

# Evaluation of a Pap smear screening program for elderly women in Hong Kong

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## Abstract

**Aim:** To evaluate the outcome of a cervical cancer screening program in a population of elderly women (age  $\geq 65$  years) in Hong Kong.

**Methods:** A retrospective audit was undertaken on the results of the cervical smear examinations performed on 9950 clients attending the Elderly Health Centers. A wooden Ayre's spatula was used to perform the Papanicolaou (Pap) smear in all the subjects. In patients with specific indications a cytobrush was also used. The outcome was measured in terms of the number of unsatisfactory smears, and the possible causes were analyzed.

**Results:** The unsatisfactory rate of the Pap smear examination was 7.8%, and this was inversely related to less than 3 months obstetrics and gynecology training of the family doctor in each center, but was not related to the years of clinical experience of the practitioner.

**Conclusions:** The quality of the Pap smear could be improved by providing more hands-on training for the doctors, preferably in obstetrics and gynecology, and possibly by using a better instrument for sample taking (e.g. combination spatula and brush).

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**Key words:** elderly, cervical cancer, Pap smear, screening.

## Introduction

Cervical cancer is the fourth most common cancer among women in Hong Kong, with an age-standardized incidence rate of 9.8 per 100 000; there were 436 new cases registered in 1999.<sup>1</sup> Papanicolaou (Pap) smear as a screening tool remains a very effective way to reduce the incidence and mortality of cervical cancer.<sup>2</sup> However, the sensitivity and specificity of Pap smear screening has always been an important issue and the false negative rate is of particular concern because of the clinical consequences. The majority of false negative results have been shown to be caused by sampling error, which may relate to the technical competence of the health care workers.<sup>3,4</sup> Information on these issues, especially in relation to the yield of cervical screening in the elderly population is limited.

The Elderly Health Service in Hong Kong was established by the Department of Health in 1998 with the aim of promoting the health of the elderly population and to prevent diseases at the primary health care level. There are 18 Elderly Health Centers evenly distributed throughout Hong Kong and they provide health assessment, screening and education to approximately 45 000 patients per year, with a coverage rate of approximately 6% of the elderly population in Hong Kong. There is one family physician in each center with nursing and paramedical support. Cervical cancer screening by Pap smear examination is part of the health assessment protocol.

The aim of the present study was to evaluate the ongoing organized cervical cancer screening program and to assess whether a relationship exists between the yield of unsatisfactory smears and prior obstetrics and gynecology training of the medical staff.

## Methods

### Sample

The subjects of the present study were women aged 65 years and over who had enrolled for an annual

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health assessment in one of the 18 Elderly Health Centres during the year 2000. All women, except those who had never been sexually active or who had had a previous hysterectomy, were offered cervical cancer screening during this visit.

### Study design

This was a retrospective study based on reviewing data from the Pap smear screening program. Pap smear examinations were performed in the clinic by a family physician after obtaining verbal consent from the patient. The years of experience of the family physician after graduation and the duration of obstetrics and gynecology (O & G) training in a hospital-based O & G department were subsequently obtained from personnel records.

All doctors were instructed to adopt a similar technique in performing the Pap smear as laid down by the clinical practice guideline developed by the Elderly Health Service. The patient was supine on a standard examination couch. A suitably sized speculum lubricated with water was inserted in the vagina and the position of the speculum was adjusted so that the cervix could be seen with a well-lit examination lamp. Wooden Ayre's spatulas were used. Because of the upward migration of the transformational zone in elderly women, the elongated end of the Ayre's spatula was used. It was inserted into the cervical opening (os) with gentle pressure. A few rotations were made to collect the cells, which were then transferred to a glass slide and the sample was quickly fixed with a fixative agent. A cervical cytobrush was also used in addition to the Ayre's spatula for those patients who had a history of cervical pathology, a very small cervical os or a previously unsatisfactory Pap smear examination.

All the Pap smears were sent to the pathology laboratory of the Department of Health, where the 1991 Bethesda System was used for reporting. The slides were examined by qualified and experienced cytopathologists. The yield of the Pap smear was then analyzed.

### Data analysis

Data were analyzed using the SPSS 11.0 statistical software package (SPSS, Chicago, IL, USA). The yield was also compared with local and overseas data. The number of unsatisfactory smears was correlated with years of experience and O & G training of the practitioners using Spearman's correlation coefficient and the Kruskal-Wallis Statistic test. Analysis-of-covariance was used to show the effect of training, after adjustment for the use of the cytobrush.

## Results

A total of 27 816 female clients aged 65–101 years, with a median age of 72, attended the annual assessment in the year 2000. Of these, 9950 Pap smears (35.77%) were performed on those aged less than 80 years. The rate of use of the cytobrush was low and varied from 0.1 to 4% with a mean of 2.3%. The results of the cytology report of the Pap smear are shown in Table 1.

Among the 9950 Pap smears, 171 (1.72%) were found to be abnormal and required referral to a gynecologist. The abnormal smears included those in which there was a squamous epithelial abnormality or glandular epithelial cell abnormality.

The unsatisfactory rate of the Pap smear was 7.80% (Table 1). According to the 1991 Bethesda System, unsatisfactory samples are defined as mismatching of the information on the request form and slides, the specimen being poorly fixed, and problems with interpreting the cellular samples. There was a significant variation of the unsatisfactory rate among the 18 Elderly Health Centers, although there was no mismatch of information on the request forms and slides.

Figure 1 shows the relationship between the duration of training in O & G of the doctors and the rate of yield of unsatisfactory Pap smears. There were 10 female doctors and eight male doctors. The duration of

**Table 1** Result of Pap smear cytology from 18 Elderly Health Centers in Hong Kong during 2000

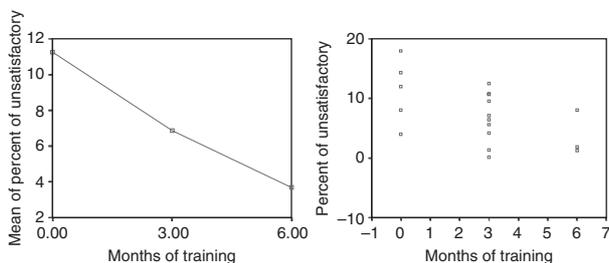
| Result of Pap smear | No. of cases | Percentage (%) |
|---------------------|--------------|----------------|
| UNSAT               | 776          | 7.80           |
| NEG                 | 8395         | 84.37          |
| SUBOP               | 608          | 6.11           |
| ASCUS               | 105          | 1.0            |
| AGUS                | 1            | 0              |
| SIL                 | 13           | 0.13           |
| LSIL                | 17           | 0.17           |
| HSIL                | 14           | 0.14           |
| ADENO               | 0            | 0              |
| SCC                 | 3            | 0.03           |
| Others              | 18           | 0.18           |
| Total               | 9950         | 100.00         |

ADENO, adenocarcinoma; AGCUS, atypical glandular cell of unknown significance; ASCUS, atypical squamous cell of unknown significance; HSIL, high-grade squamous intraepithelial lesion; LSIL, low-grade squamous intraepithelial lesion; NEG, negative for malignancy; Others, broken, uninterpretable, rejected, cancelled, etc.; SCC, squamous cell carcinoma; SIL, squamous intraepithelial lesion (grade not specified); SUBOP, suboptimal; UNSAT, unsatisfactory.

**Table 2** Unsatisfactory smear and duration of training adjusted by brush rate

| Months of training | No. of doctors | Adjusted mean | SE   | 95% Confidence interval | <i>p</i> value* |
|--------------------|----------------|---------------|------|-------------------------|-----------------|
| 0                  | 5              | 10.64         | 1.83 | (6.7–14.6)              | 0.028           |
| 3                  | 10             | 7.24          | 1.29 | (4.5–10.0)              | 0.154           |
| 6                  | 3              | 3.44          | 2.33 | (–1.6–8.4)              |                 |

SE, standard error. \*Past hoc analyses compared 0 and 3 months with 6 months training group.



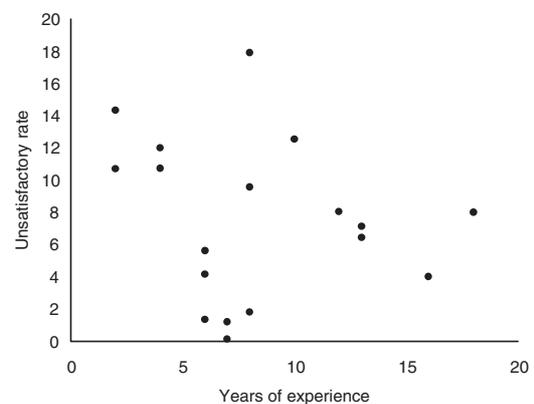
**Figure 1** Relationship between months of training and the percentage of unsatisfactory rate. Spearman's correlation coefficient = 0.474,  $p = 0.0474$ .

O & G training varied from zero to 6 months and undergoing less O & G training was found to be moderately correlated with the percentage of unsatisfactory rate (Spearman's correlation coefficient = 0.474,  $p = 0.0474$ , Fig. 1). Although the size of the '6 months' training group was too small to compare with the '3 months' training group ( $p = 0.148$ , Kruskal–Wallis Test), there was a strong tendency that doctors with longer training yielded better results. The result of the analysis-of-covariance showed some evidence of a training effect ( $\beta = 37.32$ ,  $R^2 = 0.46$ ,  $F = 3.04$ ,  $p = 0.08$ ) on the unsatisfactory rates after adjusting for the rates of using the brush method in taking the Pap smear. The test of homogeneity of regression showed no evidence of violation of the equal slope assumption ( $F = 0.82$ ,  $p = 0.46$ ) and interaction between brushing and training (Table 2).

The years of experience of the doctors varied from 2 to 18 years with a mean of 8.5 years. As seen in Fig. 2, there was no correlation between the rate of unsatisfactory Pap smear and the years of experience of family physicians (Spearman's correlation coefficient = 0.19;  $p = 0.45$ ).

## Discussion

The rate of unsatisfactory Pap smear results in the present study was 7.80%, which was higher than those reported from other studies (Table 3), except for an American study.<sup>5</sup> The largest series reported by the Department of Health in Hong Kong had included adult women of all ages (unpublished data). Another



**Figure 2** Correlation between years of experience and the yield of the Pap smear.

**Table 3** Comparison of the unsatisfactory rate of Pap smear in different studies

|   | No. of unsatisfactory Pap smears (%) | Total no. of Pap smears |
|---|--------------------------------------|-------------------------|
| Elderly Health Service (present study)    | 778 (7.8)                            | 9 950                   |
| Hong Kong (Department of Health, 2000)    | 4364 (4.2)                           | 102 978                 |
| Private hospital (Hong Kong) <sup>6</sup> | 180 (0.5)                            | 34 570                  |
| Italy <sup>7</sup>                        | 10 (1.0)                             | 1 000                   |
| USA (Georgia) <sup>5</sup>                | 39 (7.5)                             | 516                     |

local study was done in a private hospital on adult women of all ages, but the sample size was relatively small.<sup>6</sup> An Italian study was performed in several gynecologic care centers and the age range of the study population was 14–80, with an average of 34.6.<sup>7</sup> The American study was done in women aged between 15 and 93 years of age from three family practices in Georgia.<sup>5</sup> It can be seen that the other studies differed from the present study, which involved a large sample of exclusively elderly subjects.

It is well known that the physiological changes that result in a low concentration of estrogen in elderly women may make smear taking and interpretation difficult. The cervix in the elderly is usually more atrophic and sometimes it may not be easy to accurately locate the cervical os. The transformational zone is higher up in the endocervix, from where the samples are more difficult to harvest. The Ayre's spatula may not pick up an adequate number of cells from the cervix in these elderly women and it is also possible that a high proportion of the cells collected from the spatula are not effectively transferred onto the slides. This may account for the high unsatisfactory rate in the present study.

The present results seem to suggest that some training in O & G could help reduce the rate of unsatisfactory Pap smears, and even though the sample of doctors was relatively small, there was a strong tendency that a longer period of O & G training yielded better Pap smear results and that the yield was not related to the years of experience after graduation.

Research indicates that scraping the cervix with the extended tip of the spatula followed by using a cytobrush gives better results;<sup>8,9</sup> in the present study this method was recommended for only a limited number of patients with specific indications. Therefore, an average of only 2.3% of Pap smear samples included the use of the cytobrush. In view of the high unsatisfactory rate, changing the current protocol to include routine combined use of the spatula and cytobrush in all elderly women seems warranted, although more time will be needed to examine the sample of each subject, which requires more time of the cytopathologists.

The present data also showed that the rate of abnormal Pap smears in the elderly clients was 1.72%, which was comparable to a study conducted in a primary care setting in New York; that study reported the overall prevalence of abnormal Pap smears in 816 elderly women aged over 65 years as 1.59%.<sup>10</sup>

Elderly women are still at risk for developing cervical cancer especially those who have never been screened before. Local data on new cases of cervical cancer in 1999 revealed that the incidence rose dramatically in the 40–45 years age group (23.7 per 100 000) and the incidence rate remained high in women older than 65 years (39.4 per 100 000).<sup>11</sup> Therefore, cervical cancer screening should be continued beyond 65 years of age, particularly for those who had never had a Pap smear.

Elderly women are known to underutilize screening programs<sup>10,12,13</sup> and encouraging women to have screening is the most promising factor in decreasing the incidence and mortality of cervical cancer.<sup>14</sup> The relatively low uptake rate of the present elderly population may be related to lack of awareness, cultural factors and the sex of the attending doctors, but this needs further study.

## Conclusion

This is the first study to review the Pap smear program for elderly women in Hong Kong. There was a relatively low participation rate and the percentage of unsatisfactory Pap smear was slightly higher than other centers dealing with adults of all ages, correlating inversely with the duration of previous O & G training of the family physicians. However, the limitation of this study is the relatively small number of doctors being monitored. A larger study including more doctors is recommended. Identifying possible barriers to screening and assuring high-quality sampling techniques with proper hands-on training are important for future improvement of this program.

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