SECTION 11

Reproductive History and Health Screening for Women and Mortality in the Japan Collaborative Cohort Study for Evaluation of Cancer (JACC)

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Abstract

Reproductive history and participation in health screening for women were surveyed among female subjects, and interesting results were obtained in the present analyses. Women who had never experienced pregnancy had significantly increased risks of death from all causes and cerebrovascular disorders compared with those who had experienced 1 or 2 pregnancies. In contrast, women who had experienced 3 or 4 pregnancies had significantly decreased risks of death from all causes, all cancers, rectal cancer, and breast cancer. Among women who had ever undergone mass screening examination for uterine cervical cancer, there were significantly lower risks of death from all causes, all cancers, stomach cancer, uterine cervical cancer, urinary tract cancer, and ischemic heart diseases compared with those who had not had such experience.

Keywords: Reproductive history - screening history - mortality - cancer - circulatory disease

Introduction

Reproductive history and participation in health screening for women were surveyed among female subjects in the JACC Study.

Materials and Methods

The subjects were asked about number of pregnancies and deliveries, age at first delivery, age at menopause, use of sex hormones, and participation in health screening. The hazard ratios (HRs) adjusted for age and area of study and 95% confidence intervals (95%CIs) of major causes of death were calculated.

Results

Number of pregnancies (Table1)

Women who had never experienced pregnancy had a significantly increased risks of death from all causes

Table 1. Hazard Ratios (HRs)[#] and 95% Confidence Intervals (95% CI) for Mortality According to Reproductive History

Cause ICD	Observed person years	Number of pregnancies							
		none		1-2 times		3-4 times		≥5 times	
		No	HR (95%CI)	No	HR	No	HR (95%CI)	No	HR (95%CI)
All causes	7,174	346	1.28 (1.13, 1.45)**	1,284	1.00	2,467	0.93 (0.87, 1.00)*	1,997	0.99 (0.92, 1.06)
All cancer C00-90	2,325	87	0.99 (0.79, 1.25)	505	1.00	865	0.88 (0.79, 0.98)*	564	0.91 (0.80, 1.03)
Esophagus C15	27	3	2.75 (0.63, 11.9)	5	1.00	9	0.86 (0.29, 2.58)	7	0.93 (0.28, 3.06)
Stomach C16	386	16	1.12 (0.65, 1.94)	79	1.00	147	0.95 (0.72, 1.25)	93	0.86 (0.63, 1.19)
Colon C18	220	7	0.76 (0.34, 1.70)	44	1.00	86	0.93 (0.65, 1.34)	51	0.80 (0.53, 1.22)
Rectum C19-20	89	0	NA	25	1.00	24	0.49 (0.28, 0.87)*	26	0.92 (0.51, 1.66)
Liver C22	227	8	1.16 (0.54, 2.49)	46	1.00	96	1.03 (0.72, 1.46)	54	0.91 (0.60, 1.37)
Gall bladder C23	95	4	1.38 (0.45, 4.20)	17	1.00	38	1.22 (0.68, 2.19)	24	1.25 (0.64, 2.43)
Pancreas C25	217	5	0.46 (0.18, 1.16)[+]	49	1.00	77	0.79 (0.55, 1.14)	61	0.96 (0.64, 1.43)
Lung C33-34	268	16	1.55 (0.88, 2.73)	63	1.00	91	0.74 (0.53, 1.03)[+]	66	0.84 (0.59, 1.21)
Breast C50	103	3	0.77 (0.23, 2.53)	40	1.00	35	0.56 (0.36, 0.89)*	13	0.52 (0.27, 1.00)*
Uterine cervix C53	36	0	NA	6	1.00	20	2.02 (0.81, 5.06)	7	1.46 (0.47, 4.54)
Kidney C64	19	1	1.02 (0.11, 9.34)	5	1.00	5	0.50 (0.14, 1.73)	4	0.61 (0.15, 2.48)
UrotheliumC65-67	41	3	2.02 (0.49, 8.38)	6	1.00	13	1.05 (0.40, 2.78)	11	1.20 (0.42, 3.40)
Non-Hodgkin's C82-85	65	3	1.61 (0.44, 5.83)	12	1.00	25	1.02 (0.51, 2.05)	14	0.99 (0.44, 2.20)
Multiple myeloma C90	49	2	0.90 (0.20, 4.13)	12	1.00	17	0.70 (0.33, 1.48)	14	0.88 (0.39, 1.99)
Myeloid leukemia C92	33	0	NA	5	1.00	14	1.49 (0.53, 4.16)	7	1.38 (0.42, 4.60)
Ischemic heart dis I20-25	458	28	1.52 (0.98, 2.38)[+]	75	1.00	148	0.93 (0.70, 1.24)	138	0.94 (0.70, 1.27)
Cerebrovascular dis I60-69	1,151	65	1.51 (1.13, 2.02)**	172	1.00	404	1.08 (0.90, 1.29)	338	1.06 (0.87, 1.28)

[#] Adjusted for age and area of study. **, p<0.01; *, p<0.05; [+], p<0.10   NA: not applicable

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Table 2. Hazard Ratios (HRs)# and 95% Confidence Intervals (CI) for Mortality According to Reproductive History Among Women - Deliveries

| | Observed | Number of deliveries | | | | | | Age at first delivery | | | | |
| | | none | | 1-2 times | | ≥3 times | | ≤22 | | 23-25 | | ≥26 | |
Cause ICD	person years	No	HR(95%CI)	No	HR	No	HR(95%CI)	No	HR(95%CI)	No	HR	No	HR(95%CI)
All causes	7,174	356	1.38 (1.23, 1.55)**	1,698	1.00	3,890	1.00 (0.94, 1.07)	1,802	1.14 (1.07, 1.23)**	1,908	1.00	2,026	1.08 (1.01, 1.15)*
All cancer C00-90	2,325	90	1.10 (0.88, 1.38)	691	1.00	1,193	0.97 (0.87, 1.07)	575	1.16 (1.02, 1.31)*	653	1.00	707	1.14 (1.02, 1.27)*
Esophagus C15	27	3	3.06 (0.73, 12.8)	6	1.00	14	1.09 (0.40, 2.99)	8	1.63 (0.51, 5.17)	6	1.00	7	1.37 (0.45, 4.14)
Stomach C16	386	16	1.17 (0.68, 2.01)	107	1.00	204	0.99 (0.77, 1.27)	97	1.11 (0.82, 1.50)	106	1.00	117	1.17 (0.90, 1.53)
Colon C18	220	8	0.92 (0.44, 1.96)	61	1.00	115	0.93 (0.67, 1.30)	43	0.74 (0.49, 1.13)	72	1.00	64	0.93 (0.66, 1.31)
Rectum C19-20	89	0	N.A	31	1.00	43	0.80 (0.49, 1.32)	28	1.75 (0.96, 3.20)+	23	1.00	25	1.14 (0.64, 2.02)
Liver C22	227	8	1.17 (0.55, 2.47)	68	1.00	126	1.02 (0.74, 1.40)	63	1.19 (0.80, 1.79)	61	1.00	71	1.21 (0.85, 1.71)
Gall bladder C23	95	4	1.58 (0.53, 4.72)	22	1.00	55	1.51 (0.88, 2.58)	22	1.16 (0.62, 2.17)	26	1.00	31	1.26 (0.74, 2.14)
Pancreas C25	217	8	0.87 (0.41, 1.84)	60	1.00	119	1.04 (0.75, 1.46)	55	1.52 (1.00, 2.30)+	51	1.00	76	1.46 (1.02, 2.11)*
Lung C33-34	268	16	1.86 (1.07, 3.23)*	78	1.00	136	0.99 (0.74, 1.34)	68	1.37 (0.95, 1.96)+	68	1.00	81	1.30 (0.94, 1.81)
Breast C50	103	4	1.13 (0.40, 3.18)	54	1.00	32	0.57 (0.36, 0.91)*	19	0.74 (0.37, 1.48)	31	1.00	38	1.43 (0.88, 2.32)
Uterine cervix C53	36	0	N.A	10	1.00	23	1.98 (0.90, 4.35)+	8	1.57 (0.57, 4.28)	9	1.00	14	1.73 (0.74, 4.04)
Kidney C64	19	1	1.23 (0.14, 11.0)	6	1.00	7	0.62 (0.19, 2.00)	2	0.54 (0.10, 2.79)	6	1.00	6	1.00 (0.31, 3.22)
Urothelial tract C65-67	41	3	1.45 (0.30, 7.12)	8	1.00	22	1.21 (0.51, 2.86)	9	1.17 (0.45, 3.02)	12	1.00	11	0.80 (0.35, 1.85)
Non-Hodgkin's C82-85	65	3	1.53 (0.44, 5.31)	19	1.00	30	0.97 (0.53, 1.76)	17	1.08 (0.56, 2.09)	24	1.00	14	0.68 (0.35, 1.34)
Multiple myeloma C90	49	2	0.79 (0.18, 3.53)	19	1.00	22	0.56 (0.29, 1.08)+	13	1.37 (0.59, 3.19)	13	1.00	18	1.43 (0.69, 2.96)
Myeloid leukemia C92	33	0	N.A	9	1.00	17	1.19 (0.50, 2.82)	8	1.06 (0.38, 2.94)	11	1.00	8	0.68 (0.27, 1.72)
Ischemic heart disease I20-25	458	27	1.50 (0.97, 2.34)+	94	1.00	258	0.97 (0.75, 1.24)	121	1.09 (0.82, 1.45)	116	1.00	131	1.17 (0.90, 1.51)
Cerebrovascular disease I60-69	1,151	66	1.56 (1.18, 2.07)**	229	1.00	661	1.08 (0.92, 1.26)	291	1.19 (0.99, 1.42)+	294	1.00	326	1.07 (0.91, 1.26)

Adjusted for age and area of study. **, p<0.01; *, p<0.05; +, p<0.10

Table 3. Hazard Ratios (HRs)# and 95% Confidence Intervals (CI) for Mortality According to Menarche and Menopause among Women

	Age at menarche						Age at menopause						Type of menopause			
	≤13		14-15		≥16		≤47		48-50		≥51		Natural		Operative	
Observed person-years	162,987		328,330		259,302		131,525		187,272		164,695		306,385		49,111	
	No	HR (95%CI)	No	HR	No	HR (95%CI)	No	HR (95%CI)	No	HR	No	HR (95%CI)	No	HR	No	HR (95%CI)
All causes	752	1.07 (0.98, 1.16)	2,270	1.00	2,838	1.02 (0.96, 1.08)	1,506	1.10 (1.03, 1.18)**	1,996	1.00	1,499	0.94 (0.88, 1.01)+	3,012	1.00	315	1.03 (0.92, 1.16)
All cancer C00-C97	299	1.05 (0.91, 1.20)	802	1.00	898	1.02 (0.92, 1.12)	464	1.11 (0.98, 1.26)+	623	1.00	512	0.98 (0.87, 1.10)	1,015	1.00	120	1.05 (0.87, 1.27)
Esophagus C15	1	0.47 (0.06, 3.87)	7	1.00	15	1.56 (0.63, 3.87)	7	2.08 (0.66, 6.56)	5	1.00	7	1.74 (0.55, 5.48)	11	1.00	2	0.68 (0.15, 3.19)
Stomach C16	52	1.07 (0.77, 1.49)	139	1.00	140	0.87 (0.69, 1.11)	81	1.14 (0.85, 1.53)	104	1.00	88	1.03 (0.78, 1.37)	176	1.00	15	1.35 (0.80, 2.30)
Colon C18	27	1.02 (0.66, 1.59)	83	1.00	75	0.80 (0.58, 1.10)	44	1.01 (0.69, 1.48)	67	1.00	40	0.72 (0.49, 1.07)	87	1.00	10	1.02 (0.53, 1.97)
Rectum C19-20	10	0.88 (0.43, 1.79)	33	1.00	35	1.01 (0.62, 1.65)	6	0.34 (0.14, 0.81)*	27	1.00	22	1.02 (0.58, 1.79)	28	1.00	8	0.42 (0.19, 0.93)*
Liver C22	29	1.01 (0.66, 1.55)	83	1.00	83	0.93 (0.68, 1.26)	59	1.56 (1.09, 2.24)*	58	1.00	45	0.91 (0.62, 1.34)	116	1.00	14	1.06 (0.60, 1.85)
Gall bladder C23	12	1.11 (0.55, 2.24)	29	1.00	38	1.18 (0.72, 1.94)	26	1.60 (0.91, 2.80)	24	1.00	20	1.00 (0.55, 1.82)	43	1.00	5	1.11 (0.43, 2.84)
Pancreas C25	28	1.23 (0.78, 1.94)	67	1.00	100	1.29 (0.94, 1.77)	46	1.03 (0.71, 1.51)	67	1.00	44	0.78 (0.53, 1.14)	88	1.00	18	0.63 (0.38, 1.06)+
Lung C33-C34	39	1.26 (0.85, 1.86)	82	1.00	110	1.26 (0.94, 1.69)	51	1.05 (0.73, 1.52)	72	1.00	62	1.02 (0.72, 1.43)	126	1.00	14	1.13 (0.64, 1.97)
Breast C50	21	0.98 (0.57, 1.67)	44	1.00	32	0.96 (0.60, 1.54)	12	0.79 (0.38, 1.64)	21	1.00	20	1.06 (0.58, 1.96)	35	1.00	10	0.60 (0.29, 1.25)
Uterine cervix C53	5	0.86 (0.30, 2.46)	13	1.00	12	1.10 (0.49, 2.49)	4	1.07 (0.30, 3.79)	6	1.00	10	1.86 (0.68, 5.14)	17	1.00	0	NA
Kidney C64	1	0.57 (0.07, 4.78)	6	1.00	8	1.17 (0.40, 3.43)	3	0.96 (0.23, 4.02)	5	1.00	4	0.92 (0.25, 3.42)	6	1.00	1	0.71 (0.08, 5.99)
Urothelial tract C65-C67	1	0.30 (0.04, 2.34)	12	1.00	18	1.19 (0.57, 2.48)	5	0.49 (0.18, 1.35)	15	1.00	3	0.25 (0.07, 0.87)*	13	1.00	1	1.57 (0.20, 12.2)
Non-Hodgkin's C82-85	7	0.76 (0.32, 1.77)	24	1.00	27	1.16 (0.66, 2.03)	18	1.91 (0.96, 3.79)+	15	1.00	16	1.21 (0.60, 2.46)	32	1.00	3	1.44 (0.44, 4.74)
Multiple myeloma C90	6	0.89 (0.36, 2.23)	21	1.00	18	0.74 (0.39, 1.40)	12	1.43 (0.65, 3.13)	13	1.00	14	1.31 (0.61, 2.79)	21	1.00	1	2.89 (0.39, 21.8)
Myeloid leukemia C92	4	1.23 (0.37, 4.04)	9	1.00	15	1.64 (0.71, 3.83)	8	2.01 (0.70, 5.78)	6	1.00	10	1.90 (0.69, 5.23)	14	1.00	3	0.67 (0.19, 2.39)
Ischemic heart disease I20-25	47	1.19 (0.85, 1.68)	140	1.00	185	1.02 (0.82, 1.27)	96	1.19 (0.91, 1.57)	115	1.00	114	1.31 (1.01, 1.70)*	194	1.00	20	0.95 (0.60, 1.52)
Cerebrovascular disease I60-69	90	0.98 (0.77, 1.24)	335	1.00	489	1.13 (0.98, 1.30)+	233	1.02 (0.86, 1.20)	336	1.00	242	0.94 (0.79, 1.11)	476	1.00	40	1.17 (0.85, 1.62)

Adjusted for age and area of study. **, p<0.01; *, p<0.05; +, p<0.10 NA: not applicable

Table 4. Hazard Ratios (HRs)# and 95% Confidence Intervals (95% CI) for Mortality and Sex Hormone Use

		History of sex hormone use				Frequency of use					
		No		Yes		Never use		<6months		6 months+	
Observed person yrs		574,072		29,425		574,072		10,083		10,670	
Site	ICD10	No	HR	No	HR (95% CI)	No	HR	No	HR (95% CI)	No	HR (95% CI)
All causes		4,491	1.00	177	1.03 (0.88, 1.19)	4,491	1.00	59	1.07 (0.83, 1.39)	60	0.92 (0.71, 1.19)
All cancer	C00-97	1,521	1.00	65	0.99 (0.77, 1.27)	1,521	1.00	21	0.97 (0.63, 1.49)	27	1.12 (0.76, 1.63)
Esophagus C15		17	1.00	3	4.60 (1.33, 15.9)	17	1.00	2	8.46 (1.91, 37.6)	0	NA
Stomach C16		256	1.00	7	0.68 (0.32, 1.45)	256	1.00	3	0.90 (0.29, 2.80)	1	0.26 (0.04, 1.85)
Colon C18		158	1.00	4	0.59 (0.22, 1.60)	158	1.00	3	1.36 (0.43, 4.28)	1	0.38 (0.05, 2.68)
Rectum C19-20		57	1.00	1	0.39 (0.06, 2.85)	57	1.00	0	NA	1	1.05 (0.15, 7.62)
Liver C22		138	1.00	9	1.46 (0.74, 2.88)	138	1.00	2	1.00 (0.25, 4.07)	4	1.88 (0.69, 5.10)
Gall bladder C23		62	1.00	2	0.75 (0.18, 3.09)	62	1.00	0	NA	2	2.04 (0.49, 8.40)
Pancreas C25		158	1.00	4	0.59 (0.22, 1.59)	158	1.00	1	0.45 (0.06, 3.23)	1	0.40 (0.06, 2.83)
Lung C33-34		166	1.00	13	1.71 (0.97, 3.01)+	166	1.00	5	1.89 (0.77, 4.63)	5	1.77 (0.72, 4.33)
Breast C50		64	1.00	5	1.51 (0.61, 3.78)	64	1.00	2	1.84 (0.45, 7.56)	1	0.91 (0.13, 6.60)
Uterine cervix C53		26	1.00	1	0.77 (0.10, 5.74)	26	1.00	0	NA	1	2.16 (0.29, 16.1)
Kidney C64		11	1.00	0	N.A	11	1.00	0	NA	0	NA
Urothelium C65-67		23	1.00	1	1.35 (0.18, 10.1)	23	1.00	0	NA	1	3.83 (0.51, 29.0)
Non-Hodgkin lymphoma C82-85		48	1.00	1	0.45 (0.06, 3.29)	48	1.00	1	1.28 (0.18, 9.35)	0	NA
Multiple myeloma C90		28	1.00	0	N.A	28	1.00	0	NA	0	NA
Myeloid leukemia C92		20	1.00	0	N.A	20	1.00	0	NA	0	NA
IHD	I20-I25	287	1.00	8	0.82 (0.41, 1.66)	287	1.00	3	0.98 (0.31, 3.07)	2	0.55 (0.14, 2.21)
CVD	I60-I69	742	1.00	18	0.69 (0.43, 1.10)	742	1.00	8	1.02 (0.51, 2.05)	6	0.60 (0.27, 1.33)

Adjusted for age and area of study.   Significance level: ** p<0.01, * p<0.05, + p<0.1 NA: not applicable

(HR=1.28) and cerebrovascular disorders (HR=1.51) compared with those who had experienced 1 or 2 pregnancies. In contrast, women who had experienced 3 or 4 pregnancies had significantly decreased risks of death from all causes (HR=0.93), all cancers (HR=0.88), rectal cancer (HR=0.49), and breast cancer (HR=0.56). Additionally, women who had experienced more than 5 pregnancies also had a decreased risk of death from breast cancer (HR=0.52).

Number and age of deliveries (Table 2)

Results regarding number of delivered babies were similar to those regarding the number of pregnancies. Women who had never experienced delivery had significantly increased risks of death from all causes (HR=1.38), lung cancer (HR=1.86), and cerebrovascular disorders (HR=1.56) compared with those who had experienced 1 or 2 deliveries. In contrast, women who had experienced more than 3 deliveries had a significantly decreased risk of death from breast cancer (HR=0.57).

Age at first delivery of less than 23 years or more than 25 years was positively associated with risk of death from all causes (HR=1.14 for less than 23 years, and HR=1.08 for more than 25 years, respectively), all cancers (HR=1.16 for less than 23 years, and HR=1.14 for more than 25 years), and that of more than 25 years was also positively associated with risk of death from pancreatic cancer (HR=1.46) compared with those who experienced their first delivery between 23 and 25 years old.

Age at menarche and menopause (Table 3)

Age at natural menopause less than 48 years was positively associated with risks of death from all causes (HR=1.10), and liver cancer (HR=1.56) compared with those who experienced their natural menopause between

48 and 50 years old, but, it was inversely associated with risk of death from rectal cancer (HR=0.34). At the same time, age at natural menopause of more than 50 years was positively associated with risk of death from ischemic heart diseases (HR=1.31), but inversely linked with risk of death from urinary tract cancers (HR=0.25).

Sex hormone use (Table 4)

In the present study, no significant effects were found regarding risks of death from breast, ovarian, and uterine cervical cancer associated with the use of sex hormones.

Participation in health screening (Table 5)

There were significantly lower risks of death from all causes (HR=0.76), all cancers (HR=0.81), stomach cancer (HR=0.65), uterine cervical cancer (HR=0.40), urinary tract cancer (HR=0.29), and ischemic heart diseases (HR=0.67) among women who had ever undergone mass screening examination for uterine cervical cancer compared with those who had not had such experience. There were also significantly lower risks of death from all causes (HR=0.74), all cancers (HR=0.75, 95%CI 0.66-0.85), stomach cancer (HR=0.63, 95%CI 0.45-0.88), uterine cervical cancer (HR=0.19, 95%CI 0.04-0.81), ischemic heart diseases (HR=0.65, 95%CI 0.47-0.92), and cerebrovascular disorders (HR=0.81, 95%CI 0.66-0.99) among women who had ever undergone a mass screening examination for breast cancer. Similar results were found among those who habitually performed self examination for breast cancer.

Discussion

Results regarding number of pregnancies were similar to those of delivered babies. For example, women who

Table 5. Hazard Ratios (HRs)# and 95% Confidence Intervals (CI) of Selected Causes of Death for Health Screening among Women

| | | Participation in cervical cancer screening | | | | Participation in breast cancer screening | | | | Self-examination of breast cancer | | | | Don't know how to do | |
| | | No 321,864 | | Yes 298,794 | | No 411,876 | | Yes 183,685 | | No 302,994 | | Yes 231,303 | | 28,643 | |
Observed person years	ICD	N	HR	N	HR(95%CI)	No	HR	No	HR(95%CI)	No	HR	No	HR(95%CI)	No	HR(95%CI)
All causes		3,485	1.00	1,446	0.76 (0.72, 0.82)**	3,866	1.00	861	0.74 (0.69, 0.80)**	3,010	1.00	1,113	0.76 (0.71, 0.82)**	334	1.01 (0.90, 1.13)
All cancers	C00-C97	1,072	1.00	584	0.81 (0.73, 0.91)**	1,251	1.00	337	0.75 (0.66, 0.85)**	925	1.00	473	0.87 (0.77, 0.97)*	78	0.82 (0.65, 1.03)+
Esophagus	C15	11	1.00	8	1.69 (0.62, 4.61)	10	1.00	5	1.44 (0.46, 4.57)	12	1.00	2	0.34 (0.07, 1.60)	0	N.A
Stomach	C16	188	1.00	81	0.65 (0.49, 0.85)**	214	1.00	46	0.63 (0.45, 0.88)**	162	1.00	67	0.76 (0.56, 1.02)+	12	0.63 (0.35, 1.14)
Colon	C18	107	1.00	64	0.97 (0.69, 1.35)	132	1.00	36	0.81 (0.55, 1.19)	90	1.00	52	1.11 (0.77, 1.58)	11	1.17 (0.62, 2.21)
Rectum	C19-C20	38	1.00	26	0.84 (0.49, 1.41)	47	1.00	15	0.72 (0.40, 1.33)	24	1.00	25	1.67 (0.93, 2.98)+	3	1.36 (0.40, 4.64)
Liver	C22	110	1.00	54	0.77 (0.54, 1.08)	128	1.00	33	0.76 (0.51, 1.14)	99	1.00	47	0.77 (0.54, 1.11)	6	0.68 (0.29, 1.57)
Gall bladder	C23	44	1.00	18	0.69 (0.39, 1.24)	49	1.00	11	0.68 (0.34, 1.34)	36	1.00	18	0.92 (0.51, 1.66)	5	1.17 (0.45, 3.05)
Pancreas	C25	98	1.00	60	1.00 (0.71, 1.42)	115	1.00	37	0.91 (0.62, 1.35)	90	1.00	46	0.89 (0.61, 1.30)	4	0.40 (0.14, 1.09)+
Lung	C33-34	122	1.00	62	0.75 (0.54, 1.03)+	136	1.00	41	0.88 (0.61, 1.26)	103	1.00	55	0.89 (0.63, 1.26)	11	1.06 (0.56, 2.01)
Breast	C50	43	1.00	34	0.92 (0.58, 1.47)	55	1.00	20	0.77 (0.45, 1.31)	37	1.00	30	1.03 (0.63, 1.69)	2	0.74 (0.18, 3.12)
Uterine cervix	C53	21	1.00	7	0.40 (0.16, 0.97)*	23	1.00	2	0.19 (0.04, 0.81)*	19	1.00	4	0.29 (0.10, 0.87)*	2	1.24 (0.28, 5.45)
Kidney	C64	6	1.00	6	1.60 (0.47, 5.49)	6	1.00	3	1.85 (0.41, 8.44)	6	1.00	1	0.31 (0.04, 2.71)	0	N.A
Urothelium	C65-67	23	1.00	3	0.29 (0.08, 1.00)*	22	1.00	3	0.51 (0.15, 1.80)	18	1.00	4	0.51 (0.17, 1.58)	1	0.60 (0.08, 4.66)
Non-Hodgkin and other lymphoma	C82-85	24	1.00	22	1.17 (0.63, 2.17)	32	1.00	9	0.73 (0.34, 1.56)	22	1.00	15	1.12 (0.56, 2.23)	3	1.20 (0.35, 4.11)
Multiple myeloma, plasmacytoma	C90	22	1.00	11	0.75 (0.34, 1.62)	27	1.00	6	0.62 (0.25, 1.55)	20	1.00	10	0.82 (0.37, 1.82)	1	0.51 (0.07, 3.86)
Myeloid leukemia	C92	15	1.00	7	0.68 (0.26, 1.74)	14	1.00	7	1.35 (0.52, 3.52)	10	1.00	7	2.21 (0.81, 6.00)	2	3.53 (0.71, 17.7)
Ischemic heart disease	I20-25	256	1.00	73	0.67 (0.50, 0.88)**	271	1.00	43	0.65 (0.47, 0.92)*	213	1.00	61	0.72 (0.53, 0.97)	31	1.17 (0.79, 1.72)
Cerebrovascular disease	I60-69	549	1.00	223	0.88 (0.74, 1.04)	603	1.00	129	0.81 (0.66, 0.99)*	132	1.00	507	0.61 (0.50, 0.75)	55	0.91 (0.68, 1.21)

Adjusted for age and area of study. **, p<0.01; *, p<0.05; +, p<0.10

had never experienced pregnancy or delivery had significantly increased risks of death from all causes, and cerebrovascular disorders compared with those who had experienced them. In contrast, women who had experienced more than 3 pregnancies or deliveries had a significantly decreased risk of death from breast cancer. Adjusted for potential confounding factors, there was still a significant decline in the risk of incidence of breast cancer with increasing parity among parous women in previous report from the JACC Study (Tamakoshi et al., 2005). It is reported that parity has a dual effect on breast cancer risk: it transiently increases the risk after childbirth but reduces the risk in later years (Zografos et al., 2004). Female subjects in the JACC Study were 40-79 years old, and the increasing number of pregnancy and delivery was inversely associated with the risk of the death of breast cancer.

Age at first delivery of less than 23 years or more than 25 years was positively associated with the risk of death from all causes compared with those who experienced their first delivery between 23 and 25 years old. There may be preferable age at first delivery for female health. Age at natural menopause less than 48 years was positively associated with the risk of death from all causes compared with those who experienced their natural menopause between 48 and 50 years old. Meanwhile, age at natural menopause of more than 50 years was positively associated with risk of death from ischemic heart diseases. But, in multivariable adjusted analysis Cui et al. reported that no significant association was observed between duration of menstruation and mortality from stroke, coronary heart disease (Cui et al, 2006).

Use of sex hormones is a very influential factor affecting the development of female cancers such as breast, ovarian, and endometrial cancer (Pike et al., 2004; Zografos et al., 2004). In the present study, being adjusted for only age, no significant effect was found between risks of death from breast, and ovarian cancer and the use of sex hormones. But in other result from the JACC Study, experience of using sex hormones may increase risk of endometrial cancer death (Khan et al, 2006), and this finding may support previous report that estrogen therapy increases risk of developing endometrial cancer (Pike et al., 2004). It is expected that mass screening of the endometrial cancer is generally conducted in the future.

There were significantly lower risks of death from several causes including uterine cervical cancer among women who had ever undergone mass screening examination for uterine cervical cancer compared with women who had not had such experience. There were also significantly lower risks of death from all causes and cancers among women who had ever undergone mass screening examination for breast cancer. Similar results were found among those who habitually administered self examination for breast cancer. One report in the JACC Study revealed that men and women with low interest and with no participation in health screening were at high risk for developing cardiovascular disease and all-causes of mortality (Ikeda et al., 2005; Aklimunnessa et al., 2006). It is well known that people who volunteer for cancer screening are generally more health conscious than

who do not, and they have better lifestyle. This is one of reasons why those subjects who participated in cancer screening for female had reduced mortality.

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