 (23.78)	388 (23.88)	589 (23.45)	648 (24.63)	247 (22.39)
Beyond high school	2850 (36.21)	708 (43.57)	983 (39.13)	885 (33.64)	274 (24.84)
Smoking (%)					
Never	6809 (86.51)	1392 (85.66)	2165 (86.19)	2297 (87.31)	955 (86.58)
Previous	248 (3.15)	40 (2.46)	85 (3.38)	86 (3.27)	37 (3.35)
Current	814 (10.34)	193 (11.88)	262 (10.43)	248 (9.43)	111 (10.06)

Physical exercise (%)

No exercise	3563 (45.27)	799 (49.17)	1169 (46.54)	1136 (43.18)	459 (41.61)
Low intensity exercise	2352 (29.88)	510 (31.38)	770 (30.65)	782 (29.72)	290 (26.29)
Moderate intensity exercise	1027 (13.05)	194 (11.94)	317 (12.62)	354 (13.45)	162 (14.69)
High intensity exercise	929 (11.80)	122 (7.51)	256 (10.19)	359 (13.65)	192 (17.41)

BMI, kg/m <sup>2</sup>	23.66 ± 3.37	23.40 ± 3.50	23.62 ± 3.42	23.70 ± 3.32	24.06 ± 3.17
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Abused drink (%)

No	7701 (97.84)	1587 (97.66)	2463 (98.05)	2577 (97.95)	1074 (97.37)
Yes	170 (2.16)	38 (2.34)	49 (1.95)	54 (2.05)	29 (2.63)

CAP, dB/m	239.10 ± 50.42	238.82 ± 52.59	239.73 ± 51.27	238.52 ± 49.54	239.48 ± 47.21
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LSM, kPa	5.55 ± 1.81	5.52 ± 1.83	5.58 ± 1.97	5.54 ± 1.68	5.57 ± 1.74
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WC, cm	80.24 ± 9.94	79.32 ± 10.31	79.98 ± 9.90	80.50 ± 9.87	81.53 ± 9.49
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TG, mmol/L	1.41 ± 1.38	1.44 ± 1.55	1.40 ± 1.36	1.39 ± 1.29	1.40 ± 1.39
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TC, mmol/L	5.32 ± 0.20	5.31 ± 0.19	5.32 ± 0.19	5.31 ± 0.19	5.33 ± 0.22
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HDL-C, mmol/L	1.45 ± 0.33	1.44 ± 0.32	1.45 ± 0.33	1.46 ± 0.33	1.46 ± 0.36
LDL-C, mmol/L	3.00 ± 0.73	2.99 ± 0.74	3.00 ± 0.73	2.98 ± 0.73	3.04 ± 0.74
RC, mmol/L	0.93 ± 0.50	0.92 ± 0.54	0.93 ± 0.49	0.92 ± 0.47	0.95 ± 0.51
HOMA-IR	3.27 ± 5.44	3.46 ± 6.80	3.17 ± 4.52	3.25 ± 5.19	3.24 ± 5.67
hs-CRP, mg/L	1.95 ± 4.74	2.17 ± 6.58	1.87 ± 3.23	1.89 ± 3.80	1.93 ± 6.20
non-HDL-C, mmol/L	3.92 ± 1.03	3.90 ± 1.08	3.93 ± 1.02	3.90 ± 1.00	3.99 ± 1.02
Hypertention (%)					
No	5912 (75.92)	1288 (79.80)	1907 (77.02)	1951 (74.81)	766 (70.34)
Yes	1875 (24.08)	326 (20.20)	569 (22.98)	657 (25.19)	323 (29.66)
Diabetes(%)					
No	6493 (82.49)	1392 (85.66)	2078 (82.72)	2159 (82.06)	864 (78.33)
Yes	1378 (17.51)	233 (14.34)	434 (17.28)	472 (17.94)	239 (21.67)
Fibrosis (%)					
No	7387 (93.85)	1529 (94.09)	2349 (93.51)	2479 (94.22)	1030 (93.38)
Yes	484 (6.15)	96 (5.91)	163 (6.49)	152 (5.78)	73 (6.62)
MASLD (%)					

No	6155 (78.20)	1254 (77.17)	1941 (77.27)	2089 (79.40)	871 (78.97)
Yes	1716 (21.80)	371 (22.83)	571 (22.73)	542 (20.60)	232 (21.03)
Sleep 7-8 h/day(%)	4766 (60.55)	223 (13.72)	1415 (56.33)	2025 (76.97)	1103 (100.00)
Early chronotype(%)	5508 (69.98)	447 (27.51)	1564 (62.26)	2394 (90.99)	1103 (100.00)
Never/rarely insomnia(%)	5981 (75.99)	698 (42.95)	1684 (67.04)	2496 (94.87)	1103 (100.00)
No apnea symptoms(%)	7695 (97.76)	1508 (92.80)	2459 (97.89)	2625 (99.77)	1103 (100.00)
No excessive daytime sleepiness(%)	2549 (32.38)	48 (2.95)	414 (16.48)	984 (37.40)	1103 (100.00)

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Continuous variables are described as mean  $\pm$  SD, and categorical variables are presented as n (%). MASLD : metabolic dysfunction-associated steatotic liver disease; BMI: Body Mass Index, CAP: Controlled Attenuation Parameter, LSM: Liver Stiffness Measurement, WC: Waist Circumference, TG: Triglycerides, TC: Total Cholesterol, HDL: High-Density Lipoprotein, LDL: Low-Density Lipoprotein, RC: Remnant Cholesterol, non-HDL-C: Non-High-Density Lipoprotein Cholesterol, HOMA-IR: Homeostatic Model Assessment for Insulin Resistance, hs-CRP: High-Sensitivity C-Reactive Protein, HSS: Healthy Sleep Score

**Supplementary Table 3 Association between the individual components and total score of healthy sleep score with metabolic dysfunction-associated steatotic liver disease**

		<b>Model 1*</b>		<b>Model 2**</b>		<b>Model 3***</b>	
	<i>n</i>	OR(95%CI)	<i>P</i> value	OR(95%CI)	<i>P</i> value	OR(95%CI)	<i>P</i> value
Sleep patterns	7871						
Sleep 7-8 h/day	4766 (60.55%)	0.94(0.84,1.05)	0.291	0.95(0.85,1.07)	0.394	0.91(0.80,1.03)	0.156
Early chronotype	5508 (69.98%)	0.73(0.65,0.83)	<0.001	0.73(0.64,0.83)	<0.001	0.72(0.62,0.83)	<0.001
Never/rarely insomnia	5981 (75.99%)	0.98(0.86,1.11)	0.755	0.98(0.86,1.11)	0.754	0.84(0.72,0.97)	0.017
No apnea symptoms	7695 (97.76%)	0.57(0.41,0.78)	<0.001	0.57(0.42,0.79)	<0.001	0.68(0.47,0.98)	0.040
No excessive daytime sleepiness	2549 (32.38%)	0.89(0.79,1.00)	0.050	0.89(0.79,1.00)	0.050	0.83(0.72,0.95)	0.005
Healthy sleep score	7871	0.90(0.85,0.95)	<0.001	0.90(0.85,0.95)	<0.001	0.86(0.81,0.91)	<0.001
0-1	312 (3.96%)	Ref.		Ref.		Ref.	
2	1313 (16.68%)	0.83(0.62,1.11)	0.217	0.83(0.62,1.11)	0.206	0.75(0.54,1.05)	0.090
3	2512 (31.91%)	0.81(0.62,1.07)	0.144	0.81(0.62,1.07)	0.142	0.70(0.51,0.96)	0.026
4	2631 (33.43%)	0.67(0.51,0.89)	0.005	0.67(0.51,0.89)	0.005	0.56(0.40,0.77)	<0.001

		<b>Model 1*</b>		<b>Model 2**</b>		<b>Model 3***</b>	
	<i>n</i>	OR(95%CI)	<i>P</i> value	OR(95%CI)	<i>P</i> value	OR(95%CI)	<i>P</i> value
5	1103 (14.01%)	0.65(0.48,0.88)	0.005	0.65(0.48,0.88)	0.006	0.51(0.36,0.72)	<0.001
P for trend			0.002		0.002		<0.001
Healthy sleep score	7871	0.80(0.72,0.90)	<0.001	0.81(0.72,0.90)	<0.001	0.74(0.66,0.84)	<0.001
low sleep scores (0-3)	4137(52.56%)	Ref.		Ref.		Ref.	
high sleep scores (4-5)	3734(47.44%)	0.80(0.72,0.90)	<0.001	0.81(0.72,0.90)	<0.001	0.74(0.66,0.84)	<0.001
P for trend			/		/		/

Data are presented as the logistic regression index (95% CI).

\*Model 1: adjusted for age and gender.

\*\*Model 2: adjusted for age, gender, physical exercise, smoking, education.

\*\*\*Model 3: adjusted for age, gender, physical exercise, smoking, education, BMI, hypertension and diabetes.

**Supplementary Table 4 Association between the individual components and total score of healthy sleep score with metabolic dysfunction-associated steatotic liver disease, with "Early chronotype" defined as a sleep midpoint at or before 2:00 am**

		<b>Model 1*</b>		<b>Model 2**</b>		<b>Model 3***</b>	
	<i>n</i>	OR(95%CI)	<i>P</i> value	OR(95%CI)	<i>P</i> value	OR(95%CI)	<i>P</i> value
Sleep patterns	7871						
Sleep 7-8 h/day	4766 (60.55%)	0.94(0.84,1.05)	0.291	0.95(0.85,1.07)	0.394	0.91(0.80,1.04)	0.156
Early chronotype	2090(26.55%)	0.83(0.73,0.95)	0.005	0.91(0.87,0.97)	0.001	0.86(0.80,0.91)	<0.001
Never/rarely insomnia	5981 (75.99%)	0.98(0.86,1.11)	0.755	0.98(0.86,1.11)	0.754	0.84(0.72,0.97)	0.017
No apnea symptoms	7695 (97.76%)	0.57(0.41,0.78)	<0.001	0.57(0.42,0.79)	<0.001	0.68(0.47,0.98)	0.040
No excessive daytime sleepiness	2549 (32.38%)	0.89(0.79,1.00)	0.050	0.89(0.79,1.00)	0.05	0.83(0.72,0.95)	0.005
Healthy sleep score	7871	0.90(0.85,0.96)	0.001	0.90(0.85,0.96)	0.002	0.84(0.78,0.90)	<0.001
0-2	2577(32.74%)	Ref.		Ref.		Ref.	
3	3126(39.71%)	0.89(0.79,1.01)	0.081	0.89(0.79,1.02)	0.086	0.84(0.73,0.97)	0.021
4	1701(21.61%)	0.82(0.71,0.96)	0.011	0.83(0.71,0.96)	0.013	0.73(0.61,0.87)	<0.001

		<b>Model 1*</b>		<b>Model 2**</b>		<b>Model 3***</b>	
	<i>n</i>	OR(95%CI)	<i>P</i> value	OR(95%CI)	<i>P</i> value	OR(95%CI)	<i>P</i> value
5	467(5.93%)	0.71(0.56,0.91)	0.008	0.72(0.56,0.92)	0.009	0.56(0.42,0.74)	<0.001
P for trend			0.013		0.017		<0.001

Data are presented as the logistic regression index (95% CI).

\*Model 1: adjusted for age and gender.

\*\*Model 2: adjusted for age, gender, physical exercise, smoking, education.

\*\*\*Model 3: adjusted for age, gender, physical exercise, smoking, education, BMI, hypertension and diabetes.

**Supplementary Table 5 Comparison of mediation results across different models**

<b>Mediator</b>	<b>Direct effect</b>	<b>P value</b>	<b>Mediation effect</b>	<b>P value</b>	<b>Proportion mediate(%)</b>	<b>P value</b>
Model 1*						
RC	-0.019(-0.031,-0.017)	<0.001	-0.0018(-0.0036,-0.0000)	0.020	0.087(0.011,0.218)	0.020
non-HDL-C	-0.019(-0.031,-0.017)	<0.001	-0.0020(-0.0039,-0.0000)	0.028	0.100(0.011,0.252)	0.028
HOMA-IR	-0.014(-0.024,-0.000)	0.012	-0.0065(-0.0101,-0.0000)	<0.001	0.328(0.141,0.687)	<0.001
hs-CRP	-0.016(-0.027,-0.010)	0.004	-0.0034(-0.0066,-0.0000)	0.016	0.177(0.032,0.419)	0.020
Model 2**						
RC	-0.019(-0.030,-0.014)	<0.001	-0.0016(-0.0034,-0.0000)	0.110	0.081(0.012,0.213)	0.110
non-HDL-C	-0.019(-0.037,-0.000)	<0.001	-0.0019(-0.0037,-0.0000)	0.048	0.094(0.001,0.222)	0.048
HOMA-IR	-0.013(-0.022,-0.000)	0.012	-0.0067(-0.0105,-0.0000)	0.004	0.351(0.141,0.753)	0.004
hs-CRP	-0.016(-0.027,-0.010)	<0.001	-0.0032(-0.0063,-0.0000)	0.040	0.165(0.007,0.411)	0.040
Model 3***						
RC	-0.022(-0.032,-0.012)	<0.001	-0.0012(-0.0025,-0.0000)	0.020	0.054(0.007,0.121)	0.020
non-HDL-C	-0.021(-0.033,-0.010)	<0.001	-0.0014(-0.0027,-0.0000)	0.016	0.061(0.014,0.136)	0.016
HOMA-IR	-0.018(-0.029,-0.013)	<0.001	-0.0054(-0.0075,-0.0000)	<0.001	0.235(0.137,0.427)	<0.001
hs-CRP	-0.020(-0.030,-0.010)	<0.001	-0.0022(-0.0038,-0.0000)	<0.001	0.097(0.031,0.205)	<0.001

Data are presented as the logistic regression index (95% CI).

\*Model 1: adjusted for age and gender.

\*\*Model 2: adjusted for age, gender, physical exercise, smoking, education.

\*\*\*Model 3: adjusted for age, gender, physical exercise, smoking, education, BMI, hypertension and diabetes. Diabetes was not adjusted for in the covariates of Model 3 with HOMA-IR as the mediator.

RC: Remnant Cholesterol, non-HDL-C: Non-High-Density Lipoprotein Cholesterol, HOMA-IR: Homeostatic Model Assessment for Insulin Resistance, hs-CRP: High-Sensitivity C-Reactive Protein.

**Supplementary Table 6 The association between each mediating factor and metabolic dysfunction-associated steatotic liver disease**

	<i>n</i>	Model 1*		Model 2**		Model 3***	
		OR(95%CI)	<i>P</i> value	OR(95%CI)	<i>P</i> value	OR(95%CI)	<i>P</i> value
RC	7871	1.47(1.39,1.54)	<0.001	1.47(1.39, 1.54)	<0.001	1.37(1.30, 1.46)	<0.001
Q1	1970(25.03%)	Ref.		Ref.		Ref.	
Q2	1967(24.99%)	1.30(1.09,1.55)	0.003	1.30(1.09, 1.55)	0.004	1.23(1.01, 1.50)	0.044
Q3	1969(25.01%)	1.80(1.52,2.13)	<0.001	1.80(1.52, 2.13)	<0.001	1.63(1.32, 1.94)	<0.001
Q4	1965(24.97%)	3.08(2.61,3.62)	<0.001	3.07(2.61, 3.62)	<0.001	2.53(2.10, 3.05)	<0.001
P for trend			<0.001		<0.001		<0.001

Non-HDL-C	7871	1.48(1.40,1.56)	<0.001	1.48(1.41, 1.56)	<0.001	1.37(1.29, 1.45)	<0.001
Q1	1969 (25.02%)	Ref.		Ref.		Ref.	
Q2	1983 (25.19%)	1.45(1.21,1.74)	<0.001	1.45(1.21, 1.74)	<0.001	1.36(1.11, 1.66)	0.003
Q3	1957 (24.86%)	2.16(1.82,2.56)	<0.001	2.16(1.82, 2.57)	<0.001	1.75(1.44, 2.13)	<0.001
Q4	1962 (24.93%)	3.22(2.72,3.81)	<0.001	3.24(2.73, 3.83)	<0.001	2.56(2.11, 3.10)	<0.001
P for trend			<0.001		<0.001		<0.001
HOMA-IR	7871	2.66(2.50,2.83)	<0.001	2.67(2.50, 2.84)	<0.001	1.87(1.74, 2.00)	<0.001
Q1	1968 (25.00%)	Ref.		Ref.		Ref.	
Q2	1968 (25.00%)	2.32(1.80, 2.98)	<0.001	2.29(1.78, 2.94)	<0.001	1.56(1.20, 2.02)	<0.001
Q3	1967 (24.99%)	4.79(4.79, 7.58)	<0.001	5.95(4.73, 7.49)	<0.001	2.68(2.10, 3.42)	<0.001
Q4	1968 (25.00%)	15.59(13.85, 21.64)	<0.001	17.33(13.86, 21.67)	<0.001	5.86(4.60, 7.46)	<0.001
P for trend			<0.001		<0.001		<0.001
hs-CRP	7871	1.01(1.01, 1.02)	<0.001	2.06(1.95, 2.18)	<0.001	1.56(1.47, 1.66)	<0.001
Q1	1979 (25.14%)	Ref.		Ref.		Ref.	
Q2	1975 (25.09%)	2.88(2.29, 3.63)	<0.001	2.88(2.29, 3.62)	<0.001	1.92(1.51, 2.45)	<0.001

Q3	1956 (24.85%)	5.79(4.66, 7.20)	<0.001	5.79(4.65, 7.19)	<0.001	3.08(2.44, 3.89)	<0.001
Q4	1961 (24.91%)	10.45(8.44, 12.93)	<0.001	10.43(8.43, 12.92)	<0.001	4.21(3.34, 5.30)	<0.001
P for trend			<0.001		<0.001		<0.001

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Data are presented as the logistic regression index (95% CI).

\*Model 1: adjusted for age and gender.

\*\*Model 2: adjusted for age, gender, physical exercise, smoking, education.

\*\*\*Model 3: adjusted for age, gender, physical exercise, smoking, education, BMI, hypertension and diabetes.

MASLD : metabolic dysfunction-associated steatotic liver disease; RC: Remnant Cholesterol, non-HDL-C: Non-High-Density Lipoprotein Cholesterol, HOMA-IR: Homeostatic Model Assessment for Insulin Resistance, hs-CRP: High-Sensitivity C-Reactive Protein.