

Pap smear coverage among rural workers

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Abstract Despite the high incidence of cancer of the uterine cervix among black South African women, many do not have access to cytological screening services. Data describing Papanicolaou smear coverage and factors related to coverage are presented from 9 surveys of rural women workers in the food canning and processing industry in the Cape. Adequacy of Pap smear coverage was assessed according to whether the respondent had ever previously had a Pap smear, or had had one in the 3 years preceding the survey. From the 3 surveys with the greatest generalisability, only 49 - 65% of workers reported adequate Pap smear coverage. Knowledge about Pap smears was lacking. At the same time, of those women with adequate coverage, many appeared to be receiving unnecessary routine Pap smears. It appears that the policy which makes the availability of Pap smears dependent upon acceptance of contraceptive services is responsible for both the lack of Pap smear coverage and the over-provision of smears in this group of women. An urgent review of state Pap smear policy is required and a coherent community-based educational programme to facilitate the prevention of cervical cancer should be implemented as soon as possible.

S Afr Med J 1993; 83: 172-176.

Cancer of the uterine cervix is the most common cancer in women in developing countries¹⁻⁴ and the second most common cancer among women throughout the world.^{1,5} The incidence of cancer of the cervix is inversely related to social class.^{2,3,6,7} It remains the most important cause of cancer mortality⁸ and morbidity⁹ among black working class women in South Africa and is on the increase among coloured women.¹⁰ Despite the awareness that cytological examination of the cervix can contribute to a reduction in mortality from cervical cancer,^{1,3,6,7,11-14} the majority of South African women have poor access to this important public health measure.^{5,12,15-17} It has been argued that an effective Papanicolaou smear service would significantly reduce the costs of this illness to our scant health resources in South Africa.^{5,13,15,16,18,19}

The Food Workers' Medical Benefit Fund (FWMBF) has approximately 10 000 - 15 000 members in the food processing and packing industry in the rural western Cape. The majority of employees in the industry are coloured women and are only employed for the duration of the canning season, which lasts an average of 12 - 18 weeks per year. Health services in these areas are provided largely by the private sector and by local authorities. In practice, it appears that Pap smears are only offered to those women making use of contraceptive services. This practice has led the Fund to investigate patterns of coverage among its members in different towns of the western Cape. This article reports on the results of 9 surveys conducted among women

workers in these areas over the past 5 years. The article reports on Pap smear coverage in relation to age, contraceptive use and parity. One of the surveys also sought to evaluate knowledge of, and attitudes towards, Pap smears among workers.

Materials and methods

In 8 of the surveys, information on Pap smear coverage was collected by interview as part of a comprehensive general health screening conducted at factory level. Information related to age, history of a previous Pap smear and length of time since last smear was collected for all surveys. Seven of these studies also collected data on current contraceptive use and on parity. One particular study at Groot Drakenstein was a specific evaluation of Pap smear history, knowledge and attitudes among workers. For this group an attempt was made to validate Pap smear histories by the checking of local authority clinic records for a sub-sample of workers. Surveys were conducted by the personnel of the FWMBF and/or by medical students involved in their 4th-year community health projects.

Table I lists the type of sample, the estimated female factory population and the sample size of the 9 factories surveyed.

Analysis

Analysis was done by means of χ^2 -testing for categorical data. Odds ratios (ORs) were estimated as measures of association with 95% confidence intervals (CIs) calculated with the Centers for Disease Control's statistical package Epi Info, version 5.00. Statistical significance of differences in proportions were calculated using a χ^2 statistic or, where cells were too small, Fisher's exact probability test.

Results

Data on Pap smear history and current contraceptive use were validated by comparison with municipal clinic records for 6 workers at Groot Drakenstein; 100% agreement was noted.

Table II lists the age ranges and median age of the samples and of those women who had never previously had Pap smears. Table III describes the Pap smear history of women workers and lists the percentages of women who had never had smears as well as those who had last had smears more than 3 years before the survey took place. Table III also indicates the length of time since the last Pap smear among those women who had previously had one.

Table IV analyses the relationship between current contraceptive use and lifetime Pap smear history. ORs are estimated for the likelihood of a woman never having had a Pap smear if she was not currently on contraception (with 95% CIs in brackets). Five women who had undergone hysterectomy and 21 who were post-menopausal were excluded from this analysis, as were the 16 non-workers seen at Paarl, of whom 15 were post-menopausal.

Table V describes the parity of women workers according to Pap smear history.

TABLE I.
Estimated female factory workforce, sample size and sample type

Setting and date	Estimated total female workforce	Sample size		Sample type
		No.	%	
Montagu 1987 Canning workers	350	16	4,6	Volunteer
Montagu 1988 Canning workers	350	37	10,6	Volunteer
Worcester 1988 Food processors	900	16	1,7	Volunteer
Paarl 1988 Canning workers	750	14	1,9	Volunteer
	—	16	—	Volunteer
Mossel Bay 1989 Canning workers	550	34	6,2	Volunteer
Groot Drakenstein 1989 Canning workers	770	99	12,8	Random sample of single shift
Uppington 1990 Dried fruit sorters	130	113	86,9	Factory screening (volunteer)
Ceres 1990 Fruit packers	650	38	5,8	Volunteer
Wellington 1991 Dried fruit sorters	155	148	95,5	Factory screening (volunteer)

TABLE II
Median age and age range (in years)*

	Total sample			Women who <i>never</i> had a previous Pap smear		
	No.	Median age	Range	No.	Median age	Range
Survey 1	16	33	20 - 54	7	28	20 - 49
Survey 2	37	31,5	18 - 56	9	22	18 - 56
Survey 3	16	32,5	21 - 59	5	23	21 - 59
Survey 4a	14	31,5	23 - 48	3	31	30 - 35
Survey 4b	16	63,5	48 - 78	10	65	58 - 78
Survey 5	34	42,5	29 - 58	7	51	31 - 58
Survey 7	130	29	19 - 55	50	31,5	19 - 55
Survey 8	38	31	20 - 58	15	28,5	20 - 42
Survey 9	148	31	19 - 59	36	28,5	19 - 52

* Data on the Groot Drakenstein survey (survey 6) are incomplete: age range of entire sample was 18 - 65 years and two-thirds of subjects (66 women) were younger than 35 years. No data on median ages, or of range of age among subgroups of the sample, are available.

TABLE III.
Pap smear coverage among female workers

	No.	No Pap smear		Pap smear > 3 yrs ago		Yrs since last Pap smear	
		No.	%	No.	%	Median	Range
Survey 1	16	7	44	3	19	1	1 - 16
Survey 2	37	9	24	4	11	1	1 - 15
Survey 3	16	5	28	2	11	1	1 - 9
Survey 4a	14	3	21	5	36	1	1 - 7
Survey 4b	16	10	63	4	25	10	1 - 23
Survey 5	34	7	21	4	12	2	1 - 20
Survey 6	99	30	30	13	13	1	1 - 20
Survey 7	130	50	44	7	6	1	1 - 11
Survey 8	38	15	39	3	8	1	1 - 8
Survey 9	148	36	24	16	11	1	1 - 25

Tables VI - IX analyse the relationship between Pap smear coverage and age of respondent, age at first conception, educational level and knowledge about cancer of the cervix, respectively, in the Groot Drakenstein sample. Table IX is stratified for ages below and above 35 years. Data in Tables VII and VIII were too scanty for stratification by age.

Of the 66 women aged under 35 in this study at Groot Drakenstein, only 55% knew what a Pap smear was. Even among the 40 women in this age group who

had previously had a Pap smear, there were 16 (40%) who were unaware that a smear was intended to prevent cancer of the cervix. Only 36% of women workers aged 35 years and older were aware that prevention of cancer of the cervix was a reason for a Pap smear. Of the 69 women who had previously had Pap smears, 74% reported that the reason for their smear was related either to a routine antenatal or a family planning visit, while 45% reported that they had not been informed of the result of the smear.

In the survey of 38 women workers at Ceres, 59% of the entire sample knew that prevention of cancer of the cervix was a reason for a Pap smear. However, of those 14 women who had never had a Pap smear, only 36% were aware of this reason ($P > 0,05$; OR 4,37 (95% CI 0,88 - 23,11)).

Discussion

Surveys of women attending for health screening are vulnerable to volunteer bias,²⁰ because these women are likely to be more concerned about their health and to differ from the general population in terms of their Pap

smear history. However, the studies in Uppington and Wellington involved over 85% of the respective workforces and thus have sound sampling validity, while the study at Groot Drakenstein sampled randomly from a single shift of production workers. These 3 studies are therefore emphasised in the discussion of the results. Moreover, the distributions of age (Table II) and parity (Table V) in the different studies were broadly similar, suggesting that the samples were comparable. While reliability of the data was not widely assessed, the limited information of 100% agreement from the Groot Drakenstein study, based on small numbers, suggests adequate data reliability.

Controversy exists as to the optimal interval fre-

TABLE IV.
Lifetime history of Pap smear and current contraceptive coverage*

	Percentage of those on contraception who had had Pap smear		Percentage of those on no contraception who had had Pap smear		OR
	No.	%	No.	%	
Survey 1	8	50	7	57	0,75 (0,06 - 8,58)
Survey 2	24	83	10	70	2,14 (0,24 - 16,17)
Survey 3	5	100	6	50	—
Survey 4a	6	83	8	75	1,67 (0,06 - 117,71)
Survey 5	16	94	9	78	4,29 (0,18 - 269,29)
Survey 6	75	80	24	38	6,67† (2,21 - 20,66)
Survey 9	71	89	67	63	4,69† (1,80 - 12,58)

* Data on contraceptive use not available for surveys 7 and 8 and not included for survey 4b (post-menopausal subjects).

† $P < 0,05$.

TABLE V.
Parity of women in relation to Pap smear history*

	No.	No previous Pap smear		Previous Pap smear	
		Median	Range	Median	Range
Survey 1	16	3	0 - 7	3	1 - 5
Survey 2	37	1	0 - 10	3	1 - 7
Survey 3	16	0	0 - 12	3	0 - 8
Survey 4a	14	2	1 - 2	4	0 - 9
Survey 4b	16	8	2 - 17	—†	—
Survey 5	34	4	1 - 8	3,5	1 - 11
Survey 6	99	2,5‡		2,65	

* Data on parity not available for surveys 7, 8 and 9.

† Too few subjects to calculate median parity.

‡ Mean parity.

TABLE VI.
Pap smear history and age of 99 respondents

Age group	No.	% never having had Pap smear	OR	95% CI
< 35 yrs	66	39,4	4,7	1,36 - 17,95
>35 yrs	33	12,1		

TABLE VII.
Pap smear history and age at first conception of 80 respondents

Age at first conception	No.	% never having had Pap smear	OR	95% CI
< 16 yrs	8	62,5	10,33	1,64 - 73,79
> 16 yrs	72	13,9		

TABLE VIII.
Pap smear history and educational level of 99 respondents

Educational level	No.	% never having had Pap smear	OR	95% CI
< Std 8	77	29,9	0,51	0,17 - 1,50
> Std 8	22	45,5		

TABLE IX.
Knowledge about PAP smears among female canning workers

Knowledge	No.	% never having had Pap smear	OR	95% CI
Women < 35 yrs				
Cited cancer of cervix	32	25	0,30	0,09 - 0,95
Cited other	34	52,9		
Women ≥ 35 yrs				
Cited cancer of cervix	12	16,7	1,90	0,12 - 29,35
Cited other	21	9,5		

The combined Mantel-Haentzel OR was 2,31 (95% CI = 0,86 - 7,04).

quency and criteria for cervical cytological screening. In developed countries yearly screening is frequently recommended,²¹ but this usually fails to take cost-effectiveness into account.²² World Health Organisation guidelines for Pap smear programmes¹ emphasise coverage of the population at risk, rather than frequency of re-screening. Even where sufficient resources are available, WHO recommendations for frequency of screening do not exceed once every 3 years for women with at least two previous normal cytology results.

Data in Table III indicate that between 24% and 44% of women who work in the food processing and packing industries of the rural Cape had never had a Pap smear and a further 6 - 36% had last had Pap smears more than 3 years before the survey. While this degree of coverage may be attributed partly to differences in quality and availability of health services in different towns, it is apparent that large numbers of rural women in the western Cape do not have access to Pap smear services. For the three studies with best generalisability from the point of view of their methodology, the proportions of women who had had a Pap smear within the past 3 years were 49%, 65% and 57% respectively. Applying best-case and worst-case scenarios to the studies at Wellington and Upington, slightly less than half to two-thirds of working women in these factories had received Pap smears in accordance with WHO recommendations.

Many sources, including the WHO,¹ have recommended the applicability of routine cervical smears for antenatal^{1,7,15,23,24} and family planning attenders^{1,7,15,23} and such practices go a long way towards integrating cervical cytology services in broader health care.^{7,25} Seventy-four per cent of women at Groot Drakenstein who reported having previously had a Pap smear had had their first smear as a routine in the course of family planning or antenatal attendance. However, there are serious drawbacks to the overemphasis of this approach to cervical cytological screening.

One the one hand, data from Table IV demonstrate a statistically significant relationship between lifetime Pap smear coverage and current contraceptive use for the two large studies with the greatest generalisability. This suggests that access to Pap smear services among rural workers is dependent on acceptance of family planning, an inference which was borne out by verbal responses from workers during surveys. When encouraged to attend their local clinic after the survey for a Pap smear, they replied that the clinic would not provide the service if they were not on contraception. This relation-

ship would probably have been accentuated by measurement of lifetime contraceptive use. Particularly in the light of some communities' perception of a coercive element in state family planning programmes,²⁶ the limitation of cervical cytology services to those who accept family planning is extremely problematic.

Secondly, data from Table III show that the median number of years since the last Pap smear among those women who did receive them was 1 year in all but 2 surveys. The majority of these women were receiving Pap smears yearly, and these were unlikely to be women who were doing so because of previous abnormal Pap results. This implies that the vast majority of smears performed at state clinics are done in excess of WHO screening frequency recommendations, at unnecessary cost to the health services. The yearly Pap smear frequency interval is apparently attributable to the practice at family planning clinics in the region.

These results indicate that some women (those who accept family planning services) are being 'over-serviced' while other women (not on contraceptives) are being excluded from cervical cytological screening. Moreover, Department of National Health and Population Development policy statements appear to recommend that, outside of those who accept contraceptives, Pap smears be made available only to symptomatic patients,²⁷ or twice in a lifetime to women aged 30 and 35 years.²⁸ This approach contradicts the value of Pap smears in detecting premalignant lesions in asymptomatic women,^{1,5,15} particularly at an early age.²⁸ Known risk factors for the development of cervical cancer such as multiparity⁶ and sexual intercourse at an early age^{8,12,23,29} were present in many of the women who had never had Pap smears previously (Tables V and VII).

From both an ethical and an epidemiological point of view, this is an unacceptable situation and cervical cytology services and policy require radical revision and rationalisation, both to reduce unnecessary utilisation and to ensure access for those who need services most.¹⁹ What appears to be happening in practice is that state cervical cytology services are being increasingly overworked while, at the same time, resources for cervical cytology facilities are simply being cut back. These cut-backs are presumably, in part, the result of poor follow-up of abnormal results¹⁶ but do not address the problem areas identified in this and other studies.³⁰

Some authorities suggest that cervical screening should start at the start of sexual activity,¹⁵ while others recommend age thresholds as useful proxy measures of sexual activity.^{1,23} Thirty-eight per cent of the women in

the Groot Drakenstein study conceived their first child before the age of 18 years and many rural working women are therefore sexually active from an early age (Table VII). This is consistent with the findings of a study conducted in Paarl that found extremely high rates of teenage pregnancy in the population.³¹ Despite this, younger women had lower rates of screening (Table VI). It seems rational therefore to recommend that cervical cytological screening start being undertaken at the onset of sexual activity rather than at an arbitrary age of 25 years, as suggested by the WHO.¹

In addition to questions of access, women's individual attitudes to cervical screening and cancer are crucially important in determining use of Pap smear services.^{6,32} However, beliefs about cancer and Pap smear screening are themselves related to social class and require specifically targeted educational interventions to allay underlying fears.⁹ Data in Table IX suggest that workers' knowledge and understanding of Pap smears is not always adequate, even among those making use of services. This is supported by other studies in Khayelitsha¹⁷ and Soweto¹⁶ where awareness of, and knowledge about, Pap smears were extremely low. Moreover, data in Table VIII suggest that educational levels played little role in encouraging women to make use of Pap smear services. In fact, there seemed to be an inverse relationship between years of schooling and Pap smear use, even though this was not statistically significant. This points to the need for such education to be included in the school curriculum, an argument supported by the findings of another study on the problem of teenage pregnancy in the Paarl area.³³

Conclusion

There is urgent need for an education programme particularly in those communities most at risk of carcinoma of the cervix. Such a programme should emphasise a community-based approach to public education on cervical cytology^{5,7,15,23} and should be integrated in a national programme to eradicate cancer of the cervix; this should include a rational policy that makes Pap smears accessible to all South African women. It has been argued that the responsibility for such a programme should rest with the State Health Services;^{5,15} such sentiments are broadly echoed by resolutions from organised labour, which has identified the need for free Pap smears and information and counselling at state clinics.^{34,35} There is ample evidence to suggest that communities and trade unions would be receptive to the need to take up such a campaign for women's health in South Africa.

I wish to thank the workers of the Food and Allied Workers Union for their participation in this study and the Health Care Trust, the Industrial Health Research Group and the many volunteers whose assistance made these programmes possible. I also wish to thank Dr Mohamed Jebbhay, Dr Debbie Bradshaw and the staff of the Department of Community Health at the University of Cape Town for their valuable comments.

REFERENCES

1. *Cytological Screening in the Control of Cervical Cancer: Technical Guidelines*. Geneva: World Health Organisation, 1988.
2. Solanke TF. Cancer in Africa. In: Aoki K, Tominaga S, Hirayama T, Hirota Y, eds. *Cancer Prevention in Developing Countries*; Proceedings of the 1st UICC Conference on Cancer Prevention in Developing Countries. Nagoya: University of Nagoya Press, 1982; 188-203.
3. Correa P, Zavala D. Patterns of cancer frequency in Latin America. In: Aoki K, Tominaga S, Hirayama T, Hirota Y, eds. *Cancer Prevention in Developing Countries: Proceedings of the 1st UICC Conference on Cancer Prevention in Developing Countries*. Nagoya: University of Nagoya Press, 1982; 227-235.
4. Hutt MSR. Cancer in east and central Africa. In: Aoki K, Tominaga S, Hirayama T, Hirota Y, eds. *Cancer Prevention in Developing Countries: Proceedings of the 1st UICC Conference on Cancer Prevention in Developing Countries*. Nagoya: University of Nagoya Press, 1982; 217-225.
5. Du Toit JP. Carcinoma of the cervix — a plea for some organised planning. *S Afr J Hosp Med* 1980; **6**: 199-205.
6. King J. Women's attitudes towards cervical smear. *Update* 1990; **4**(12): 98-104.
7. Wahi PN. Aetiology and prevention of cervical cancer. In: Aoki K, Tominaga S, Hirayama T, Hirota Y, eds. *Cancer Prevention in Developing Countries: Proceedings of the 1st UICC Conference on Cancer Prevention in Developing Countries*. Nagoya: University of Nagoya Press, 1982; 461-467.
8. Bradshaw E, Harington JS. A comparison of cancer mortality rates in South Africa with those in other countries. *S Afr Med J* 1982; **61**: 943-946.
9. Sitas F, Isaacson M. Histologically diagnosed cancer in South Africa, 1987. *S Afr Med J* 1992; **81**: 565-568.
10. Bradshaw E, Harington JS. The changing pattern of cancer mortality in South Africa, 1949 - 1979. *S Afr Med J* 1985; **68**: 455-465.
11. Doll R. Underlining concepts of cancer control in the future. In: Aoki K, Tominaga S, Hirayama T, Hirota Y, eds. *Cancer Prevention in Developing Countries: Proceedings of the 1st UICC Conference on Cancer Prevention in Developing Countries*. Nagoya: University of Nagoya Press, 1982; 587-594.
12. Shingleton HM, Orr JW. *Cancer of the Cervix*. New York: Churchill Livingstone, 1987; 1-20.
13. Editorial. Screening for cervical cancer. *S Afr J Epidemiol Infect* 1987; **2**: 51.
14. Hudson E. The prevention of cervical cancer: the place of the cytological smear test. *Clin Obstet Gynecol* 1985; **12**: 33-51.
15. Gordon Grant MC. Carcinoma of the cervix — a tragic disease in South Africa. *S Afr Med J* 1982; **61**: 819-822.
16. Leiman G. 'Project Screen Soweto' — a planned cervical screening programme in a high-risk population. *S Afr J Epidemiol Infect* 1987; **2**: 61-68.
17. Cooper D, Pick WM, Myers JE, Hoffman MN, Sayed AR, Klopper JML. Urbanisation and women's health in Khayelitsha: Part II. Health status and use of health services. *S Afr Med J* 1991; **79**: 428-432.
18. Klopper JML, Bourne DE, McIntyre DE, Pick WM, Taylor SP. A methodology for resource allocation in health care for South Africa: Part I. Rationale and prerequisites. *S Afr Med J* 1989; **76**: 209-211.
19. Gordon-Grant MC. Cervical cancer — have we lost the battle? (Letter). *S Afr Med J* 1990; **78**: 699-700.
20. Sackett DL. Bias in analytical research. *J Chron Dis* 1979; **32**: 51-63.
21. Barbieri RL. Common problems in gynaecology: vaginitis and abnormal Pap smears. *Modern Medicine* 1989; **14**(8): 27-35.
22. Eddy DM. *Screening for Cancer: Theory, Analysis and Design*. Englewood Cliffs, NJ: Prentice-Hall, 1980.
23. Peters EE. Taking a cervical smear. *Update* 1987; **2**(3): 67-70.
24. Khatree MHD, Houlton MCC, Moodley J. Cervical cytology in pregnant black patients and potential selective screening programmes. *S Afr Med J* 1980; **58**: 358-360.
25. Nakajima H. Some remarks concerning approaches to be taken for cancer control in developing countries. In: Aoki K, Tominaga S, Hirayama T, Hirota Y, eds. *Cancer Prevention in Developing Countries: Proceedings of the First UICC Conference on Cancer Prevention in Developing Countries*. Nagoya: University of Nagoya Press, 1982; 577-580.
26. Moore S, Oskowitz B. Family planning as a human right in South Africa. *Critical Health* 1991; **34**: 14-19.
27. Editorial. *S Afr Med J* 1962; **36**: 705.
28. Learmonth GM, Durcan CM, Beck JD. The changing incidence of cervical intra-epithelial neoplasia. *S Afr Med J* 1990; **77**: 637-639.
29. Tait I, Alawattagama AB, Rees E. Screening for cervical dysplasia in departments of genitourinary medicine. *Genitourin Med* 1988; **64**: 255-258.
30. Chamberlin J. Failures of the cervical cytology screening programme (Editorial). *BMJ* 1984; **289**: 853-854.
31. De Villiers VP. Tienderjarige swangerskappe in die Paarl-hospitaal. *S Afr Med J* 1985; **67**: 301-302.
32. Fry R, Linder AM, Bull MM, Brinton A. The values and dangers of gynaecological cytology. *S Afr Med J* 1976; **50**: 35-38.
33. De Villiers VP. Seksonderig onder tieners in die Paarl. *S Afr Med J* 1991; **80**: 231-232.
34. Resolution on Cervical Cancer. *Proceedings of COSATU Women's Conference*. Johannesburg: COSATU, 1988; 21-22.
35. Truscott K. Our bodies, our lives — women, health and the workers' charter. *Critical Health* 1991; **34**: 8-13.