International Journal of Nursing Education
Volume 15 No. 1, January-March 2023

Cervical Pap Smear Abnormalities among Women with Diabetics Versus Non Diabetics Women at Omdurman Military Hospital, Sudan

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How to cite this article: Adam MO, Yagoub AEB, Adam AM, Fadlalmola HA. Cervical pap smear abnormalities among women with diabetics versus non diabetics women at Omdurman Military Hospital, Sudan. 2023;15(1):49-48.

ABSTRACT

Background: Cervical cancer is a common cancer in the world, Pap smear and human papilloma virus test are used for early detection and follow up of cervical cellular changes and cervical cancer, but here in Sudan they are still poorly used. Diabetes and cancer share some risk factors and they have both been found to happen in the same patients. The aim of this study is to evaluate abnormal pap smears from diabetics and non-diabetics.

Methods: this is a case-control hospital base study, (109) cases and (109) controls, the patients who requested pap smear during study period and who matched the characteristics of the study. Controls are diabetes-free, but they have another complains because of which the pap smear is requested like genital infection complaints or gynecological complaints, cases have diabetes plus the infection or gynecological complaints because of which the pap smear is requested.

Results:(74.3%) of the cases showed abnormal results (positive), (47.6%) of them Atypical Squamous Cells of Undetermined Significance and Atypical Glandular Cells of Undetermined Significance, (26.7%) of them inflammation and infection. (22.9%) of the controls showed positive results (4.6%) of them Atypical Squamous Cells of Undetermined Significance and Atypical Glandular cells of Undetermined Significance, (18.3%) of them signs of inflammation and infection signs. (25.7%) of the cases have had negative pap results for intraepithelial lesion, malignancy, or infections while (77.1%) of control.

Conclusions: there is association between diabetes mellitus and abnormal finding of pap smear test and controlling of diabetes mellitus is important issue affecting pap smear findings. also, diabetes increases liability of diabetic women to get infections and cervical cellular changes.

Keywords: pap smear, cervical cancer, diabetes, HbA1C, Sudan

INTRODUCTION

Cervical cancer is a common cancer through the world, and it is the highest one in Europe. Pap smear and HPV test (human papilloma virus) are using for early detection and follow-up of cervical cellular changes and cervical cancer, especially a lot of patients are still diagnosed in the end stages, here in Sudan cervical smear still poorly used, [1-3] diabetes is considered main factor that

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increases the tendency to get genital infections specially when not controlled, it affects both occurrence and reoccurrence of the infection. Hyperglycemia affects immune system of patients negatively as well as it enhances the yeast multiplication and adhesion, infections are one of the main causes of precancerous cellular changes, So, first important element of preventing happening of this is to get diabetes controlled. [4]

Ddiabetes and cancers have mutual risk factors and they both been noticed to happen in the same patients which is unlikely to be by chance and doctors reported for more than 50 years backward that diabetes occur synchronizing with cancer, and some malignancy occur more frequent with diabetes also diabetic patients at higher risk for developing cancers , some studies noticed that some antihyperglycemic (metformin and Thiazolidinediones) agents have a relation with cancers, gynecologic cancers have several common mechanisms with type two diabetes mellitus, including increased insulin and insulin like growth factor (IGF) signaling and chronic inflammation. [5-7] diabetes mellitus is studied a lot as a cause of many cancers, but it rolls in developing cervical cancer still un studied. [8]

Generally, diabetes increases occurrence of malignancy of anus and genital area especially cervical cancer which increases in patients with type two diabetes than in non-diabetic patients, as well as diabetes increase risk of getting HPV which is the main leading cause to cervical cancer also some studies confirm relation between cervical cancer and type one diabetes. [9,10]

The aim of this study is to evaluate cervical pap smear abnormalities among diabetic versus non diabetics women at Omdurman Military Hospital.

METHODS

This is case control, Hospital based study was carried out in Omdurman military hospital - Oncology clinic which is a section in obstetric and gynecological hospital inside Omdurman military hospital, it provides diagnostic (such as pap smear), therapeutic and follow up services for military covered oncology patients, also it receives the referred patients from another hospital and even from outside Khartoum state and serves them even if they are not military covered. Target populations Composed of women who have requested for pap smear in Omdurman Military Hospital's oncology clinic at the time of the study, including diabetic and non-diabetic participants. Structured questionnaire formulated by the researchers based on the literature, it is composed of three parts, first part is demographic data, second part is answering the variables of specific objectives, third part for conclusion of pap smear results, questionnaire was filled by the researchers during waiting time of participants. A single questionnaire filling time took about five to seven minutes from each participant time. Face-to-face interview method for the participants who were met life and telephone interview method for the participants who were been taken from the records at the time of the study, Convenience selection of sample is used, the sample size was estimated using this equation. Certain factors that may be confounding and may affect results of pap smear were used to match controls to cases, those factors include (HPV, Sexual history, Smoking history , Weakened immune system, Long term contraception use, Age at first pregnancy, Fruit and vegetables consumption, DES, Family history of cervical cancer, Chlamydia infection, weight, age and parity). Controls are diabetes-free, but they have other complaints because of which pap smear requested like genital infection complains (vaginal discharge, itchy, lower back pain, suprapubic pain, dyspareunia, ectropion, intrauterine device infection complain) and another gynecological problem complains (secondary infertility, post coital bleeding, postmenopausal bleeding, menstrual cycle disturbance, fibroid , polyp , inclusion cyst, prolapsed), cases have diabetes plus the infection or gynecological complains because

of which the pap smear has been requested. After data collected it cleaned, coded, and tabulated then entered SPSS software version 19 for analysis using Pearson Correlation and Chi Square test. The research was respected the rights of participants, Consent was obtained from all participants after explanation.

RESULTS

The test is significant, there is relation between diabetes mellitus and abnormal results of pap smear, P value = 0.000.

Odd ratio = 113, that is, there is association between diabetes and abnormal pap smear test.

Linear Regression Coefficients = 13.483 which means as the diabetes occurrence increases the mean of the abnormal pap smear also increases.

Pearson correlation coefficient (Pearson's r) = - .242 which means there is negative association.

Table 1: Demographic Data

Variables	*Percentages (%)*			
Age	(52.8%) young adulthood (18-35) y	(44%^) middle age (36-55) y	(3.2%) adulthood (56) y and above	--------
Parity	(1.8 %) Null parity	(83 %) Multi parity	(15.1%) Grand multipara	--------
Gravidity	(0%) Pregnant	(100%) Not Pregnant	--------	--------
Education	(2.8%) Post graduate	(47.2%) Graduate	(38.1%) Secondary	(11.9%) Elementary \ illiterate
Occupation	(2.3%) free worker	(36.2 %) Employee	(61.5%) House wife	--------
Residence	(22.5%) Khartoum	(20.2%) Bahri	(45.4%) Omdurman	(11.9%) Outside Khartoum
Body mass index	(11.9%) Under weight (16-18.5)	(56%) Normal weight (18.5-25)	(24.8%) Over weight (25-30)	(7.8%) Obese (30 and above)

Table 2: Showed results of pap smear

Results	*Case*	*Control*	*Total*
NILM (Negative for intraepithelial lesion or malignancy)	(25.7%)	(77.1%)	(51.5%)
Inflammation and infection signs	(26.7%)	(18.3%)	(45%)
Infection manifestation with ASCUS\AGUS	(47.6%)	(4.6%)	(52.2%)
Total	109 (100%)	109 (100%)	218 (100%)

Table 3: Level of HbA1C

Level of HbA1C	*Case*	*Control*	*Total*
Not diabetic	0(0%)	109(50%)	109(50%)
Normal (below 5.7%)	49(22.5%)	Not requested	49(22.5%)
Abnormal (5.7%-6.4%)	35(16.1%)	Not requested	35(16.1%)
Abnormal above (6.5%)	25(11.5%)	Not requested	25(11.5%)
Total	109 (50%)	109 (50%)	218(100%)

Table): Showed Chi-square tests for relation between diabetes mellitus and abnormal results of pap smear

	Value	*df*	*Asymptotic significance (2-sided)*
Pearson chi-square likelihood ratio N of Cases	90.673a	23	.000
Pearson correlation coefficient (Pearson's r)	113.013 12.750 218 - .242	23 1	.000

DISCUSSION

Considering factors like gravidity, HPV infection, number of sexual partner, smoking condition, long use of oral contraception, age at first pregnancy, fruits and vegetables consumption, exposure to DES, history of ca cervix, history of Chlamydia infection in this study all participants were not pregnant, do not know whether they get HPV infection or not , have one sexual partner, are not smoking, have no long use of oral contraception, get first pregnancy older that (20) years old, have poor fruits and vegetables consumption, do not know whether they exposed to DES or not, have no history of ca cervix, do not know whether they had Chlamydia infection or not. those are the risk factors as mentioned by the American Cancer Society. [11]

In this study, half (51%) of participants is in young adulthood (18-35) years, people in this age group are expected to be sexually active so easily to get infections. This explained that they have been requested for a pap test due to their complains. In fact, the pap smear performed on our participants is not routine; it is diagnostic. This result is supported by literature that says that women usually start a routine pap smear test late in their reproductive life. [12] Most of participants (45.4 %) are living in Omdurman; the reason could be because the hospital located in Omdurman closed to them. In spite of that most of our respondent had secondary education; the majority (56%) of them (diabetic and nun diabetic) are within normal weight, this may be related to their awareness or may be the cause is the deterioration of general economic status of the country, this is differed than the result of a study performed in (2017) in which (64.4%) of diabetic women were overweight and obese. [13]

Only (45%) of our study cases group have controlled diabetes with HbA1C below (5.7), the rest (55%) have not controlled diabetes; this explain the increased percentage of abnormal pap test results and infections among them, this finding supported by study revealed that patients with borderline and elevated hemoglobin A1C are likely to get Bacterial Vaginosis, Trichomoniasis, and Trichomonas vaginalis. [14]

The general results of the pap test of our participants (case and control) revealed that (74.3%) of the cases have abnormal results (positive results) in accordance with to study done on diabetic patients attending the tertiary care center which have (70%) abnormal results, including infection, inflammation, and malignancies, also similar to meta-analyses result that says diabetic sufferers are in increased danger of growing infections and malignancies. [15]

In this study Candida infection in the diabetic group (7.3%) exceeds that of the nondiabetic group (.9%), supported by a retrospective case-control study of Pap smear which revealed that Candida is greater in diabetic ladies in comparison to non-diabetic. [16] as well as another study in Maringa, Brazil, studied host elements that would predispose ladies to increase recurrent vulvovaginal candidiasis (RVVC), one of them glycemia, and told that Diabetes mellitus and insulin

resistance had been extra related to positive culture groups than the passive ones. [17]

The results of diabetic group in this study showed no malignant changes agreed to a prospective observe in cytomorphological abnormalities and microorganisms in Pap smear in Type II Diabetes Mellitus that showed no malignancies also there was increased Candidacies as well as this study. [18] This result is supported by a study done in Korea that elevated said that diabetes glucose level are risk factors for uterine cervical cancer that revealed that the connection between cervical cancers and type 2 diabetes stays doubtful. [19]

(47.6%) of the cases have acquired atypical squamous cells of Undetermined Significance while just (4.6%) of control have obtained it, the marked deference indicates that diabetes increase liability of diabetic women to obtain cellular changes (ASCUS\AGUS), if ASCUS left without follow-up or untreated (.25%) developed carcinoma, [20] and (20%-50%) of AGUS when more investigated it was found to have cervical intraepithelial neoplasia and adenocarcinoma in situ. [21] Also, study performed for linking non-insulin dependent diabetes and gynecological cancer emphasize that this type of diabetes is risk factor of developing cervical carcinoma. [22]

(74.3%) of the cases showed abnormal results (positive), (47.6%) of them atypical squamous cells of Undetermined Significance, which represent more than half of the abnormalities this supported by the study revealed that ASCUS and cervical intraepithelial neoplasia (CIN) are increased in patients with diabetes than in patients without diabetes. [23]

P value = .000, So the test is significant, there is relation between diabetes mellitus and abnormal results of pap smear. Odd ratio = 113, that is mean there is association between diabetes and abnormal pap smear test. Linear Regression Coefficients = 13.483 which means as the diabetes occurrence increases the mean of the abnormal pap smear also increases. Pearson correlation coefficient (Pearson's r) =.242 which means there is negative association, this can be explained by that those participants were been requested for pap smear because they were suffering from some things, so maybe there is confounding factors affected the Pearson's r.

CONCLUSIONS

The result of this study showed that there is an association between diabetes mellitus and abnormal pap smear test, also the study told that controlling of diabetes mellitus is important issue affecting pap smear findings. Also, diabetes increases the liability of diabetic women to get cervical cellular changes (ASCUSAGUS).

Acknowledgement

Special thanks to Neelain University Graduate College and Nursing College. We also acknowledge and thank Omdurman Military Hospital staff for their cooperation.

FUNDING

This study did not receive any type of funding.

Conflict of interest

The authors did not have a conflict of interest to disclose.

Ethical clearance

The ethical committee and scientific research board of Omdurman Military Hospital provided the approval for the study to be carried out. The hospital directors were consulted for initial approval. A verbal description of the study's objectives was given to each participant.

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