Journal of Epidemiology and Community Health 1996;50:104–105

Short reports

Geographical distribution of risk factors and incidence of invasive cervical cancer in south east China

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Accepted for publication September 1995

(*J Epidemiol Community Health* 1996;50:104–105)

Cervical cancer is a major public health problem in China. The 132 000 new cases estimated to occur each year represent 28% of the world incidence of cervical cancer.[1] Few studies have been conducted to investigate risk factors of invasive cervical cancer in the Chinese population.[2 3] We conducted this analysis to investigate the geographic distribution of several potential risk factors, and its relationship to the incidence of cervical cancer in a rural population in south east China, in order to shed light on the effect of geographic characteristics on the aetiology of cervical cancer.

Methods: The study was conducted within the framework of a cervical screening programme in the Jingan County of China. A total of 16 797 women aged 25 years or more were followed at least once during the study period from 1974–85. Women were interviewed at their first screening using a standard questionnaire. Information obtained included: demographic variables, menarche history, fertility and reproductive histories, marital status, and family history of cancer. Additional information gathered from 1984–85, included personal habits, hygiene factors, sexual behaviour, and husband's sexual behaviour. The associations between geographic areas as well as other potential risk factors and cervical cancer were first examined by using the Mantel-Haenszel χ^2 test for density follow up study.[4] The proportional hazards model[5] was used in multivariate analysis to examine the association between geographical areas and cervical cancer when potential confounding factors were adjusted for in the model. Relative risks and their 95% confidence intervals were estimated and trend tests were performed.

Multivariate analysis on the risk of cervical cancer by proportional hazards model

Risk factors	*Relative risk*	*(95% CI)*
Geographical area:		
Plain	1·00	
Hills	1·74	(0·89,3·38)
Mountain	2·38	(1·25,4·54)
Trend test	p=0·0076	
Trichomonas vaginitis	3·30	(1·48,7·35)
No of extramarital sexual partners	1·35	(1·13,1·60)
No of husband's extramarital sexual partners	1·24	(1·05,1·47)
Cigarette smoking	1·63	(1·00,2·67)
Irregular menstruation	2·49	(1·50,4·13)
Age	1·04	(1·02,1·06)
Cervical atrophy	1·08	(0·61,1·92)
Age at first birth	1·04	(0·99,1·08)
Parity	1·03	(0·94,1·14)
No of negative smears	0·51	(0·45,0·59)

In proportional hazards model, trichomonas vaginitis, cigarette smoking, irregular menstruation, and cervical atrophy were coded at 0 for no and 1 for yes; and numbers of the subject's and her husband's extra sexual partners, age, age at first birth, parity, and number of negative smears were continuous variables.

Results: Ninety nine incident cases of pathologically confirmed invasive squamous cell carcinoma were identified from the cohort after a total of 140 018 person years of observation. The crude incidence rate of cervical cancer was 70·7 per 100 000 in Jingan County. The incidence rates (/100 000) were remarkably high among women who lived in the mountain area (105·6), moderate in the hill area (81·9), and lower among women who lived in the plain (32·2). Although the age specific incidence rates were increased with age in all three geographical areas, the age specific rate in the mountain area was the highest among most age groups and that in the plain was the lowest. In univariate analysis, the relative risks were 2·50 (95% CI 1·40,4·47) in the hill area and 3·30 (95% CI 1·90,5·75) in the mountain area in comparison to the plain. All variables which were significantly associated with cervical cancer in the univariate analysis were included in a proportional hazards model in the multivariate analysis. After controlling for potential confounding factors listed in the table, the relative risks for cervical cancer were 1·74 (95% CI 0·89, 3·38) for women living in the hill area and 2·38 (95% CI 1·25, 4·54) for women residing in the mountain area, compared to women living in the plain (trend-test: p=0·0076). Aside from geographical area, many other factors were found to be associated with increased risk of cervical cancer. Women who had extramarital partners or likewise women with husbands who had extramarital sexual partners had an increased risk of cervical cancer. The relative risk was 1·6 for women who smoked cigarettes compared with women who were not smokers. Women with irregular menstruation had a relative risk of 2·49 compared with those whose menstrual cycle was regular. The number of negative smears was strongly associated with a decreased risk of cervical cancer (table).

Conclusions: The association between geographical area and cervical cancer persists after controlling for 10 other factors. The results are consistent with a multiple infectious aetiology of cervical cancer and suggest that there may be additional risk factors associated with geographical characteristics.

We thank Drs D M Parkin, N E Day and J Esteve for their many helpful discussions on this project when Dr. Zhang worked at International Agency on Cancer. This work was supported in part by a Cancer Research Grant from the Chinese Scientific Committee, a Research Fellowship by the International Agency for Research on Cancer, grants no CA 11535 from the National Cancer Institute, and no R01 ES 06718 from the national institute of Environmental Health Sciences, PHHS.

1 Parkin DM, Laara E, Muir CS. Estimates of the worldwide frequency of sixteen major cancers in 1980. *Int J Cancer* 1988;**41**:184–97.
2 Zhang ZF, Parkin DM, Yu SZ, Esteve J, Yang XZ. Risk factors for cancer of the cervix in a rural population in China. *Int J Cancer* 1989;**43**:762–7.
3 Zhang ZF, Graham S, Yu SZ, *et al.* Trichomonas vaginalis and cervical cancer: A prospective study. *Ann Epidemiol* 1995;**5**:325–332.
4 Kleinbaum DG, Kupper LL, Morgenstern H. *Epidemiologic research: principles and quantitative methods.* New York: Van Nostrand Reinhold, 1982.
5 Cox DR. Regression modles and life tables (with discussion). *J R Stat Soc B* 1972;**34**:187–220.

Desire for the body normal: body image and discrepancies between self reported and measured height and weight in a British population

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Accepted for publication August 1995

(*J Epidemiol Community Health* 1996;**50**:105–106)

In surveys of self reported height and weight a systematic bias towards declaring more inches and fewer pounds than is confirmed by subsequent objective measurement has been noted.[1 2] A recent analysis of 11 284 participants in the North American national health and nutrition examination survey found that weight and height were reported with only small errors on average, but misclassification was significant within important subgroups. Heavier people under reported their weight and exaggerated their height more than lighter people. It was concluded that these systematic discrepancies were consistent with American cultural ideals.[3] Data are therefore presented to examine the possibility that these biases may be found in a British population.

During the OXCHECK trial of nurse health checks in general practice, a health and lifestyle questionnaire was completed at the study outset. A health check was subsequently performed and the information from these enables the comparison of self reported height and weight, and also body image, with objective meas-

Table 1 Discrepancies in reported height (in) by measured body mass index

	BMI <20	(95% CI)	BMI 20–24	(95% CI)	BMI 25–29	(95% CI)	BMI >30	(95% CI)
Men								
No	13		392		424		86	
All	0·23	NS	0·35	(0·24,0·46)	0·38	(0·28,0·48)	0·62	(0·41,0·81)
Age group:								
35–44	0·40	NS	0·31	(0·15,0·47)	0·27	(0·08,0·47)	0·54	(0·17,0·92)
45–54	0·33	NS	0·32	(0·12,0·51)	0·37	(0·22,0·52)	0·60	(0·22,0·98)
55–65	0·50	NS	0·47	(0·26,0·69)	0·49	(0·28,0·70)	0·47	(0·27,1·06)
Women								
No	61		542		370		181	
All	0·15	NS	0·37	(0·20,0·46)	0·44	(0·34,0·56)	0·64	(0·48,0·79)
Age group								
35–44	0·13	NS	0·18	(0·03,0·33)	0·21	(0·16,0·26)	0·40	(0·13,0·66)
45–54	−0·25	NS	0·27	(0·11,0·42)	0·41	(0·26,0·56)	0·30	(0·11,0·50)
55–64	0·46	NS	0·87	(0·69,1·04)	0·68	(0·45,0·92)	1·13	(0·86,1·41)

Table 2 Discrepancies in weight (lb) by measured body mass index

	BMI <20	(95% CI)	BMI 20–24	(95% CI)	BMI 25–29	(95% CI)	BMI >30	95% CI
Men								
No	3		378		435		58	
All	5·67	NS	−0·31	NS	−2·72	(−3·43, −1·99)	−6·98	(−9·56, −4·40)
Age group:								
35–44	(1)	NS	−1·60	(−2·56, −0·64)	−4·44	(−5·61, −3·27)	−10·26	(−16·6, −4·54)
45–54	(1)	NS	−0·33	NS	−1·88	(−3·08, −0·69)	−5·59	(−10·7, −0·50)
55–64	(1)	NS	1·69	(0·22,3·15)	−1·95	(−0·55, −0·36)	−5·23	(−8·39, −2·07)
Women								
No	41		534		385		131	
All	1·66	NS	−1·07	(−1·60, −0·53)	−4·04	(−4·88, −3·20)	−7·34	(−9·22, −5·46)
Age group:								
35–44	0·90	NS	−1·76	(−0·95, −2·56)	−5·73	(−7·43, −4·03)	−10·38	(−13·8, −6·96)
45–54	2·00	NS	−0·97	(−0·10, −1·84)	−3·95	(−5·37, −2·53)	−7·28	(−10·4, −4·22)
55–64	5·60	NS	0·13	NS	−2·68	(−3·92, −1·44)	−5·66	(−8·76, −2·56)

Note: measures above the 95th and below the 5th percentile have been excluded.