

# A Study of Pap-Smear Findings in Patients of Diabetes Attending OPD in a Tertiary Care Centre in Indore and Comparison with Non-Diabetics

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## ABSTRACT

**Introduction:** Cervical cancer is known to be a major health problem in India with prevalence being around 3.5%. India has the highest disease burden for cervical cancer in South Asia, especially due to lack of any organized screening program. Diabetes is estimated to affect 8.8% Indians as per International Diabetes Federation which roughly translates to 72 million cases. Diabetes is also known to increase prevalence of various cancers including cervical cancer as well as its prognosis. Diabetes is also known to increase occurrence of genitourinary infections by various mechanisms. This study was undertaken to study findings in pap-smear samples of patients with diabetes and compare them with non-diabetics.

**Material and methods:** Diabetic females who presented to the OPD for various complains and routine check-ups were studied for abnormalities in cervix and vagina and Pap smears were taken as screening procedure. The results were then compared to the trends noted amongst the non-diabetic cohort of females.

**Results:** Total 2660 samples were tested of diabetic females, of which 2.85% (n=76) were found to have malignant changes. 30% (n=799) samples had cervicitis, 18 among them had associated malignant changes, 28.27% (n=752) samples had vaginitis. 500 samples were tested of non-diabetic females of which 2% (n=10) had Ca cervix, 4% (n=20) had cervicitis, 10 having findings suggestive of HPV infection, 36% (n=180) had vaginitis of various causes.

**Conclusion:** More than 70% patients were found to have positive findings in their samples including malignancy, infection and inflammation. These findings are in tune with results of previous studies and meta-analyses suggesting that diabetic patients are at increased risk of developing infections and malignancies. Earlier diabetes was thought of as a disease of the upper socioeconomic class and cervical cancer was associated with lower socioeconomic class, but in the light of recent trends noted both in prevalence of diabetes and cervical cancer their association needs to be studied further. India needs to have a proper screening program for females to improve chances of detection of cervical cancers and infections in order to improve prognosis and survival.

**Keywords:** Pap-Smear, Diabetes, Non-Diabetics

breast (28.6%).<sup>3,4</sup> The age standardized incidence rate for carcinoma cervix in Indian women is 22 per 100,000 women per year, which is the highest in South Asia. Cervical cancer mortality is 12.43/100,000 per year.<sup>1,3</sup> Due to the lack of an organized cervical screening program, the disease burden is high in India.<sup>5</sup> Pap-smear test is a simple screening test, both easily available and cost effective. A smear of cells collected from the cervix and cytological patterns are studied which are used rule out precancerous and cancerous conditions of the cervix. It also aids in diagnosing infections and inflammation of the lower reproductive tract. Lower socioeconomic class is a known risk factor for Ca Cervix, both due to higher prevalence of HPV infection and also due to lesser access to health and screening services worldwide.<sup>6</sup>

India is known to have a high burden of diabetes as well. In 2017, India was estimated to have 72,946,400 cases of diabetes in adult population as per International diabetes federation data. Indian adults have about 8.8% prevalence of diabetes. Diabetes is known to increase the incidence of various cancers like endometrial, cervical, breast, stomach and pancreas.<sup>7,8</sup> Diabetes is also known to reduce overall survival in cervical cancer patients.<sup>9,10,11</sup> Though easily thought of as a disease of higher socioeconomic class, studies show that it is the lower income group that are more vulnerable for diabetes.<sup>12,13</sup> Through this study we could find an interesting pattern which paves way for further exploration.

This study was conducted to study pap-smear findings among diabetic females who visited the OPD for various complains and routine check-ups as well. The result trends were then compared to another smaller cohort of non-diabetic females.

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## INTRODUCTION

Cervical cancer is a major public health problem in India with an incidence of 1,22,844 cases and mortality of 67,477 cases every year.<sup>1-3</sup> Carcinoma cervix is the second most common gynecological malignancy amongst Indian women aged 25-44 years with an incidence of 3.5% after carcinoma

**Methods**

**Setting:** The study was performed among patients attending Medicine and Gynaecology OPD in a tertiary care hospital in Indore district of Madhya Pradesh. In total, 2660 samples were tested over a period of 2 years. Patients belonged to the age group 20-45 years, married or sexually active.

**Inclusion Criteria:** All patients had documented history of diabetes, both Type 1 DM and type 2 DM patients were included. All females were non-hypertensives, non-smokers, non-alcoholics. No history of prior HPV vaccination was there among the test subjects. No history of gynaecological illness was present. All the patients were non-pregnant, non-menstruating at the time of sampling.

**Exclusion Criteria:** Prior history of HPV vaccination, co-existing hypertension or other co-morbidities, recent history of treatment for gynaecological disorder.

All subjects had signed an informed consent form before participating in the study.

**Testing Protocols**

The patients were instructed to avoid intercourse for 48 hours before the test and withhold any vaginal medications or contraception.

After proper written, verbal and informed consent were obtained for performing a vaginal examination and pap smear to be taken and the willingness to participate in our study was assured, patients were briefed about the procedure. Lithotomy position was given after emptying the bladder and with complete aseptic measures the cervix was visualised using a sterile Cusco's or Sim's vaginal speculum. The external os was identified and a smear was taken using Ayer's spatula rotating 360° at the os. Immediately the smear was prepared on a glass slide and fixed with pre formulated fixator spray.

The samples were then sent to the pathology lab with complete patient details for assessment.

**RESULTS**

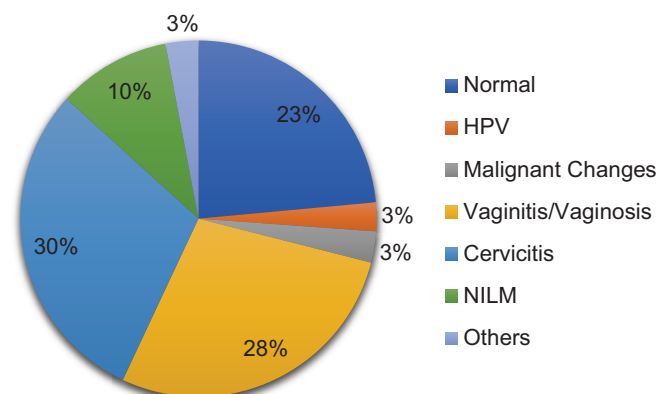
Of the total 2660 samples tested, 632 (23.75%) turned out to be normal. Most common finding was cervicitis of varying degree. 799 (30%) patients had cervicitis, of which 18 had associated malignant changes. Vaginitis was found in 752 (28.27%) samples. 2.85% patients (n=76) had malignant

changes. Results of 42 samples couldn't be assessed as they were either non-commentable or improperly prepared (table-1, fig-1).

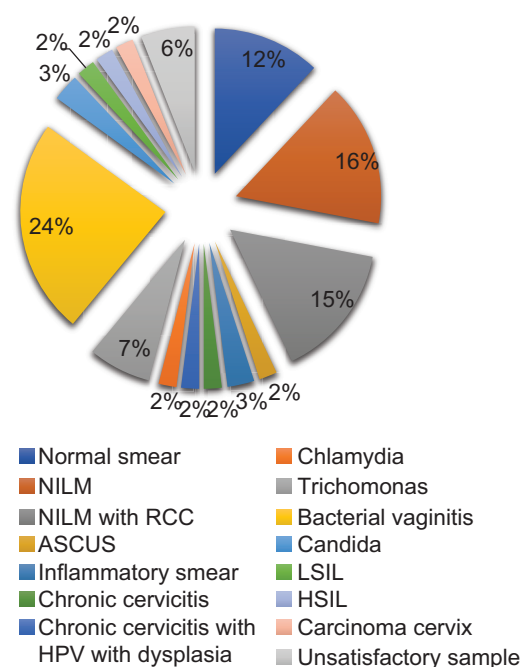
Among patients who tested positive for vaginitis or vaginosis, bacterial vaginosis (n=367) was the commonest cause followed by vaginal candidiasis (n=105) (table-2).

Result	Number	Percentage
Normal	632	23.75
HPV	70	2.63
LSIL (Low-grade squamous intraepithelial lesion)	20	0.75
Saprophytic Bacteriosis	1	0.03
Inflammatory Exudative	12	0.45
Severe Cervicitis with LSIL	18	0.67
TB Endometriosis	6	0.22
Squamous Cell Carcinoma	24	0.90
Endometriosis	2	0.07
Acute Inflammatory Cervicitis	14	0.52
Atypical Sq. cell Ca of unknown significance (ASCUS)	14	0.52
Vaginosis with cervicitis	70	2.63
NILM (Negative for Intraepithelial Lesion and Malignancy)	276	10.37
Gonococcal Vaginitis	15	0.56
Atrophic Vaginitis	30	1.12
Post Menopausal	62	2.33
Trichomonal Vaginitis	95	3.57
Vaginal Candidiasis	105	3.94
Bacterial Vaginosis	367	13.79
Non-Specific cervicitis	526	19.77
Chronic Cervicitis	189	7.10
Non-Specific Vaginitis	70	2.63
Non commentable	42	1.57
Total	2660	100

**Table-1:** Results of the samples taken



**Figure-1:** Percentage-wise distribution of Smear findings.



**Figure-2:** Graph showing findings in non-diabetic patients

Result	Number
Gonococcal Vaginitis	15
Atrophic Vaginitis	30
Trichomonal Vaginitis	95
Vaginal Candidiasis	105
Bacterial Vaginosis	367
Non-Specific Vaginitis	70

**Table-2: Cases with Vaginitis/Vaginosis**

Result	Number
Severe Cervicitis with LSIL	18
Acute Inflammatory Cervicitis	14
Vaginosis with cervicitis	70
Non-Specific cervicitis	526
Chronic Cervicitis	189

**Table-3: Cases with Cervicitis**

Result	Number	Percentage (%)
Normal smear	60	12
NILM	80	16
NILM with RCC	75	15
ASCUS	10	2
Inflammatory smear	15	3
Chronic cervicitis	10	2
Chronic cervicitis with HPV with dysplasia	10	2
Chlamydia	10	2
Trichomonas	35	7
Bacterial vaginitis	120	24
Candida	15	3
LSIL	10	2
HSIL	10	2
Carcinoma cervix	10	2
Unsatisfactory sample	30	6
Total	500	100

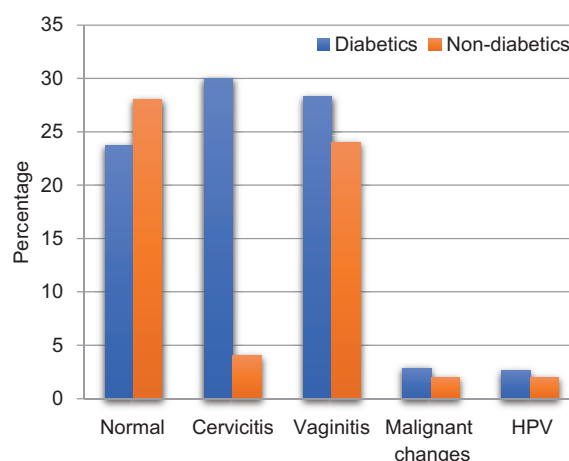
**Table-4: Findings in Non-diabetic patients.**

Inflammatory smear	15
Chronic cervicitis	10
Chronic cervicitis with HPV with dysplasia	10
Chlamydia	10
Trichomoniasis	35
Bacterial vaginitis	120
Candida	15

**Table-5: No of cases with inflammatory conditions**

Finding	Diabetics	Non-diabetics	Relative Risk	Odds Ratio	p-value
Normal	23.75	28	NA	NA	0.51
Cervicitis	30	4	7.5	10.9	0.000001
Vaginitis	28.3	24	1.17	1.23	0.51
Malignant changes	2.85	2	1.5	1.52	0.65
HPV	2.63	2	1.3	1.4	0.73

**Table-6: Comparison of results between diabetics and non-diabetics**



**Figure-3: Graph Showing comparison of major findings among both the cohorts**

Non-specific cervicitis (n=526) was the most common finding among patients having cervicitis. 18 patients had LSIL along with severe cervicitis (table-3).

**Results in non-diabetics:** Above findings were then compared to pap smear results of another cohort of non-diabetic females (n=500) who attended the OPD for HPV vaccination or various complaints and routine check-ups. Among them 12% (n=60) had normal smear, 4% had cervicitis (n=20), 36% (n=180) had vaginitis of various causes, 4% (n=20) had premalignant changes and 2% (n=10) had Ca cervix (table-4).

A considerable proportion of patients turned out to have inflammatory findings among the non-diabetic cohort as well (table-5).

On comparing the two groups, some findings were comparable while some showed significant difference between the two groups (table-6, fig-3).

**DISCUSSION**

Despite having highest incidence, India has no targeted approach towards screening females for diabetes and cervical cancer as well.<sup>14</sup> Since cancer cervix is associated directly with lower socioeconomic class, it is important that we come up with a high coverage, simple plan which enables women at risk and also general population to get routinely screened for premalignant and malignant conditions.<sup>15</sup>

Having the advantage of a long lead time between pre-malignant changes till the development of cervical cancer, pap smear serves as a very good option. Diabetes was earlier

considered to be a disease of high socioeconomic class but recent studies have shown that the incidence is rapidly rising among low socioeconomic class as well. Diabetes has been found to increase chances of development of various cancers like colon, pancreatic, postmenopausal breast, endometrial, liver, bladder and non-hodgkins lymphoma. Also diabetes has been incriminated in decreased rate of survival with cancer as a comorbidity. But no direct association has yet been found between cervical cancer and diabetes.<sup>6-10</sup>

Higher incidences of cervicitis and associated HPV infection in diabetics do pave way for further research and the need to study the correlation between diabetes and cervical cancer in women.<sup>16</sup> Govt. run programmes like national programme for prevention and control of non-communicable diseases, have guidelines for screening for diabetes and cancer cervix also including some other non-communicable diseases and cancers, but having to deal with high disease burden of communicable diseases, and other leading causes of mortality, no aggressive screening approach seems to be implemented.<sup>17</sup> It is important that we develop a system of mandatory screening to ensure the health services are used in time when we can work best in the interest of patient, rather than for palliative procedures later.

## CONCLUSION

Following patterns were observed when the pap smear findings of diabetics were compared to non-diabetics. 23.75%(n=632) were normal smears in diabetics compared to 28%(n=140) in non-diabetics. While diabetics had a higher percentage of cervicitis 30.03%(n=799) compared to 4%(n=20) in non-diabetics, diabetics also had higher percentage of vaginitis 28.27%(n=752) compared to 24%(n=120) in non-diabetics. Malignant changes were noted in 2.85%(n=70), and in non-diabetics were seen in 2%(n=10).

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## REFERENCES

1. Nanda kumar A, Ramnath T, Chaturvedi M. The magnitude of cancer cervix in India. *Indian J Med Res.* 2009;130:219-21.
2. A, Kujur A. Changing trends in genital cancer. *Int J Reprod Contracept Obstet Gynecol* 2017;6:850-5.
3. Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, Rebelo M, Parkin DM, Forman D, Bray, F. GLOBOCAN 2012v1.0, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11 [Internet]. Lyon, France: International Agency for Research on Cancer; 2013. Available from: <http://globocan.iarc.fr>

4. Centre for Disease Informatics and Research, National Cancer Registry Programme, ICMR. Time trends in cancer incidence rates, 1982-2010. Bangalore, India: NCDIR-NCRP (ICMR); 2013.
5. ICO Information Centre on HPV and cancer. Human Papillomavirus and Related Diseases in India (Summary Report 2014-08-22); 2014.
6. <https://www.cancer.org/cancer/cervical-cancer/causes-risks-prevention/risk-factors.html>. Accessed August 26, 2019.
7. Diabetes and cancer. Diabetes.co.uk website. diabetes.co.uk/diabetes-complications/diabetes-and-cancer.html. Accessed August 26, 2019.
8. Satija A, Spiegelman D, Giovannucci E, Hu FB. Type 2 diabetes and risk of cancer. *BMJ.* 2015;350:g7707.
9. Kapp DS, Fischer D, Gutierrez E, et al. Pretreatment prognostic factors in carcinoma of the uterine cervix: a multivariable analysis of the effect of age, stage, histology and blood counts on survival. *Int J Radiat Oncol Biol Phys* 1983;9:445-55.
10. Kuo H-Y, Lin Z-Z, Kuo R, et al. The prognostic impact of type 2 diabetes mellitus on early cervical cancer in Asia. *Oncologist* 2015;20:1051-7.
11. Jiamset I, Hanprasertpong J. Impact of diabetes mellitus on oncological outcomes after radical hysterectomy for early stage cervical cancer. *J Gynecol Oncol* 2016;27:27.
12. Rabi DM, Edwards AL, Southern DA, et al. Association of socio-economic status with diabetes prevalence and utilization of diabetes care services. *BMC Health Serv Res.* 2006;6:124.
13. Suwannaphant K, Laohasiriwong W, Puttanapong N, Saengsuwan J, Phajan T. Association between Socioeconomic Status and Diabetes Mellitus: The National Socioeconomics Survey, 2010 and 2012. *J Clin Diagn Res* 2017;11:LC18-LC22.
14. Srivastava AN, Misra JS, Srivastava S, Das BC, Gupta S. Cervical cancer screening in rural India: Status & current concepts. *Indian J Med Res.* 2018;148:687-696.
15. Devarapalli P, Labani S, Nagarjuna N, Panchal P, Asthana S. Barriers affecting uptake of cervical cancer screening in low and middle income countries: A systematic review. *Indian J Cancer.* 2018;55:318-326.
16. Mirzaie-Kashani E, Bouzari M, Talebi A, Arbabzadeh-Zavareh F. Detection of human papillomavirus in chronic cervicitis, cervical adenocarcinoma, intraepithelial neoplasia and squamous cell carcinoma. *undishapur J Microbiol.* 2014;7:e9930.
17. <https://nhm.gov.in/index1.php?lang=1&level=1&sublinkid=1041&lid=614>

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