

Supplementary Table S1. ICD-10 codes for cancer and cardiovascular diseases

Items	ICD-10
Cancer	
Primary liver cancer	C22.0, C22.2, C22.3, C22.4, C22.5, C22.6, C22.7, C22.8, C22.9
Thyroid cancer	C73
Esophageal cancer	C15
Gastric cancer	C16
Colorectal cancer	C18, C19, C20
Small intestine cancer	C17
Biliary cancer	C22.1 C23 C24
Pancreatic cancer	C25
Lung cancer	C34
Prostate cancer	C61
Kidney cancer	C64, C65
Bladder cancer	C67
Breast cancer	C50
Cardiovascular diseases	
Myocardial infarction	I21
Ischemic stroke	I63
Hemorrhagic stroke	I60, I61

Note. Abbreviations: ICD-10, International Classification of Diseases, Tenth Revision.

Supplementary Table S2. Association between MASLD and adverse outcomes among HBV-infected participants after excluding those with incident cirrhosis during follow-up

Items	Cases/ <i>n</i>	Incidence Density /10 ³ PYs	HR (95% CI)			
			Unadjusted	Age and sex-adjusted	Multivariable model 1 [§]	Multivariable model 2 ^{&}
Primary liver cancer						
Non-MASLD	56/2,207	2.1	1	1	1	1
MASLD	18/809	1.9	0.88 (0.52-1.50)	0.88 (0.52-1.49)	0.89 (0.52-1.51)	0.80 (0.47-1.38)
Extrahepatic cancers						
Non-MASLD	63/2,208	2.3	1	1	1	1
MASLD	35/807	3.6	1.54 (1.02-2.34)	1.48 (0.98-2.24)	1.50 (0.99-2.26)	1.55 (1.02-2.37)
CVDs						
Non-MASLD	116/2,201	4.4	1	1	1	1
MASLD	80/799	8.6	1.97 (1.48-2.61)	1.96 (1.47-2.61)	1.96 (1.47-2.61)	1.96 (1.46-2.61)

Note. [§]Adjusted for age (continuous), sex (male vs. female), education level (junior high school or below, senior high school or higher), smoking (no smoking vs. past or current smoker), drinking (current drinking or not), and physical activity (inactive, moderately active, and active). [&]Further adjusted for cardiometabolic risk factors, ALT (normal or abnormal), and CRP (normal or abnormal). Abbreviations: ALT, alanine aminotransferase; CI, confidence interval; CVDs, cardiovascular diseases; HR, hazard ratio; CRP, high-sensitivity C-reactive protein; MASLD, metabolic dysfunction-associated steatosis liver disease; PYs, person-years.

Supplementary Table S3. Baseline characteristics of the participants by MASLD and different degrees of steatosis among the participants with HBV infection (for primary liver cancer analysis)

Items	Non-MASLD <i>n</i> = 2,374	Mild SLD <i>n</i> = 755	Moderate to severe SLD <i>n</i> = 99	<i>P</i> value
Age, years	47.2 ± 13.4	49.2 ± 11.7	44.1 ± 14.5	< 0.001
Male	1,998 (84.2)	633 (83.8)	85 (85.9)	0.873
Education level				0.107
Junior high school or below	1,775 (74.8)	589 (78.0)	70 (70.7)	
Senior high school or higher	599 (25.2)	166 (22.0)	29 (29.3)	
Current/Past smoker (%)	889 (37.4)	270 (35.8)	40 (40.4)	0.559
Current/Past drinker (%)	889 (37.4)	270 (35.8)	40 (40.4)	0.544
Physical activity				0.082
Inactive	335 (14.1)	93 (12.3)	22 (22.2)	
Moderately active	1,740 (73.3)	556 (73.6)	64 (64.6)	
Active	299 (12.6)	106 (14.0)	13 (13.1)	
BMI, kg/m ²	25.2 ± 4.6	28.3 ± 4.5	34.4 ± 7.3	< 0.001
WC, cm	84.3 ± 9.3	92.1 ± 9.0	95.0 ± 11.0	< 0.001
SBP, mmHg	125.7 ± 19.5	134.1 ± 19.2	131.8 ± 17.0	< 0.001
DBP, mmHg	81.1 ± 11.1	86.4 ± 11.2	88.3 ± 10.8	< 0.001
FBG, mmol/L	5.3 ± 1.4	5.8 ± 2.0	6.0 ± 2.3	< 0.001
TG, mmol/L	1.0 (0.7-1.4)	1.4 (1.1-2.1)	1.4 (1.1-2.1)	< 0.001
TC, mmol/L	4.6 ± 1.0	4.9 ± 1.3	4.8 ± 1.0	< 0.001
LDL-c, mmol/L	2.4 (1.9-2.8)	2.4 (2.0-2.9)	2.6 (2.3-3.2)	< 0.001
HDL-c, mmol/L	1.4 (1.2-1.7)	1.4 (1.2-1.7)	1.2 (1.0-1.4)	< 0.001
CRP, mg/dL	0.8 (0.3-1.7)	1.2 (0.5-2.7)	1.8 (0.9-3.7)	< 0.001
TyG Index	8.3 (8.0-8.7)	8.8 (8.4-9.2)	8.9 (8.4-9.3)	< 0.001
ALT, U/L	22.0 (16.0-31.0)	25.0 (18.0-37.0)	32.0 (23.0-49.0)	< 0.001
Overweight	1,589 (66.9)	702 (93.0)	97 (98.0)	< 0.001
Hypertension	731 (30.8)	379 (50.2)	51 (51.5)	< 0.001
Prediabetes/T2DM	599 (25.2)	290 (38.4)	41 (41.4)	< 0.001
TG abnormal (%)	376 (15.8)	284 (37.6)	44 (44.4)	< 0.001
HDL-c abnormal	236 (9.9)	94 (12.5)	26 (26.3)	< 0.001
TC abnormal	519 (21.9)	290 (38.4)	31 (31.3)	< 0.001
CRP abnormal	519 (21.9)	250 (33.1)	47 (47.5)	< 0.001
ALT≥40 U/L	394 (16.6)	174 (23.0)	34 (34.3)	< 0.001
HBeAg (+)	259 (10.9)	60 (7.9)	13 (13.1)	0.042
HBeAb (+)	1261 (53.1)	423 (56.0)	52 (52.5)	0.365

Note. To minimize reverse causality, participants with follow-up of less than 2 years were excluded from the analysis for the specific outcome. Therefore, the analytical cohorts varied slightly across the different endpoints. This table presents the cohort used for the primary liver cancer analysis. The baseline characteristics of the analytical cohorts for extrahepatic cancers (number of non-MASLD, MASLD with mild steatosis, and MASLD with moderate to severe steatosis were 2381, 754, and 99, respectively) and cardiovascular diseases (number of non-MASLD, MASLD with mild steatosis, and MASLD with moderate to severe steatosis were 2372, 747, and 96, respectively) were similar to those presented here (data not shown). Data are presented as mean ± standard deviation, median (interquartile range), or *n* (%). ALT, alanine aminotransferase; BMI, body mass index; DBP, diastolic blood pressure; FBG, fasting blood glucose; HBeAb, Hepatitis B e Antibody; HBeAg, Hepatitis B e

antigen; HBV, hepatitis B virus; HDL-c, high-density lipoprotein cholesterol; CRP, C-reactive protein; LDL-c, low-density lipoprotein cholesterol; MASLD, metabolic dysfunction-associated steatotic liver disease; SBP, systolic blood pressure; T2DM, Type 2 Diabetes Mellitus; TC, total cholesterol; TG, triglycerides; TyG Index, triglyceride glucose index; WC, waist circumference.

Supplementary Table S4. Baseline characteristics of the participants by MASLD and different ALT levels among the participants with HBV infection (for primary liver cancer analysis)

Items	Non-MASLD <i>n</i> = 2,374	MASLD with normal ALT <i>n</i> = 646	MASLD with abnormal ALT <i>n</i> = 208	<i>P</i> value
Age, years	47.1 ± 13.4	49.8 ± 11.6	44.7 ± 12.8	< 0.001
Male	1,998 (84.2)	528 (81.7)	190 (91.3)	0.004
Education level				0.010
Junior high school or below	1,775 (74.8)	513 (79.4)	146 (70.2)	
Senior high school or higher	599 (25.2)	133 (20.6)	62 (29.8)	
Current/Past smoker	889 (37.4)	213 (33.0)	97 (46.6)	0.002
Current/Past drinker	538 (22.7)	128 (19.8)	54 (26.0)	0.129
Physical activity				0.791
Inactive	335 (14.1)	84 (13.0)	31 (14.9)	
Moderately active	1740 (73.3)	473 (73.2)	147 (70.7)	
Active	299 (12.6)	89 (13.8)	30 (14.4)	
BMI, kg/m ²	25.2 ± 4.6	28.7 ± 5.1	29.9 ± 5.9	< 0.001
WC, cm	84.3 ± 9.2	92.2 ± 9.0	92.9 ± 10.2	< 0.001
SBP, mmHg	125.7 ± 19.4	133.7 ± 19.0	134.4 ± 18.9	< 0.001
DBP, mmHg	81.1 ± 11.1	86.3 ± 11.2	87.6 ± 11.3	< 0.001
FBG, mmol/L	5.3 ± 1.4	5.9 ± 2.1	5.7 ± 1.8	< 0.001
TG, mmol/L	1.1 (0.7-1.4)	1.4 (1.1-2.1)	1.5(1.1-2.1)	< 0.001
TC, mmol/L	4.6 ± 1.0	4.8 ± 1.3	5.1 ± 1.5	< 0.001
LDL-c, mmol/L	2.4 (1.9-2.9)	2.5 (2.0-2.9)	2.5 (1.9-3.0)	< 0.001
HDL-c, mmol/L	1.5 ± 0.3	1.5 ± 0.4	1.4 ± 0.3	0.103
CRP, mg/dL	0.8 (0.3-1.7)	1.2 (0.6-2.7)	1.5 (0.7-3.1)	< 0.001
TyG Index	8.3 (8.0-8.7)	8.8 (8.4-9.2)	8.8 (8.4-9.2)	< 0.001
ALT, U/L	22.0 (16.0-31.0)	22.0 (17.0-28.0)	53.4 (46.0-82.0)	< 0.001
Overweight	1,589 (66.9)	602 (93.2)	197 (94.7)	< 0.001
Hypertension	731 (30.8)	323 (50.0)	107 (51.4)	< 0.001
Prediabetes/T2DM	599 (25.2)	250 (38.7)	81 (38.9)	< 0.001
TG abnormal	376 (15.8)	249 (38.5)	79 (38.0)	< 0.001
HDL-c abnormal	236 (9.9)	92 (14.2)	28 (13.5)	0.006
TC abnormal	519 (21.9)	225 (34.8)	96 (46.2)	< 0.001
CRP abnormal	519 (21.9)	214 (33.1)	83 (39.9)	< 0.001

ALT $\geq$ 40 U/L	394 (16.6)	0 (0.0)	208 (100)	< 0.001
HBeAg (+)	259 (10.9)	45 (7.0)	28 (13.5)	0.004
HBeAb (+)	1,261 (53.1)	369 (57.1)	106 (51.0)	0.136

Note. To minimize reverse causality, participants with follow-up of less than 2 years were excluded from the analysis for the specific outcome. Therefore, the analytical cohorts varied slightly across the different endpoints. This table presents the cohort used for the primary liver cancer analysis. The baseline characteristics of the analytical cohorts for extrahepatic cancers (number of non-MASLD, MASLD with normal ALT, and MASLD with abnormal ALT were 2381, 646, and 207, respectively) and cardiovascular diseases (number of non-MASLD, MASLD with normal ALT, and MASLD with abnormal ALT were 2372, 639, and 204, respectively) were similar to those presented here (data not shown).

Data are presented as mean $\pm$ standard deviation, median (interquartile range), or n (%). ALT, alanine aminotransferase; BMI, body mass index; DBP, diastolic blood pressure; FBG, fasting blood glucose; HBeAb, Hepatitis b e Antibody; HBeAg, Hepatitis B e antigen; HBV, hepatitis B virus; HDL-c, high-density lipoprotein cholesterol; CRP, c-reactive protein; LDL-c, low-density lipoprotein cholesterol; MASLD, metabolic dysfunction-associated steatotic liver disease; SBP, systolic blood pressure; T2DM, Type 2 Diabetes Mellitus; TC, total cholesterol; TG, triglycerides; TyG Index, triglyceride glucose index; WC, waist circumference.

Supplementary Table S5. Association between SLD, CMRFs, and HBV infection and various outcomes

Variables	Primary liver cancer		Extrahepatic cancers		Cardiovascular diseases	
	HR (95% CI)	P	HR (95% CI)	P	HR (95% CI)	P
SLD	0.90 (0.69-1.17)	0.439	1.09 (1.02-1.16)	0.011	1.55 (1.49-1.61)	< 0.0001
CMRFs	11.85 (0.74-190.87)	0.081	1.40 (1.06-1.86)	0.021	2.91 (2.21-3.83)	< 0.0001
HBV infection	13.88 (10.44-18.44)	< 0.0001	0.99 (0.82-1.21)	0.949	0.78 (0.68-0.90)	0.0007

Note. Adjusted for age (continuous), sex (male vs. female), education level (junior high school or below, senior high school or higher), smoking (no smoking vs. past or current smoker), drinking (current drinking or not), physical activity (inactive, moderately active, and active), and cirrhosis (with or without) during follow-up. CI, confidence interval; CMRFs, cardiometabolic risk factors; HR, hazard ratio; HBV, hepatitis B virus; SLD, steatosis liver disease.