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The pattern of cervical cancer screening in Hong Kong

Background

Cervical cancer is an important cause of morbidity and mortality among women worldwide.¹ Compared to other developed countries, Hong Kong has a moderately high mortality rate for cervical cancer,² and is cited as a 'high risk' area for this by the International Agency for Cancer Research.³ Despite good evidence that effective prevention can be provided by screening,⁴ not all women attend and Hong Kong has no organised screening programme. There has been much research investigating reasons for screening attendance and non-attendance in different communities, and the factors associated with uptake. However, few have been done in Chinese populations. Although many industrialised countries have adopted organised screening programmes, this is by no means universal. Reported uptake of screening in regions with no organised programme varies widely and there are few studies formally comparing ad-hoc with organised programmes.

Aims and objectives

This study aimed to determine the coverage and frequency of cervical cancer screening among women in Hong Kong, describe the factors affecting attendance and non-attendance for screening, and use this information to make future policy decisions.

Methods

Study design

This was a cross-sectional study undertaken from August 1997 to May 1999, using telephone interviewing to survey a random selection of Chinese women in Hong Kong.

Subjects

Chinese women aged 20 years or older were included, and only those with a previous hysterectomy were excluded. A randomly selected household was contacted by phone, all eligible women in the household were identified and one was randomly selected and invited to participate. The sample size was chosen to allow estimation of coverage in three age bands (20-39, 40-59, ≥60 years). Only after sufficient numbers in an age-group were obtained, women in the other age-groups were then sampled. However, older women were still under-represented and so interviews of elderly centre attendees were used to supplement numbers in this group.

Study variables

The main outcome measure was coverage and frequency of Papanicolaou (Pap) smear screening. Diagnostic Pap smears were differentiated from screening smears by identifying those that were taken because of gynaecological symptoms or following an abnormal result. Those taken as part of a routine or opportunistic check-up were classed as screening smears. For those who had previously been screened, other outcomes were the frequency and regularity of screening. Respondents who had not been screened were asked about reasons for non-attendance. Information on knowledge and attitudes towards cervical cancer and screening, risk factors for cervical cancer, and perceived risk was obtained.

Key Messages

1. Cervical cancer is an important health problem in Hong Kong.
2. A large proportion (56%) of women in Hong Kong do not attend cervical cancer screening.
3. Those who are being screened have lower risk and are screened more frequently than necessary.
4. The current system is inadequate, inequitable, wastes resources and may result in harm due to over-screening low-risk respondents.
5. Introduction of an organised screening programme should improve effectiveness and efficiency.
6. To balance effectiveness and efficiency, a 4- to 6-yearly screening interval with target coverage of 80% is a reasonable option.
7. To be effective, an organised programme should have high coverage of target groups as its main aim.
8. Introducing such a programme would require commitment to adequate long-term resources, and development of agreed policies for screening methods, programme organisation, and monitoring.

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Table. Effectiveness and efficiency of adopting various screening policies, targeting all or selected groups in the population, and with varying screening interval and coverage (weighted for age, education levels, and living districts)

As the true incidence of cervical cancer in the absence of any screening was unknown, our estimation of benefits for organised screening was based on incidence calculated by the optimistic model (*) and the pessimistic model (†) of current screening patterns

Organised screening system	60% coverage	
	Range for % reduction in incidence (cases prevented)	Range for No. of smears per case prevented
Screen all women with the following screening intervals		
0-11 months	56.1* [†] (307 [†] - 329*)	4200* - 4500 [†]
12-23 months	55.5* [†] (304 [†] - 326*)	2123* - 2275 [†]
24-35 months	54.5* [†] (298 [†] - 320*)	1442* - 1545 [†]
36-47 months	52.3* [†] (286 [†] - 307*)	1127* - 1208 [†]
48-71 months	50.2* [†] (275 [†] - 294*)	939* - 1007 [†]
72-119 months	42.8* [†] (234 [†] - 251*)	688* - 738 [†]
≥120 months	22.5* [†] (123 [†] - 132*)	698* - 748 [†]
Age <40 ad hoc and age >40 with 3-4 yrs screening interval	48.4 [†] - 49.4* (265 [†] - 290*)	1279 [†] - 1399*
No screening for age <40 and age >40 with 3-4 yrs screening interval	41.0* - 41.1 [†] (225 [†] - 240*)	69 [†] * - 738 [†]
Private ad hoc plus 3-4 yrs organised screening for those insufficiently or never screened	56.1 [†] - 57.7* (307 [†] - 338*)	1378 [†] - 1379*
Current screening system*		
Optimistic*	31.1 (183)	2492
Pessimistic [†]	26.2 (144)	2018

Data analysis

Coverage and frequency of cervical screening

The coverage and screening frequency obtained was used to estimate the effectiveness (number of cases of invasive cervical cancer potentially prevented) and efficiency (tests per case prevented) of the current screening system. This was done by applying the estimated benefits of screening reported by a published analysis of data from large screening programmes in the west.⁵ When respondents had had two negative screens in the past, we assumed they would have some benefit. To classify their level of benefit, we determined the likely interval till their next screen. When this was unknown, we modelled it based on pessimistic (next screen will be 10 years or more after the last one) and optimistic (next screen will take place soon) assumptions.

Factors affecting attendance and non-attendance for screening

The associations between screening behaviour and several factors, including socio-demographic and behavioural factors, perceived risk, and knowledge and attitude towards screening were examined. Reasons for non-attendance and barriers to screening were described.

Informing future policy

Potential effectiveness and efficiency of various organised programmes with different screening intervals and coverage were estimated and compared with the current system.

Results

Characteristics of the sample

A total of 1826 women between the ages of 20 and 77 years

were interviewed, with an overall response rate of 61.6%. The 584 women in the 20-to-39-year age band were selected using only random digit dialling, and were similar in level of education and district of residence to the general population in that age-group. The other women were recruited partly through random digit dialling and partly through targeted sampling. In these groups, women with a lower level of education and those living in Kowloon are relatively under-represented. Where population estimates are given in subsequent analyses, weighting to compensate for under-representation of sub-groups has been used.

Coverage and frequency of screening

Excluding 111 (6.1%) women who had never had sexual intercourse, 792 (46.3%) respondents had ever had a Pap smear. This included 54 (6.8% of all tested) who had diagnostic smears. Thus screening coverage in this population was 43.1%. This is equivalent to coverage of 44.4% for all eligible women in Hong Kong (ie those over 20 years old with a previous sexual history), after standardising to the age structure of women in the region.

Among the respondents who have ever had a screening test in their lifetime, 160 (9.4%) had only had one such test and only 427 (25.0%) attended for regular screening. The majority of regular attendees (80.8%) attended at least once per year and 99% attended at least 3 yearly. The maximum screening interval was 3 to 4 years. A proportion (5.5%) attended for screening more than once per year.

Factors affecting attendance for screening

The majority of respondents had good knowledge about the risk of cervical cancer and the benefits of screening. Respondents who had previously had a screening test had significantly higher mean knowledge scores (1.44 and 1.30

Range for No. of Pap smear tests/year	Range for % reduction in incidence (cases prevented)	80% coverage	
		Range for No. of smears per case prevented	Range for No. of Pap smear tests/year
1 381 800 [†]	74.8 [†] (409 [†] - 439 [*])	4200 [*] - 4500 [†]	1 842 400 [†]
690 900 [†]	74.0 [†] (405 [†] - 434 [*])	2123 [*] - 2275 [†]	921 200 [†]
460 600 [†]	72.6 [†] (398 [†] - 426 [*])	1442 [*] - 1545 [†]	614 133 [†]
345 450 [†]	69.7 [†] (381 [†] - 409 [*])	1127 [*] - 1208 [†]	460 600 [†]
276 360 [†]	66.9 [†] (366 [†] - 392 [*])	939 [*] - 1007 [†]	368 480 [†]
172 725 [†]	57.0 [†] (312 [†] - 335 [*])	688 [*] - 738 [†]	230 300 [†]
92 120 [†]	30.0 [†] (164 [†] - 176 [*])	698 [*] - 748 [†]	122 827 [†]
338 710 [†] - 405 588 [*]	62.1 [†] - 63.1 [*] (340 [†] - 370 [*])	1160 [†] - 1246 [*]	394 045 [†] - 460 923 [*]
166 005 [†]	54.6 [*] - 54.8 [†] (300 [†] - 320 [*])	691 [*] - 738 [†]	221 340 [†]
422 914 [†] - 466 397 [*]	71.1 [†] - 72.6 [*] (389 [†] - 426 [*])	1319 [*] - 1333 [†]	518 675 [†] - 562 009 [*]
454 736	-	-	-
289 238	-	-	-

respectively, $t = -3.0$, $P = 0.003$) and attitude scores (0.87 and 0.34 respectively, $t = -8.4$, $P < 0.001$).

The reasons given for non-attendance were varied. The most common reasons were that respondents did not think they needed to, or that they did not know what the test was for. Apart from these, the most commonly reported reason for non-attendance was lack of time. Respondents who perceived the test as unnecessary, who did not want it or did not know what it was for, tended to be older. Fear, anxiety, pain, and humiliation appeared to be more common reasons among younger respondents. When asked about factors that would make it easier to attend for screening, the most common suggestion was increased publicity and education.

All respondents were asked how likely they were to attend for Pap screening in the future. Nearly two thirds stated that they were likely or very likely to attend. Respondents, who said they were unlikely or very unlikely to attend, tended to be older, in lower social class groups, and single. They were also less likely to have had a previous Pap smear, had less knowledge about cervical cancer and screening, and were less likely to believe they were personally at risk of cervical cancer. They were significantly more likely to think the test would be embarrassing and expect the clinical atmosphere to be cold and less likely to believe having a test would give them peace of mind.

Respondents who had been screened for cervical cancer, and who were regular attendees, were more likely to have lower risk for disease. Thus, they tended to be younger, non-smokers, in the higher social groups, and to have used the oral contraceptive pill. Only 38.4% of respondents

perceived their own risk of cervical cancer as low. There was a significant positive association between higher perceived risk and history of screening. There was also a significant increasing trend in the likelihood of having had a screening test with increasing levels of reported worry associated with cervical cancer. In summary, there was no relationship between objective risk and perceived risk, but perceived risk was a better predictor of previous screening.

Using a logistic regression model to explore factors associated with screening uptake in the last 5 years, we found that women who were younger, in higher socio-economic groups, and married were more likely to have attended for screening. About half the responders were born in Hong Kong. The rest were mainly born in Mainland China, though 4.8% were born in other Asian countries, and 0.2% in the west. Those born in Hong Kong were more likely to have attended for screening. Within Hong Kong, those living in Kowloon were least likely to have attended for screening. Women who had attended for cervical screening, were also more likely to have attended for a mammogram, to have regular dental check-ups, and to have never smoked.

Informing policy

Based on the Hong Kong population age-sex structure and age-group-specific incidence for cervical cancer in 1997, we estimated the potential percentage reduction in incidence of cervical cancer and the number of cases prevented in the present system of screening in Hong Kong. At best, the present system is likely to have prevented about 31.1% (183 cases), and more realistically, 26.2% (144 cases) of all potential new cases of invasive cancer.

We examined the effects of introducing various

organised screening programmes, and compared these with the current situation (Table). A programme with target coverage of 80% and a 3-to-4 yearly screening interval, would achieve a nearly 70% reduction in cervical cancer incidence. More frequent screening would lead to only a small increase in effectiveness (5% lower incidence), with a fall in efficiency (4-fold increase in smears). Extending the screening interval to 4 to 6 years would only lead to a small decrease in effectiveness (about 3%, 15 cases), while the efficiency would increase by a further 20%. A programme with 80% coverage and a 3-to-4 yearly screening interval would achieve more than double the benefit of the current system in terms of reduction of incidence (55% versus 26% with the current system).

Discussion

This was a large study of a representative sample of Hong Kong Chinese women in different age-groups, regarding their knowledge, attitudes, and screening practice in relation to cervical cancer.

Screening coverage

Our finding of 43% ever-screening coverage is likely to be an overestimate, and the proportion who are regular attendees are probably less than a quarter of all women. Analysis of screening programmes in the European Union found that coverage of 3-yearly screening varied from 50 to 82%.⁵ Generally higher coverage is reported in countries with centrally organised screening. Screening coverage was lowest among women over the age of 60 years.

Factors associated with screening uptake

In this study population, screening uptake was higher among younger women, those in higher socio-economic groups, those who engage in other health promoting behaviour, and those who perceive that they are personally at risk of cervical cancer. Lack of knowledge about the Pap test and not perceiving it as necessary were the major reasons for non-uptake of screening. In countries where there is organised screening, not wanting to attend or believing that screening is unnecessary also account for a large proportion of non-attendance.⁶ Those with more risk factors were less likely to have been screened. However, perceived risk was closely related to screening attendance. Personal susceptibility has been shown to be a motivator for screening attendance in other studies and there is evidence that educational messages to change risk perception can result in behaviour change.

Effectiveness and efficiency of screening

An organised screening programme aiming to achieve at least 80% coverage across all age-groups would be most effective. A less effective but more efficient system would

target those over 40 years old. Effectiveness increases with increasing coverage whilst reducing the screening interval has less effect. The current system of ad-hoc screening in Hong Kong is likely to be less effective than we would expect from an organised 10-yearly screening programme achieving a low coverage of 60%. The current system is also inefficient, with 20 to 25% of women being over-screened. Our findings are consistent with other studies, suggesting that targeting older women would be very efficient and quite effective. An organised system would improve the efficiency and cost effectiveness of screening in terms of Pap smears per case prevented.

Conclusion

The current cervical screening system achieves poor coverage, is inequitable, wastes resources, and may result in more harm as a result of over-screening low-risk women. It is also less effective and efficient than organised programmes elsewhere. Special attention should be focused on encouraging uptake among older women. Based on our findings, maximum effectiveness at best efficiency would occur with a 4-to-6 yearly screening interval. A shorter screening interval would increase effectiveness by up to 5% (yearly screening), but at 5 times the cost. Since lack of knowledge about the Pap smear was the main reason for non-attendance, women need to be offered more information on Pap screening, its benefits and potential harms to be able to make informed choices about screening.

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