

A Retrospective Record Evaluation of Cervical Cancer Screening Using Liquid-Based Cytology (LBC)

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Abstract

Aim: The objective of this study was to address this preventable cancer burden and also to determine a fraction of pap cervical smear finding through LBC

Methods: From the period of one year from 1 May 2022 to 30 April 2023, a retrospective record review was performed for a total of 100 women who were referred from Department of Obstetrics and Gynaecology at Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda, Bihar, India for Pap cervical smear to the Department of Pathology.

Results: It was observed that among women with abnormal cytology, majority of the cytology presented as ASC-US with 50% (50/100), LSIL 5% (5/100), ASC-H 25% (25/100), 15% (15/100) were High grade squamous intraepithelial lesion (HSIL), while 4% (4/100) were Squamous cell carcinoma and adenocarcinoma stood at 1% (1/100).

Conclusion: The result from this retrospective analysis was to address the disease burden through representative data, highlight the need of effective screening programme and availability of HPV testing for uniformity of management and treatment according to the national recommendations. LBC can be a better alternative to conventional smear because of lower rate of unsatisfactory smears.

Keywords: Cervical cancer, Cervix uteri, Liquid based cytology (LBC), Papanicolaou (Pap), Human papillomavirus (HPV).

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Introduction

Cancer of the cervix uteri is the fourth most common cancer among women worldwide, with an estimated 604,000 new cases and 342,000 deaths worldwide. The majority of cases are squamous cell carcinoma followed by adenocarcinomas.[1] The National Cancer Registry Programme (NCRP) report containing 5-year data (2012-2016) was published in 2020 to assess the status and trends of cancer in India through

standardized data collected from population-based cancer registries (PBCRs) and hospital based cancer registries (HBCRs) which is published by ICMR-NCDIR. The projected incidence of patients with cancer for the year 2020 in India in males is 679,421 and in females is 712,758.[2] As per World Health Organization, more than 30000 women die of cervical cancer each year and the alarming fact is nine out of ten women

who die are in poor countries, which means some of the most vulnerable women are dying unnecessarily because each death can be prevented.[3] The idea of screening for early detection of cancer was accepted in the 1920s after the development of exfoliative cytological techniques initiated through the work of Babes[4] and Papanicolaou.[5]

Across the globe, there are 2784 million women aged 15 years and older who are at risk of developing cervical cancer, and about 527,624 new cervical cancer cases are diagnosed annually. Cervical cancer ranks as the fourth leading cause of cancer in women worldwide, and it is the second most common cancer in women between 15 and 44 years of age.[6,7] Almost 70% of the global burden of cervical cancer falls in areas with lower levels of development, and more than one-fifth of all new cases are diagnosed in India. For women in India, cervical cancer is the second most common cancer. Cervical cancer is also the second most common cause of cancer deaths when both genders are combined.[8]

“Cervical cancer can have devastating effects with a very high human, social, and economic cost, affecting women in their prime. But this disease should not be a death sentence, even in poor countries,” explains Dr. Rengaswamy Sankaranarayanan, a lead investigator for an IARC research project with a focus on cervical cancer screening in rural India. “Low-tech and inexpensive screening tools exist and could significantly reduce the burden of cervical cancer deaths right now in less developed countries.”[9]

Frequently performed cytology screening programs have led to a decline in cervical cancer incidence and mortality in developed countries. In contrast, cervical cancer remains largely uncontrolled in high-risk developing countries because of ineffective or no screening program.[10] Pap smear is the most effective method for

the prevention and detection of cervical cancer, but the accuracy of this important screening tool remains controversial. Several recent meta-analyses have reported quite low Pap smear sensitivities – in the range of 50% but as low as 20%.[11,12]

The objective of this study was to address this preventable cancer burden and also to determine a fraction of pap cervical smear finding through LBC in Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda, Bihar, India.

Methods

From the period of one year, a retrospective record review was performed for a total of 100 women who were referred from Department of Obstetrics and Gynaecology at Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda, Bihar, India for Pap cervical smear to the Department of Pathology. Pap cervical smear sample was collected by trained personnel following the manufacturer’s protocol for performing liquid based cytology (LBC) with Sure Path (BD Diagnostics, United States) direct to slide method. The LBC technique successfully captures the complete cellular samples under a consistent, localized area thereby improving visualization, assessment and cellular preservation. Samples were processed and stained within 24 hours of receiving and the slides were reported by the pathologist following the latest Bethesda system of reporting (TBS 2014). Data on age, marital status of the patient, reproductive history and their current gynaecological symptoms (if any), date of Pap smear performed and the result were retrieved from the pre-filled proforma. After screening, all screened women collected their reports and were directed to the Department of Obstetrics and Gynaecology, to ensure that those with abnormal cytology were subjected to further necessary evaluations and treated appropriately.

Results

Table 1: Abnormal cytology classification (n =100)

Cytology category	Abnormal n (%)
Malignant	5
HSIL	15
ASC-H	25
LSIL	5
ASC-US	50

It was observed that among women with abnormal cytology, majority of the cytology presented as ASC-US with 50% (50/100), LSIL 5% (5/100), ASC-H 25% (25/100), 15% (15/100) were High grade squamous intraepithelial lesion (HSIL),

while 4% (4/100) were Squamous cell carcinoma and adenocarcinoma stood at 1% (1/100). (Table 1) The abnormal smears were however not subjected to HPV testing due to unavailability of resources.

Table 2: Common complaints among screened positives (n=100)

Complaints	Abnormal n (%)
White discharge	30 (30%)
Pain lower abdomen	25 (25%)
Itching	10 (10%)
Postmenopausal bleeding	5 (5%)
Menorrhagia	5 (5%)
Prolapse	7 (7%)
Spotting	10 (10%)
Irregular Periods	8 (8%)

The chief complaints among women with abnormal cytology were white discharge (30%), pain in the lower abdomen (25%). Among women with abnormal cytology the mean age was 40 years. However, there was no significant correlation between chief complaints and cytology category.

The details of the women screened, the frequency of cytological abnormalities and the most common complaints have been enlisted in Table 1 and Table 2 respectively. Our study also indicated that 20% of women who had abnormal cytology came to the hospital seeking routine cervical cancer screening.

Discussion

Cancer is one of the leading causes of adult deaths worldwide and around 8 million people die of cancer every year.[1] Cervical cancer is one of the leading causes of cancer mortality accounting for

nearly 17% of all cancer deaths among women aged between 30 and 69 years. It is estimated that cervical cancer will occur in approximately 1 in 53 Indian women during their lifetime compared with 1 in 100 women in more developed regions of the world.[2] Cervical cancer is the second most common cancer among women in India.[8] Prevention and early diagnosis are major factors in reducing morbidity and mortality resulting from neoplasia.

The use of liquid based cytology is a recent screening tool in this part of the state. Bihar have not in the past conducted any large scale population based cervical cancer screening which could be one of the factors for the higher incidence of Cancer cervix in this region with only a few private clinics and hospitals performing conventional pap test on request. This technically achievable and cost-effective screening should have a wider reach to the marginalized inhabitants of this region.

Despite the hospital not having a specific cervical cancer clinic, this review highlights that 20% of the women cytology came to the hospital seeking routine cervical cancer screening.

They found out that there was higher percentage of SIL in rural 10.5% as compared to 4.5% SIL in urban.[13] Another hospital based Cervical screening done over 1 year with sample size of 1650 showed 5.57% SIL.[14] When compared with a study done over 35 years in a hospital based cytological screening in Lucknow revealed a proportion of 7.2% SIL in 36,484 samples which was comparable to our study.[15]

Pap smear is a very important and useful method for cervical cancer screening. Globally, efforts to prevent the disease include screening women using Pap smears and treating precancerous lesions. Impressive results have been achieved in reducing cervical cancer incidence and mortality in some developed countries by Pap smear screening.

Cervical cancer incidence can be reduced by as much as 90% where screening quality and coverage are high.[16] However, in developing countries – where approximately 80% of all new cases occur – many women have never had a Pap smear. Proper implementation of screening programs is essential to reduce the incidence and mortality of cervical cancer in India.

In the Seventy-third World Health Assembly, a resolution was made for the global strategy to eliminate cervical cancer as a public burden by accelerating global strategy to eliminate cervical cancer as a public burden by accelerating interventions and prioritizing vaccination and screening for the period 2020-2030.[17] WHO recommends different models for Cervical cancer screening with 'HPV only' as more widely accepted in high income countries and 'PAP triaging with HPV' more suited for lower income regions with specific

2030 targets. HPV testing in this region is still not routinely done due to lack of testing facilities and high cost which is one of the main problem in following national and international recommendations. Strong association is linked between high-risk Human papillomavirus.

Above all we should keep in mind that there is no synchronised initiative from public health authorities for prevention and control of cancer cervix in India which show alarming statistics. Therefore our main aim should be towards creating awareness among the rural setup like ours and high cost of LBC will be a main hindrance for it. So to conclude, even though LBC is slightly superior to CPS as far as the quality of smear is concerned, taking into consideration the similar detection rate of other parameters in addition to the cost efficacy CPS provides, it is better to continue with CPS as our setup is a rural setup with low resource setting.

Conclusion

The result from this retrospective analysis was to address the disease burden through representative data, highlight the need of effective screening programme and availability of HPV testing for uniformity of management and treatment according to the national recommendations. LBC can be a better alternative to conventional smear because of lower rate of unsatisfactory smears. Furthermore, residual LBC sample is available to perform HPV DNA testing. LBC with concomitant HPV testing can prove to be more effective in high-resource setting. However, as the detection rate of epithelial abnormalities is similar using both CPS and LBC techniques, CPS is still the best screening method in the Indian scenario with a low-resource setting considering its cost-effectiveness over LBC.

References

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal

- A, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin.* 2021;71(3):209–49.
2. ICMR-NCDIR: Report of National Cancer Registry Programme (2012-2016) Bengaluru, India, National Cancer Registry Programme (NCRP-ICMR).
 3. World Health Organization, Cancer, Cervical cancer. Available from <https://www.who.int/cancer/cervicalcancer>
 4. BABES A. Diagnostic du cancer du col utrin par les frottis. *Presse med.* 1928; 29:451-4.
 5. Classes in oncology: George Nicholas Papanicolaou's new cancer diagnosis presented at the Third Race Betterment Conference, Battle Creek, Michigan, January 2-6, 1928, and published in the Proceedings of the Conference. *CA Cancer J Clin.* 1973;23(3):174-179.
 6. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, Parkin DM, Forman D, Bray F. Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. *International journal of cancer.* 2015 Mar 1;136(5):E359-86.
 7. Bray F, Ren JS, Masuyer E, Ferlay J. Global estimates of cancer prevalence for 27 sites in the adult population in 2008. *International journal of cancer.* 2013 Mar 1;132(5):1133-45.
 8. Mallath MK, Taylor DG, Badwe RA, Rath GK, Shanta V, Pramesh CS, Digumarti R, Sebastian P, Borthakur BB, Kalwar A, Kapoor S. The growing burden of cancer in India: epidemiology and social context. *The Lancet Oncology.* 2014 May 1;15(6): e205-12.
 9. PR 223- Latest World Cancer Statistics Global Cancer Burden Rises to 14.1 million New Cases in 2012: Marked Increase in Breast Cancers must be Addressed. IARC; 12 December 2013
 10. Cuzick J, Arbyn M, Sankaranarayanan R, Tsu V, Ronco G, Mayrand MH, Dillner J, Meijer CJ. Overview of human papillomavirus-based and other novel options for cervical cancer screening in developed and developing countries. *Vaccine.* 2008 Aug 19;26: K29-41.
 11. Nanda K, McCrory D, Myers E, Bastian L, Hasselblad V, Hickey J, Matchar D. Accuracy of the Papanicolaou Test in Screening for and Follow-up of Cervical Cytologic Abnormalities: A Systematic Review. *Journal of Lower Genital Tract Disease: Abstracts: Winter 2001.* 2001 Jan;5(1):60-.
 12. Fahey MT, Irwig L, Macaskill P. Meta-analysis of Pap test accuracy. *American journal of epidemiology.* 1995 Apr 1;141(7):680-9.
 13. Rajput N, Verma YS, Ahirwar G. Detection of abnormal cervical cytology by Pap's smear and comparison between rural and urban women. *J Evol Med Dent Sci.* 2013;2(41):7923–31.
 14. Sachan PL, Singh M, Patel ML, Sachan R. A study on cervical cancer screening using pap smear test and clinical correlation. *Asia Pac J Oncol Nurs.* 2018;5(3):337.
 15. Misra JS, Srivastava S, Singh U, Srivastava AN. Risk-factors and strategies for control of carcinoma cervix in India: Hospital based cytological screening experience of 35 years. *Indian J Cancer.* 2009;46(2):155–9.
 16. Eddy DM. Secondary prevention of cancer: An overview. *Bull World Health Organ* 1986; 64:421-9.
 17. World Health Organization. Seventy-third World Health Assembly. InA73/CONF./1 rEV 2020 (Vol. 1).