

# ABSENCE OF EXCESS BODY FATNESS

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**Table 2.2.6a Cohort studies of measures of body fatness and cancers of the biliary tract**

Reference Location Follow-up period	Total number of subjects Sex Incidence/mortality	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Covariates
Oh et al. (2005) Republic of Korea 1992–2001	781 283 Men Incidence	Intra- and extrahepatic bile ducts	BMI			Age, smoking status, alcohol consumption, physical activity, family history of cancer, residence area
			< 18.5	9	0.90 (0.45–1.83)	
			18.5–22.9	192	1.00	
			23.0–24.9	164	1.22 (0.99–1.50)	
			25.0–26.9	108	1.40 (1.11–1.78)	
27.0–29.9	38	1.24 (0.87–1.75)				
> 30.0	6	1.64 (0.73–3.70)				
Ishiguro et al. (2008) Japan Public Health Center 1990–2004	53 187 Women Incidence	Extrahepatic bile ducts (ICD-O-3: C23.9, C24.0)	BMI			Age, study area, cholelithiasis, diabetes, smoking, alcohol consumption
			< 23	12	1.00	
			23.0–24.9	14	2.09 (0.97–4.53)	
			25.0–26.9	9	2.04 (0.85–4.85)	
			≥ 27.0	8	1.89 (0.76–4.67)	
	[ <i>P</i> <sub>trend</sub> ]		[0.12]			
	48 681 Men Incidence			BMI		
				< 23	40	1.00
				23.0–24.9	31	1.33 (0.83–2.13)
				25.0–26.9	14	1.08 (0.58–1.98)
	≥ 27.0	14	1.83 (0.98–3.39)			
	[ <i>P</i> <sub>trend</sub> ]		[0.12]			
	101 868 Women and men Incidence			BMI		
< 23				52	1.00	
23.0–24.9				45	1.50 (1.00–2.24)	
25.0–26.9				23	1.29 (0.79–2.11)	
≥ 27.0	22	1.78 (1.07–2.95)				
[ <i>P</i> <sub>trend</sub> ]		[0.03]				
53 187 Women Incidence		Gall bladder and biliary tract (ICD-O-3: C23.9, C24.0)	BMI			Age, study area, cholelithiasis, diabetes, smoking, alcohol consumption
			< 23	47	1.00	
			23.0–24.9	23	0.85 (0.51–1.41)	
			25.0–26.9	17	0.98 (0.56–1.71)	
≥ 27.0	19	1.19 (0.69–2.04)				

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Reference Location Follow-up period	Total number of subjects Sex Incidence/mortality	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Covariates	
Ishiguro et al. (2008) (cont.)	48 681 Men Incidence		BMI				
			< 23	54	1.00		
			23.0–24.9	37	1.09 (0.71–1.68)		
			25.0–26.9	20	1.14 (0.68–1.92)		
			≥ 27.0	18	1.62 (0.93–2.84)		
	101 868 Men and women Incidence		BMI				
			< 23	101	1.00		
			23.0–24.9	60	0.98 (0.70–1.36)		
25.0–26.9		37	1.06 (0.72–1.55)				
	≥ 27.0	37	1.38 (0.94–2.03)				
Schlesinger et al. (2013) EPIC cohort 1992–2010	359 290 Men and women (191 934 men and women for weight change) Incidence	Biliary tract (ICD-O): gall bladder (C23.9), extrahepatic bile ducts (C24.0), ampulla of Vater (C24.1), and C24.8, C24.9	BMI, tertiles (sex-specific)			Age, sex, study centre, education, smoking, alcohol consumption, height Weight change per year further adjusted for weight at age 20 yr Analyses by hip circumference, waist-to-hip ratio, waist-to-height ratio gave similar results	
			Men:	Women:			
			< 24.93	< 23.04	50		1.00
			24.93–27.80	23.04–26.64	74		1.21 (0.84–1.74)
			≥ 27.81	≥ 26.65	86		1.26 (0.87–1.83)
			[ <i>P</i> <sub>trend</sub> ]				[0.37]
			per 5 kg/m <sup>2</sup>				1.11 (0.93–1.31)
			Weight change, tertiles				
			T1		38		1.00
			T2		48		1.33 (0.85–2.08)
			T3		29		0.98 (0.59–1.65)
[ <i>P</i> <sub>trend</sub> ]			[0.89]				
per 1 kg/yr			0.98 (0.51–1.89)				
Intrahepatic bile ducts ICD-10: C22.1	BMI, per 5 kg/m <sup>2</sup>			1.10 (0.80–1.52)			
	Weight, per 5 kg			1.05 (0.93–1.18)			
	Weight change (kg/yr) [sic]			1.17 (0.36–3.79)			

**Table 2.2.6a Cohort studies of measures of body fatness and cancers of the biliary tract**

Reference Location Follow-up period	Total number of subjects Sex Incidence/mortality	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Covariates
Park et al. (2014) Meta-analysis 2005–2013	Men: 5 studies Women: 6 studies Incidence and mortality	Gall bladder and biliary tract	BMI, highest vs lowest category Men Women	NR	1.37 (0.83–1.91) 1.44 (1.12–1.76)	

BMI, body mass index (in kg/m<sup>2</sup>); CI, confidence interval; EPIC, European Prospective Investigation into Cancer and Nutrition; ICD, International Classification of Diseases; NR, not reported; yr, year or years

**Table 2.2.6b Case–control studies of measures of body fatness and cancers of the biliary tract**

Reference Study location Period	Number of cases Number of controls Source of controls	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Adjustment for confounding
Kato et al. (1989) Japan 1982–1986	73 73 Population	Bile ducts	Broca index (obesity) > 1.0	73	0.23 (0.11–0.49)	Age, sex
Ahrens et al. (2007) Europe 1995–1997	104 1401 (men only) Population	Biliary tract (ICD-O): gall bladder (C23.9), extrahepatic bile ducts (C24.0), ampulla of Vater (C24.1), and C24.8, C24.9	BMI 1–5 yr ago < 18.5 18.5– < 25 25– < 27 27– < 30 ≥ 30  BMI at age 35 yr < 18.5 18.5– < 25 25– < 27 27– < 30 ≥ 30  Lowest adult BMI < 18.5 18.5– < 25 25– < 27 27– < 30 ≥ 30  Maximum adult BMI 18.5– < 25 25– < 27 27– < 30 ≥ 30	0 39 27 23 13  1 57 21 13 7  4 65 10 7 5  23 24 23 25	– 1.00 1.30 (0.77–2.21) 1.00 (0.57–1.74) 1.39 (0.70–2.77)  1.27 (0.14–11.4) 1.00 1.53 (0.89–2.64) 1.63 (0.84–3.15) 2.58 (1.07–6.23)  0.79 (0.27–2.30) 1.00 2.02 (0.95–4.32) 4.15 (1.60–10.7) 4.68 (1.13–19.4)  1.00 1.33 (0.72–2.45) 0.97 (0.52–1.80) 1.34 (0.73–2.47)	Age, country, history of gallstones

**Table 2.2.6b Case-control studies of measures of body fatness and cancers of the biliary tract**

Reference Study location Period	Number of cases Number of controls Source of controls	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Adjustment for confounding
Ahrens et al. (2007) (cont.)		Extrahepatic bile ducts ( <i>n</i> = 74)	≤ 25 ≥ 25		1.00 3.34 (1.08–10.35)	
Hsing et al. (2008) China 1997–2001	627 959 Population	Biliary tract (ICD-9: 156)	Usual adult BMI < 18.5 18.5–22.9 23.0–24.9 ≥ 25 [ <i>P</i> <sub>trend</sub> ]	17 30 73 145	0.62 (0.35–1.09) 1.00 1.2 (0.85–1.68) 1.56 (1.17–2.10) [< 0.001]	Age (continuous), sex (male, female), education (none/primary, junior middle, senior, some college)
			Maximum adult BMI < 18.5 18.5–22.9 23.0–24.9 ≥ 25 [ <i>P</i> <sub>trend</sub> ]	6 74 83 185	1.24 (0.47–3.29) 1.00 1.35 (0.94–1.95) 1.48 (1.08–2.03) [0.02]	
			BMI change in adulthood ≤ 0.74 0.75–2.77 2.78–5.21 > 5.21 [ <i>P</i> <sub>trend</sub> ]	74 62 86 93	1.00 0.93 (0.62–1.39) 1.45 (0.98–2.14) 1.47 (1.00–2.16) [0.01]	
		Extrahepatic bile ducts ( <i>n</i> = 191)	Usual adult BMI < 18.5 18.5–22.9 ≥ 23 [ <i>P</i> <sub>trend</sub> ]	8 86 95	0.52 (0.24–1.13) 1.00 0.99 (0.71–1.37) [0.29]	No effect of maximum adult BMI, or BMI change in adulthood
Grainje et al. (2009) United Kingdom 1987–2002	86 3007 Population	Bile ducts (cholangiocarcinoma)	BMI < 25 25–29.9 ≥ 30	36 31 19	1.00 1.03 (0.62–1.72) 1.51 (0.83–2.75)	Smoking, alcohol, NSAID use

**Table 2.2.6b Case–control studies of measures of body fatness and cancers of the biliary tract**

Reference Study location Period	Number of cases Number of controls Source of controls	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Adjustment for confounding
Shebl et al. (2011) China 1997–2001	627 959 Population	Extrahepatic bile ducts	WC (cm) Low High (men: $\geq 90$ ; women: $\geq 80$ )	61 31	1.00 0.64 (0.37–1.13)	Age, sex, BMI

BMI, body mass index (in  $\text{kg}/\text{m}^2$ ); CI, confidence interval; ICD, International Classification of Diseases; NSAID, non-steroidal anti-inflammatory drug; WC, waist circumference; yr, year or years

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