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# Coffee consumption, total caffeine intake, and risk of diabetes in Japanese men and women

Shino OBA, MSPH

Gifu University Graduate School of Med.

Dept. Prevention for Lifestyle-Related Diseases

Nagata C , Nakamura K , Fujii K,  
Kawachi T, Takatsuka N, Shimizu H

# Takayama city



# Background

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- The **protective effect of coffee** consumption on the development of diabetes has been reported
- Several studies indicated a lowered risk of diabetes with increased **caffeine intake**
- **Decaffeinated coffee** also decreased the risk of diabetes
- Reported association between **green tea consumption and diabetes** was inconsistent

# Aim of the study

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- Assessing the association between coffee consumption and risk of developing diabetes in **a prospective study** among Japanese men and women in a community-based cohort
- Consumption of tea and chocolate snacks was assessed with the risk of diabetes
- Total caffeine intake was estimated and assessed

# Takayama cohort

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- Original cohort: residents of **Takayama, Gifu**, Japan 35 yr+ in 1992. Participation rate: 85.3%
- Current study (followed in 2002)
  - < 70yr and not diagnosed with diabetes, cancer, heart diseases or stroke at the baseline
  - Who confirmed their death during the follow-up were excluded
  - Answered follow-up questionnaire (66.7%)
- Total **13,540** (5,897 men and 7,643 women)

# Estimation of caffeine contents



coffee

90 mg / serving



oolong tea

20 mg / serving



green tea

20 mg / serving



black tea

30 mg / serving



chocolate snacks

1.1 mg / serving

# Baseline assessment

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- From FFQ
  - Coffee
  - Decaffeinated coffee
  - Green tea
  - Black tea
  - Oolong tea and
  - Chocolate snack
- Caffeine content was estimated
- Questionnaire
  - Smoking status
  - Medical and reproductive histories
  - Physical activity

# Ascertainment of diabetes and Statistical Analysis

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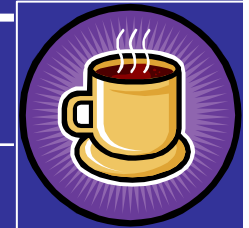
- Follow-up questionnaire
  - Asked if ever diagnosed as diabetes
  - Age at diagnosis
- Cox proportional hazard model
  - Adjusted for
    - age
    - smoking status,
    - BMI,
    - physical activity,
    - education,
    - alcohol consumption
    - total caloric intake,
    - fat intake



# Baseline characteristics according to level of coffee consumption

	Men			Women		
	0 –almost never n = 931	1/month – 6/week n = 2402	1/day + n=2564	0 - almost never n = 1398	1/month – 6/week n = 3312	1/day + n = 2933
	Mean (SD) or %			Mean (SD) or %		
Age [yr]	56.7 (8.0)	53.1 (8.7)	48.9 (8.6)	56.4 (8.7)	52.5 (8.9)	48.0 (8.1)
BMI [kg/m <sup>2</sup> ]	22.3 (2.6)	22.7 (2.6)	22.6 (2.7)	21.9 (2.9)	22.3 (2.7)	22.0 (2.7)
Current smoker	39.0 %	44.0 %	65.5 %	5.9 %	5.3 %	15.5 %
Married	95.0 %	93.9 %	94.5 %	81.9 %	86.8 %	85.9 %
Education 12 yr+	30.9 %	44.9 %	57.3 %	24.2 %	37.7 %	51.1 %
Physical activity [METs/h/week]	26.6 (39.8)	31.1 (43.3)	28.0 (42.1)	18.0 (26.8)	22.6 (33.1)	22.0 (30.4)
Total energy [kcal]	2586 (822)	2643 (807)	2727 (870)	2048 (755)	2188 (731)	2245 (773)
Fat [g]	56.9 (28.0)	60.2 (26.5)	63.7 (29.2)	51.5 (25.5)	57.5 (25.9)	60.7 (26.6)
Alcohol [g]	50.7 (44.1)	44.5 (40.5)	41.0 (39.1)	6.2 (13.9)	6.8 (14.1)	9.5 (17.5)

# HR of diabetes according to consumption of coffee



	Men			Women		
	n, total	HR	95% CI	n, total	HR	95% CI
0-almost never	931	1.00		1398	1.00	
1/month-6/wk	2402	0.69	(0.50-0.97)	3312	1.08	(0.73-1.59)
1/day or more	2564	0.69	(0.49-0.98)	2933	0.70	(0.44-1.11)
$p_{\text{trend}}$			0.32			0.03

# HR of diabetes according to consumption of caffeine

	Men			Women		
	n, total	HR	95% CI	n, total	HR	95% CI
1 <sup>st</sup> tertile	1966	1.00		2553	1.00	
2 <sup>nd</sup> tertile	1967	0.81	(0.60-1.10)	2547	1.25	(0.87-1.81)
3 <sup>rd</sup> tertile	1964	0.95	(0.69-1.30)	2543	0.94	(0.62-1.41)
$p_{\text{trend}}$			0.94			0.51

# HR of diabetes according to consumption of tea

	Men			Women		
	n, total	HR	95% CI	n, total	HR	95% CI
<b>Green tea</b>						
almost never	2131	1.00		1539	1.00	
1/month-6/wk	801	1.23	(0.87-1.76)	1075	0.90	(0.52-1.55)
1/day	616	0.97	(0.63-1.49)	778	1.00	(0.53-1.88)
2/day or more	2349	0.94	(0.71-1.26)	4251	1.03	(0.69-1.55)
$p_{\text{trend}}$			0.38			0.64
<b>Oolong tea</b>						
almost never	2245	1.00		2702	1.00	
1/month-6/wk	2997	1.05	(0.80-1.37)	3696	0.89	(0.62-1.28)
1/day or more	655	1.12	(0.77-1.64)	1245	1.37	(0.90-2.08)
$p_{\text{trend}}$			0.58			<b>0.03</b>



# Other HRs of diabetes

	Men			Women		
	n, total	HR	95% CI	n, total	HR	95% CI
<b>Decaffeinated coffee</b>						
almost never	5394	1.00		6931	1.00	
1/month +	503	1.09	(0.73-1.61)	712	0.66	(0.36-1.23)
$p_{\text{trend}}$			0.69			0.19
<b>Black tea</b>						
almost never	4225	1.00		4586	1.00	
1/month +	1672	0.88	(0.67-1.16)	3057	1.28	(0.94-1.76)
$p_{\text{trend}}$			0.37			0.12
<b>Chocolate snack piece</b>						
almost never	2825	1.00		2494	1.00	
1/month-1/week	2199	0.84	(0.65-1.09)	3546	<b>0.70</b>	<b>(0.50-0.98)</b>
1/week+	873	<b>0.65</b>	<b>(0.43-0.97)</b>	1603	0.74	(0.48-1.13)
$p_{\text{trend}}$			<b>0.04</b>			0.34

# Conclusion

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- Higher **coffee consumption** modestly **decreased the risk of diabetes** among Japanese men and women
- **Total caffeine** intake was **not associated** with the risk
- Association of coffee consumption with the risk of diabetes **may exist separate from the influence of caffeine** intake on the risk