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## SOCIAL ISSUES IN REPRODUCTIVE HEALTH

# Factors affecting uptake of cervical cancer screening among Chinese women in New Zealand

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Received 13 March 2008; received in revised form 29 April 2008; accepted 29 April 2008

### KEYWORDS

Cervical cancer;  
Cervical screening;  
Chinese women;  
New Zealand;  
PRECEDE model

### Abstract

*Objective:* To examine the factors affecting uptake of cervical cancer screening among women born in China now living in Auckland, New Zealand. *Method:* A community-based pilot study of 260 women surveyed by questionnaire between November 2006 and February 2007 to ascertain the uptake of cervical screening. *Results:* Of 234 returned questionnaires, 152 women (65%) reported being screened in New Zealand and 56% had been screened in the last 3 years. The 4 most important predictive factors affecting uptake were the women's belief that cervical smear tests are necessary for asymptomatic women, having a family doctor, having received gynecologic, obstetric, and family planning services in New Zealand, and having ever received a recommendation for a cervical smear test. *Conclusion:* The most important influential factors affecting uptake of cervical screening among Chinese women in New Zealand are women's belief in its value and their engagement in general and women's health services.

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## 1. Introduction

Invasive cervical cancer is the second most common cancer among women in mainland China [1]. Several studies have suggested that Chinese women living in North America have

higher incidence rates of cervical cancer than the general population [2,3], and that this higher prevalence is due in part to inadequate cervical screening [4,5].

International studies have also found that sociodemographic factors such as older age, marital status, being born in mainland China, lower education, lower household income, and less acculturation were associated with women having fewer smear tests [4–6]. In addition, factors associated with the uptake of screening were the belief among women that cervical cancer screening prevents cancer, general knowledge about the smear test, concern about pain/discomfort with the test, availability of time,

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culturally sensitive health care services, recommendation for screening from a physician, and having previously obtained family planning and obstetric services [5,7].

In New Zealand the National Cervical Screening Program (NCSP) reported that the screening coverage rate was about 45% in Asian women, a low rate compared with the national level of 73% [8]. Despite this low coverage and the growing Asian population, which currently accounts for 9.2% of the total population in New Zealand [9], there are no published statistics on cervical cancer in Asian women.

In response to the lack of research into screening uptake and the reasons behind the low rate of uptake in Asian women in New Zealand, we conducted a pilot study focusing on female immigrants from mainland China living in the Auckland region. The aim was to investigate the cervical screening practices of these women, their knowledge of cervical screening and risk factors for cervical cancer, and the factors affecting screening uptake that could be used to develop intervention strategies for Chinese women. We decided to study Chinese women living in the Auckland region because two-thirds of Asian people are located in the Auckland area, and 45% are Chinese [10]. We have previously reported the demographic predictors of cervical screening uptake in this population [11].

## 2. Materials and methods

This was a community-based pilot survey conducted by questionnaire and focus group interview between November 2006 and February 2007. We partnered with the Chinese New Settlers Services Trust (CNSST), a local nongovernmental organization, to recruit participants through their database. The researchers also used personal networks and their affiliations with ethnic community organizations. To promote the survey and enhance recruitment, information about the study was publicized via posters in Chinese distributed in community settings and in Chinese newspapers. The study was approved by the ethics committee of Auckland University of Technology.

Women were eligible to participate in the study if they had been born in mainland China, currently resided in Auckland, and were aged between 20 and 69 years. Questionnaires were sent to 260 eligible women and 234 were returned. Of these 234, 190 were recruited through CNSST, 33 through personal networks, and 11 through an advertisement.

The PRECEDE model [12] was used to develop the survey questionnaire and for analysis. According to PRECEDE, factors affecting behavior can be broadly grouped into enabling, predisposing, and reinforcing factors. Enabling factors are those skills and resources that positively or negatively facilitate change, for example, knowledge about cervical cancer risk factors. Predisposing factors include an individual's attitudes, beliefs, perceptions, and values. Reinforcing factors include social support of behavior by influential sources. This model has been successfully used in studies of immigrant women's uptake of breast and cervical cancer screening [4–7,13,14].

Sociodemographic data were collected regarding the women's age, marital status, education level, employment, income, housing status (owned, rented), duration of residence in New Zealand, and fluency in speaking English. To assess uptake of cervical screening, participants were asked whether they had ever been screened with a cervical smear test in New Zealand and, if so, whether they had been screened recently (within the last 3 years).

Enabling factors that were assessed included past medical history, as well as difficulties accessing health care. Participants were asked whether their access to health care was limited by concerns about cost, problems finding a medical interpreter, problems getting routine medical appointments, and transportation difficulties. The women's knowledge of cervical cancer and cervical smear tests was also questioned. Traditional (versus biomedical) orientations toward health and disease, as well as beliefs about smear tests were considered important predisposing factors for the uptake of screening. Reinforcing factors included 3 questions developed from other studies [5,7]. In addition, another 3 questions were developed about the role of the media and social marketing used by the NCSP. The survey questions were developed in English, translated into Chinese, piloted, and revised and reconciled by 2 translators.

Descriptive analysis was conducted to summarize the characteristics of the sample. Primary analyses included comparisons of the proportion of women who had been screened with a cervical smear test with all possible factors that may affect uptake. A secondary analysis compared the proportion of women screened recently. The  $\chi^2$  test and, where appropriate, Fisher exact test were used to assess statistical significance in bivariate comparisons. Separate multivariate logistic regression analyses were performed to summarize the independent effects within each group of factors. Backward elimination procedures were then used to select the most important risk and protective factors from the independent sociodemographic factors identified in the previous report [11] and those identified through the above process.

The adjusted odds ratios and 95% confidence intervals were reported for the effects. A significance level of 0.05 was used for all calculations.

## 3. Results

Of the 234 respondents, 80.3% were married, 80.7% had tertiary or postgraduate education, 47% were employed, 62.4% could converse in English, and 38% had religious beliefs. The mean age of the participants was  $41 \pm 10.6$  years (range, 20–69 years), and the mean duration of time living in New Zealand was  $6 \pm 3.8$  years.

A total of 152 women (65.0%; 95% CI, 58.5–71.1) reported having been screened in New Zealand and 56.0% (95% CI, 49.4–62.4) reported that they had been screened within the last 3 years.

The number of women who had been screened in New Zealand, the number who had been screened recently, and the comparisons with the possible factors (enabling, predisposing, reinforcing) affecting uptake of screening are presented in Table 1. The factors that were significantly associated with having been screened in New Zealand were: (1) the thought that cervical smear tests are necessary for asymptomatic women; (2) the thought that cervical smear tests are necessary for postmenopausal women; (3) concern about pain or discomfort; (4) having a family doctor; (5) having received gynecologic, obstetric, and family planning services in New Zealand; (6) having health insurance; (7) having transportation difficulties with medical appointments; (8) having ever received a recommendation for a cervical smear test from doctors, nurses, family members, or friends; and (9) having received or seen pamphlet information about the cervical screening program in English or in Chinese. All of the above factors, except the belief that cervical smear tests are necessary for postmenopausal

**Table 1** Factors affecting screening uptake in Chinese women screened for cervical cancer in New Zealand and screened recently

Factor	Category	Total		Ever screened		Recently screened	
		No.	%	%	P value	%	P value
<i>Predisposing factors</i>							
Believed getting cancer is a matter of fate	No	158	70.2	63.9	0.999	55.1	0.628
	Yes	28	12.4	64.3			
	Don't know	39	17.3	64.1			
Believed cancer can be prevented by faith	No	131	58.0	63.4	0.291	55.7	0.331
	Yes	52	23.0	59.6			
	Don't know	43	19.0	74.4			
Thought cancer can be caused by an imbalance of yin and yang	No	84	37.0	64.3	0.992	57.1	0.971
	Yes	51	22.5	64.7			
	Don't know	92	40.5	65.2			
Thought cancer can be caused by poor qi and blood circulation	No	95	42.2	64.2	0.212	55.8	0.399
	Yes	42	18.7	54.8			
	Don't know	88	39.1	70.5			
Believed cervical smear tests can help prevent cancer	No	46	20.4	63.0	0.284	54.3	0.742
	Yes	161	71.2	65.8			
	Don't know	19	8.4	47.4			
Thought cervical smear tests are necessary for asymptomatic women	No	11	5.0	27.3	<0.0001	18.2	0.001
	Yes	185	84.5	69.7			
	Don't know	23	10.5	39.1			
Thought cervical smear tests are necessary for sexually inactive women	No	17	7.5	64.7	0.408	64.7	0.656
	Yes	172	76.1	65.7			
	Don't know	37	16.4	54.1			
Thought cervical smear tests are necessary for postmenopausal women	No	5	2.2	20.0	0.043	20.0	0.187
	Yes	194	86.6	66.5			
	Don't know	25	11.2	52.0			
Concerned about embarrassment	No	130	58.8	70.8	0.053	60.0	0.239
	Yes	68	30.8	54.4			
	Don't know	23	10.4	56.5			
Concerned about pain or discomfort	No	130	58.6	73.8	<0.0001	62.3	0.004
	Yes	71	32.0	56.3			
	Don't know	21	9.5	33.3			
Concerned about cancer being discovered	No	148	66.7	67.6	0.360	55.4	0.965
	Yes	54	24.3	59.3			
	Don't know	20	9.0	55.0			
Believed cervical smear test should be done by gynecologists or specialists	No	34	15.2	79.4	0.112	76.5	0.031
	Yes	173	77.2	61.3			
	Don't know	17	7.6	70.6			
<i>Enabling factors</i>							
General health	Good	106	5.7	63.2	0.321	53.8	0.411
	Fair	125	53.9	67.2			
	poor	1	0.4	0			
Having a doctor	No	33	14.3	24.2	<0.0001	18.2	<0.0001
	Yes	198	85.7	71.7			
Having received gynecologic, obstetric, and family planning services in New Zealand	No	97	42.2	30.9	<0.0001	29.9	<0.0001
	Yes	133	57.8	89.5			
Health insurance	No	143	61.6	58.0	0.008	49.7	0.021
	Yes	89	38.4	75.3			
Concern about the cost of seeing a doctor	No	67	30.0	59.7	0.419	52.2	0.566
	Yes	156	70.0	65.4			
Require interpreter services to access a health service	No	126	56.0	69.8	0.079	61.1	0.111
	Yes	99	44.0	58.6			
Having problems getting routine medical appointments	No	194	85.8	68.0	0.099	57.7	0.414
	Yes	32	14.2	53.1			

Table 1 (continued)

Factor	Category	Total		Ever screened		Recently screened	
		No.	%	%	P value	%	P value
<i>Enabling factors</i>							
Transportation difficulties with medical appointments	No	188	83.2	70.2	0.001	60.1	0.019
	Yes	38	16.8	42.1		39.5	
<i>Reinforcing factors</i>							
Received a recommendation for a cervical smear test from doctors, nurses, family members, or friends	No	105	46.5	39	<0.0001	32.4	<0.0001
	Yes	121	53.5	86.8		76.0	
Received or seen pamphlet about cervical screening program in English	No	147	63.6	51	<0.0001	43.5	<0.0001
	Yes	84	36.4	88.1		76.2	
Received or seen pamphlet about cervical screening program in Chinese	No	177	77.3	59.3	0.001	49.7	0.001
	Yes	52	22.7	84.6		76.9	
Heard via media or read in newspapers or the internet about the cervical screening program	No	144	63.2	61.1	0.115	52.1	0.150
	Yes	84	36.8	71.4		61.9	

women, were also associated with having been screened recently. In addition, the belief that cervical smear testing should be done by gynecologists or specialists was significantly associated with having been screened recently.

The separate multivariate logistic regression analyses for the groups of variables listed in Table 1 and the overall model to incorporate the factors selected from each subgroup model are presented in Table 2. The most important predictive factors were: (1) the thought that cervical smear tests are necessary for asymptomatic women; (2) having a family doctor; (3) having received gynecologic, obstetric, and family planning services in New Zealand; and (4) having ever received a recommendation for a cervical smear test from doctors, nurses, family members, or friends. No sociodemographic factors were retained in the overall models.

After controlling for confounding factors, women who thought cervical smear tests were necessary for asymptomatic women were more than 10 times as likely to have been screened and screened recently compared with women who did not think smear tests were necessary for asymptomatic women. A four-fold odds of having been screened either ever or recently was found for women who had a family doctor. Adjusted odds ratios of 21.9 for women who had been screened and 6.0 for those screened recently were found for women who had received gynecologic, obstetric, and family planning services in New Zealand compared with women who had not received these services. The corresponding odds were 7.2 for women who had been screened and 4.7 for those screened recently for women who had received a recommendation for a smear test compared with those who had not.

#### 4. Discussion

We have previously reported that age and duration of residence are the most important sociodemographic factors

associated with both having been screened and screened recently for Chinese women living in New Zealand [11]. The present paper extends this work to examine the relevant enabling, predisposing, and reinforcing factors associated with uptake of cervical screening.

Our findings suggest that the most important influential factors are women's belief in the value of cervical screening, their engagement in general health services such as having a family doctor, and having received gynecologic, obstetric, or family planning services in New Zealand. In addition, receiving a recommendation for a cervical smear test, no matter whether it was from professionals, family members or friends, is an influential factor. Surprisingly, cultural beliefs about the causes of cancer such as fate, unbalanced yin and yang, poor qi or blood circulation did not have an influence on the uptake of cervical screening. These findings are in line with other studies on the Chinese emigrant population [5,7]. A strong association between physicians' recommendations and women's use of cancer screening tests has been documented in diverse populations [15–17], demonstrating the importance of primary care relationships and engagement.

Although age and years lived in New Zealand were found to be associated with cervical screening practice in the model that only considered sociodemographic factors [11], the effects of these two factors diminished and were no longer statistically significant after introducing other important factors.

Our findings suggest that health promotion and education about the importance of routine smear tests are critical for Chinese women's participation in cervical cancer screening. Only when a woman understands the importance of screening does she take the initiative to enroll and participate in the program. When a woman has a health provider or is engaged with gynecologic, obstetric, and family planning services she has a better chance of taking part in public health prevention programs. Crucially, personal networks are vital for seeking and sharing information. Some researchers also argue that

doctors and friends represent the two most significant sources of information on health for Chinese emigrant women [18].

In North America, extensive and tailored educational programs and research to target underserved communities has a major role in reducing health inequalities across ethnic communities [19–21]. A randomized controlled trial of

interventions to promote cervical cancer screening among Chinese women in North America found that interventions such as culturally and linguistically appropriate outreach and direct mail can enhance cervical screening participation [20].

One of the goals of the New Zealand Health Strategy is to monitor the health of all New Zealanders and monitor

**Table 2** Adjusted odds ratios of Chinese women screened for cervical cancer in New Zealand and those screened recently by the four groups of factors affecting uptake

Factor	Category	Total		Ever screened		Recently screened	
		No.	(%)	OR	(95% CI)	OR	(95% CI)
<i>Sociodemographic factors (model 1: n=232)</i>							
Age, y	20–29	24	(10.3)	Ref		Ref	
	30–49	161	(68.8)	9.65	(3.16–29.49) <sup>a</sup>	6.55	(2.28–18.83) <sup>a</sup>
	50+	33	(14.1)	0.97	(0.26–3.65)	0.73	(0.19–2.80)
	Unknown	16	(6.8)	8.95	(1.59–50.47) <sup>b</sup>	5.83	(1.24–27.43) <sup>c</sup>
Years lived in New Zealand	0–4	98	(41.9)	Ref		Ref	
	5–9	75	(32.1)	4.15	(1.95–8.85) <sup>a</sup>	2.10	(1.16–3.80) <sup>b</sup>
	10+	53	(22.6)	7.28	(2.6–20.10) <sup>a</sup>		
	Unknown	8	(3.4)	1.78	(0.25–12.43)	1.08	(0.19–6.26)
<i>Predisposing factors (model 2: n=208)</i>							
Thought cervical smear tests are necessary for asymptomatic women	No	11	(5.3)	Ref		Ref	
	Yes	176	(84.6)	6.03	(1.54–23.59) <sup>c</sup>	9.75	(1.85–51.30) <sup>c</sup>
	Don't know	21	(10.1)	1.33	(0.27–6.65)	2.13	(0.30–15.15)
Believed cervical smear test should be done by gynecologists or specialists	No	31	(14.9)	–		Ref	
	Yes	161	(77.4)	–		0.30	(0.11–0.79) <sup>b</sup>
	Don't know	16	(7.7)	–		0.50	(0.12–2.08)
<i>Enabling factors (model 3: n=201)</i>							
Have a doctor	No	28	(13.9)	Ref		Ref	
	Yes	173	(86.1)	4.89	(1.57–15.21) <sup>c</sup>	4.88	(1.61–14.74) <sup>c</sup>
Have received gynecologic, obstetric, and family planning services in New Zealand	No	83	(41.3)	Ref		Ref	
	Yes	118	(58.7)	22.27	(9.75–50.86) <sup>a</sup>	7.89	(4.01–15.50) <sup>a</sup>
Health insurance	No	118	(58.7)	Ref		Ref	
	Yes	83	(41.3)	2.88	(1.25–6.64) <sup>b</sup>	2.06	(1.03–4.11) <sup>b</sup>
<i>Reinforcing factors (model 4: n=216)</i>							
Received a recommendation for a cervical smear test	No	101	(46.8)	Ref		Ref	
	Yes	115	(53.2)	7.64	(3.78–15.42) <sup>a</sup>	5.15	(2.76–9.60) <sup>a</sup>
Received or seen pamphlet about cervical screening program in English	No	139	(64.4)	Ref		Ref	
	Yes	77	(35.6)	5.17	(2.18–12.25) <sup>a</sup>	2.64	(1.34–5.23) <sup>c</sup>
<i>All factors (model 5: n=202)</i>							
Thought cervical smear tests are necessary for asymptomatic women	No	11	(5.4)	Ref		Ref	
	Yes	169	(83.7)	23.29	(3.37–160.91) <sup>a</sup>	11.68	(1.91–71.35) <sup>c</sup>
	Don't know	22	(10.9)	5.63	(0.63–50.09)	3.28	(0.39–27.36)
Having a doctor	No	31	(15.3)	Ref		Ref	
	Yes	171	(84.7)	3.95	(1.13–13.81) <sup>b</sup>	3.73	(1.19–11.68) <sup>b</sup>
Having received gynecologic, obstetric and family planning services in New Zealand	No	83	(41.1)	Ref		Ref	
	Yes	119	(58.9)	21.94	(8.57–56.15) <sup>a</sup>	6.0	(2.84–12.70) <sup>a</sup>
Received a recommendation for a cervical smear test	No	97	(48.0)	Ref		Ref	
	Yes	105	(52.0)	7.19	(2.93–17.65) <sup>a</sup>	4.74	(2.28–9.85) <sup>a</sup>

<sup>a</sup>  $P < 0.05$ .

<sup>b</sup>  $P < 0.01$ .

<sup>c</sup>  $P < 0.001$ .

inequalities in health between ethnic groups [22]. Considerable progress has been made over the past decade toward monitoring the health of Maori, Pakeha, and Pacific ethnic groups, but little research has been conducted for Asian peoples [23]. The authors note that much can be learned from the findings of international studies, but more domestic public health research needs to be conducted among the growing Asian communities in New Zealand. The feasibility of undertaking community trials to examine the efficacy of different types of interventions needs to be explored. Significantly, in September 2007 a national social marketing campaign encouraging women to have regular cervical smears as part of the NCSP was launched in New Zealand. However, it omitted Asian women, even though Asian people make up 9.2% of the population [24]. It is hoped that the campaign will raise women's awareness of the program so that the rates of coverage can be increased toward the target of 75% among all population groups. To achieve this goal, a tailored, conceptually equivalent and culturally appropriate educational program that can be incorporated into the national screening program should be urgently developed for Asian women.

The present study is significant in that it contributes to our increased understanding of cervical screening practice among Chinese women living in New Zealand, the largest Asian subpopulation. The strengths of the study include the community-based sampling method that involved Chinese community service providers. However, several limitations should be acknowledged. Firstly, only women living in the Auckland area, where there is a high density of Chinese residents, were included. It is unknown to what extent our findings can be generalized to other geographic areas, where there are fewer Chinese residing. Secondly, the principal method of recruitment via CNSST networks could have caused a selection bias. It is possible that because our respondents were engaged with an ethnic community organization they had a different uptake of cervical screening compared with those not engaged with an ethnic community organization, or with those who were approached but refused to participate. Thirdly, there may have been measurement errors caused by using a self-reported assessment of screening. A previous study found that there was a concordance of 78% between the patients' reports and their medical records. Most discordance was from women who reported having had a test but had no record of testing [25]. The possible bias could partly explain the higher uptake rate in our sample compared with government statistics [8]. Finally, because this was a pilot study, our sample size was small, which limited the power to identify the independent effects of some important factors.

Despite these limitations, the present study has identified some important factors affecting access to cervical cancer screening for Chinese women living in the Auckland area. Our findings suggest that there is a need for culturally sensitive and linguistically appropriate educational material to increase the awareness and understanding of cervical cancer and the benefits of cervical screening, and to increase discussion about cervical screening in order to get support from families, friends, and communities to encourage women to have regular screening. A cross sectional approach across primary health care, sexual and reproductive health services, and community organizations to discuss the program with their clients and encourage them to enroll in the program would enhance the

uptake of cervical screening. Furthermore, collaboration between healthcare workers, academic researchers, and community service agencies could lead to the development of a robust and powerful health promotion program.

## Acknowledgements

This study was supported by Auckland University of Technology internal contestable grant 06/183.

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