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Detection of Cytomorphological Changes in Nasal Cavity amongSudanese Cigarette Smokers

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Abstract: A case-control study of cytological changes in nasal cavity smear among smokers people was conducted to test the hypothesis that exposure to cigarette tobacco smoke can make cytological change in nasal cavity. This study was conducted in eastern Sudan in Port – Sudan city during 9th of January 2016 to 30 may 2016. Include 140 people, 70 smoker people considered to be the case group and 70 non-smoker considered to be control group. Nasal mucosal smear using different method of stain (papanicolaou and grun Wald Giemsa stain). The result obtained indicated smoking causes change on the cells we found many cytological changes among case group ranged from 5% metaplasia change , 25% micro nuclear change and 20% normal epithelial cells in case group ,while 49% normal epithelial cell , 1% micro nuclear changes there was no metaplastic changes showed in control group . In conclusion, the results of current study indicate different rates of epithelial change in nasal cavity among smokers and nonsmokers and higher proliferative activity in cigarettes smoking compared to nonsmoking .Also, our results suggest a possible relationship between the number of cigarettes per day and duration can increase in the rate of cellular proliferation.

I. Introduction

Cigarette addiction remains a harmful habit that facilitates the development and progression of periodontal diseases, and there are many effect for long duration of using cigarette, such as oral hygiene, plaque, calculus, and socioeconomic and demographic issues, are in check [(1)]. Exposure to tobacco causes multiple human malignancies, including cancers of the lung, oral cavity, pharynx, esophagus, stomach, liver, pancreas, kidney, bladder, and cervix [(2)].The respiratory tract is an organ for molecular, cellular and tissue damage from inhaled radicals because of its massive surface area. Reactive oxygen species (ROS), pollutants, cigarette smoke and also products of inflammatory cells [(3)]. The nasal cavity is the most superior part of the respiratory tract. It extends from the vestibule to the nasopharynx and nasal cytology is very useful diagnostic tool in nasal disorders, being able to detect both the cellular modification of the nasal epithelium caused by either allergen exposure or irrigative stimuli (that may be physical or chemical, acute or chronic) inflammation [(4)]. Numerous studies have been carried out to assist an association between cancers of the human nasal cavity and paranasal sinuses and cigarette smoking [(5, 6, 7)]. Also numerous studies assist there were many structural and functional alterations due to tobacco cigarette smoke, important structural alterations to the respiratory epithelium. Different studies have shown that cigarette smoke causes a reduction in cell viability and induction of apoptosis in respiratory hair cells [(8, 9)]. The present study was undertaken to evaluate the cytological change in nasal cavity among tobacco smokers by using cytological techniques, to detecting early changes of diseases even in the absence of clinical manifestations.

II. Material and Method

The current study is descriptive case-control study was conducted in eastern Sudan in Port – Sudan city during 9th of January 2016 to 30 may 2016. Included 140 people, 70 smoker people considered to be the case group and 70 non-smoker considered to be control group. Nasal smear to all case and control were collected by tongue depressor. Preparation, fixation of nasal cavity smear, two smear were prepared from each participant by

using tongue depressor.The smears were stained with conventional papanicolaou stain and May-grunwald Giemsa stain (mgg) then screened by senior cytologist .Data analysis was performed using statistical package for social science (SPSS) software (crosstab chi-square test) and Test results with a probability value (*P*) of <0.05 were considered to be statistically significant.

III. Result

In the current study, 170 individuals divided equally in smokers and non-smokers, were examined. The age was range from 19 years to above 59 years, Patients aged 19–29 years old had the highest rate, and few were within the age groups ranged (above 59 years) table (1).Table 2&3 showing the number of cigrate per day and duration time for smoking among the case group, the higher percent 39.3% found with those smoked (10-20) cigrete per day and lowest found 2.9% above 50 cigrate per day. According to the duration the higher percent (31.4%) were found between 5-15 year and the lowers percent (.7%) found among above than 45 year. The association between age and cytological finding among study groups , the group (19-29 years showed 11% micro nuclear changes , 2% squamous metaplasia and 28% normal epithelial cell , while the age group above 59 years there was lower incidence of micro nuclear changes epithelial cells 3% , squamous no squamous metaplasia and 4% normal epithelial cell it is appear in figure (I). The association between number of cigarette per day and cytological finding in study group the most changes in 10-20 cigarettes per day 16%normal epithelial cells, 20% micro nuclear changes in epithelial cells 3% squamous metaplasia in epithelial cells , while the lower incidence in number of cigarettes 41-50 cigarettes per day there was no normal epithelium and no squamous metaplasia in epithelial , 1%micro nuclear change in epithelial cells ,there was no significant difference P.value 0.121 , figure (2). The association between duration of smoking and cytological finding the most changes caused in 5-15years ,14% normal epithelial cells,16%micronuclear change in epithelial cells 2% squamous metaplasia ,there was no significant different P.value 0.23 figure (3). The association between types of inflammatory cells and cytological finding we reported 65%normal epithelial ,19%icronuclear changes ,2%sqammous metaplasia in smear free from inflammatory cells ,while in smear contain eosinophil cells 1%normal epithelial cells ,4%micronuclear changes ,2%metaplasia epithelial cells (figure 4, photo 1 and 2). The association between study group smokers and non-smokers people smear finding the high incidence of morphological changes in smoker's people 5% metaplastic squamous epithelial, 25% micronuclear changes 20% normal epithelial cell see figure (5).

Table I: Frequency of ages for study group.

Age group		Frequency	Percent	Valid Percent	Cumulative Percent
	19-29 year	58	41.4	41.4	41.4
	29-39 year	18	12.9	12.9	54.3
	39-49 year	26	18.6	18.6	72.9
	49-59 year	28	20.0	20.0	92.9
	above 59 year	10	7.1	7.1	100.0
	Total	140	100.0	100.0	

Table II: numbers of cigarette smoked per day

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10-20 cigrete	55	39.3	78.6	78.6
	21-30 cigrate	6	4.3	8.6	87.1
	31-40 cigrate	4	2.9	5.7	92.9
	41-50 cigrate	1	.7	1.4	94.3
	above 50 cigrate	4	2.9	5.7	100.0
	Total	70	50.0	100.0	

Table III: the duration of smoking

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5-15 year	44	31.4	62.9	62.9
	15- 25 year	13	9.3	18.6	81.4
	25-35 year	6	4.3	8.6	90.0
	35-45 year	6	4.3	8.6	98.6
	above 45 year	1	.7	1.4	100.0
	Total	70	50.0	100.0	
Missing	System	70	50.0		
Total		140	100.0		

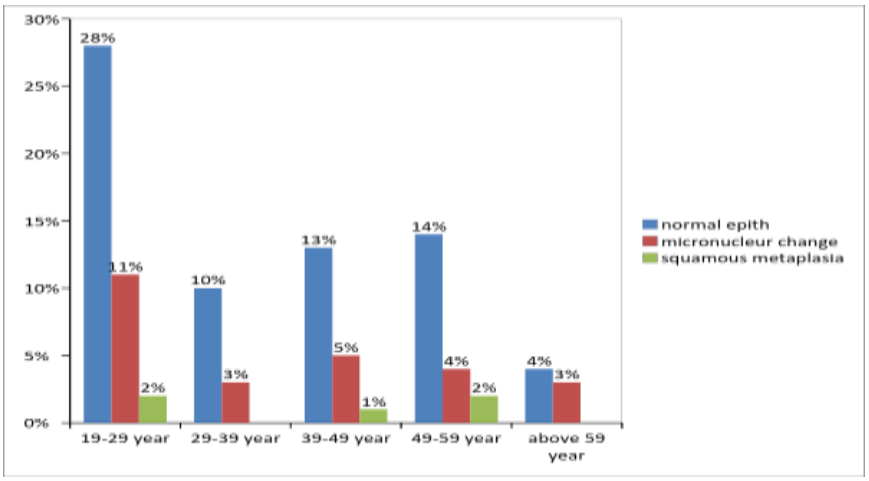


Figure 1: Association between age and cytological change in study group (P.value 0.68)

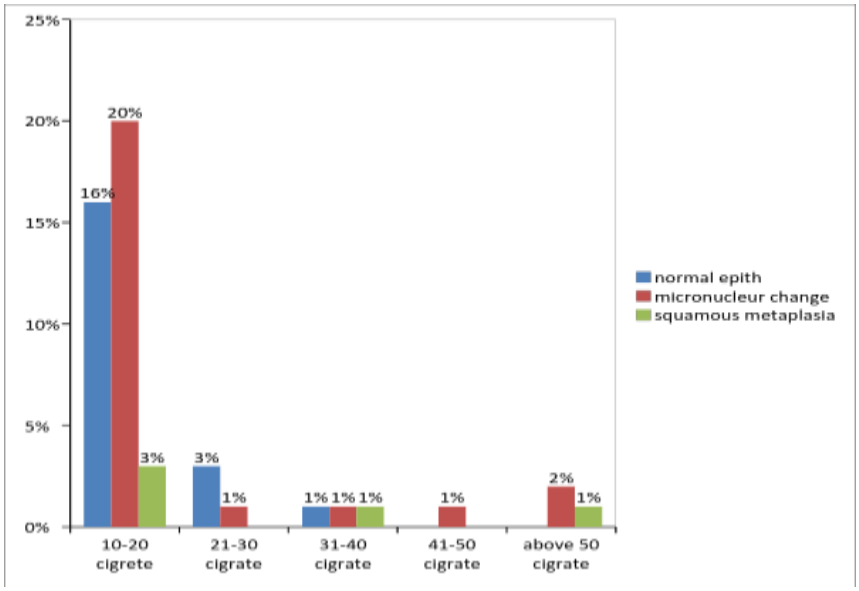


Figure 2: Association between number of cigarette per day and cytological change in study group (P.value 0.121).

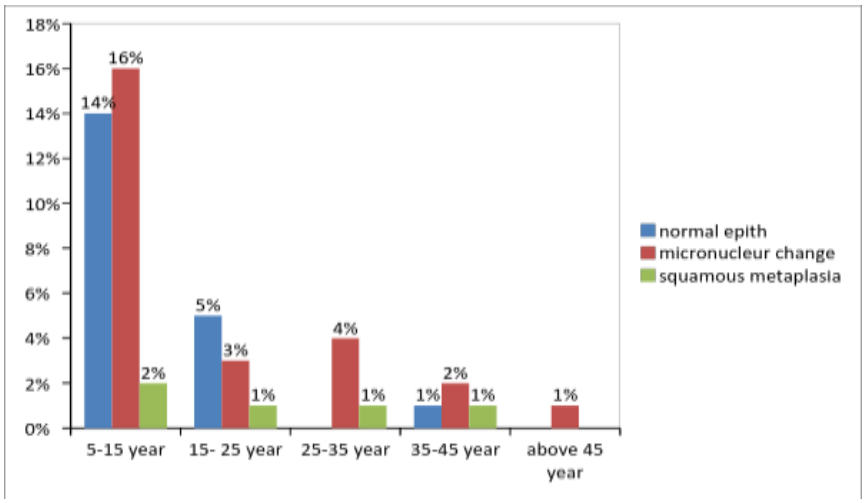


Figure 3: Association between duration of smoking per year and cytological Change in study group (P.value 0.23).

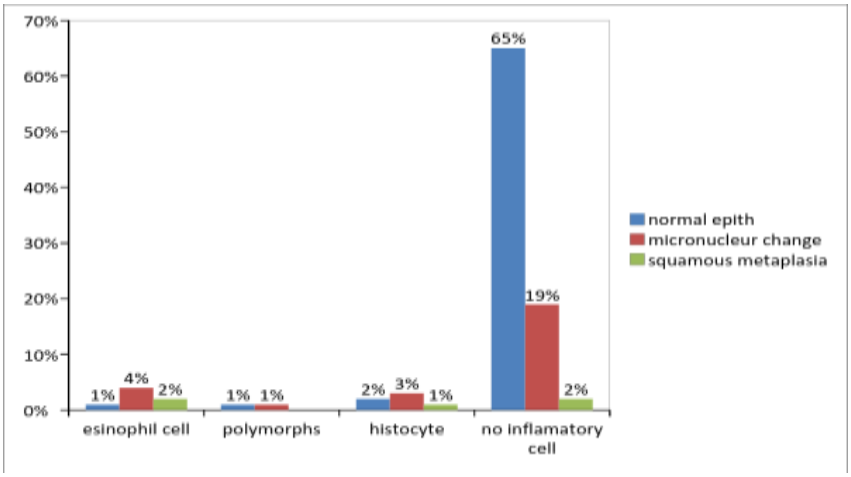
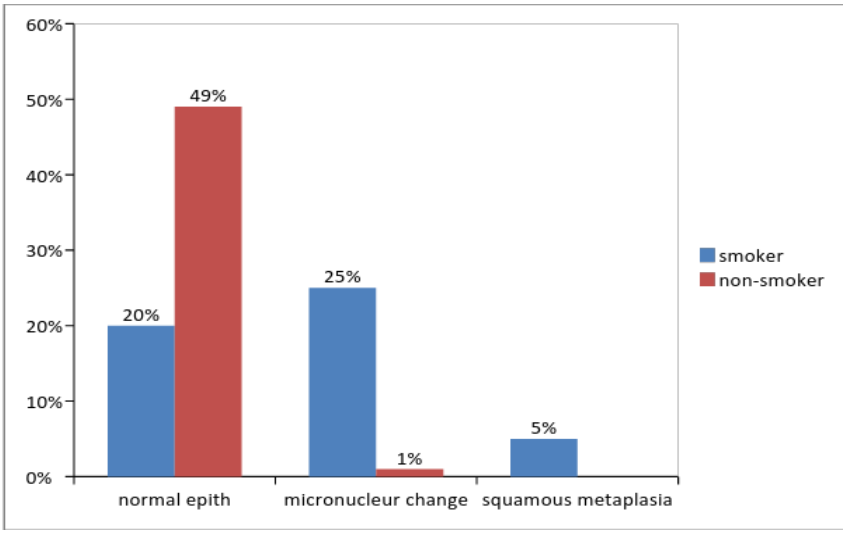


Figure 4: Association between type inflammatory cells and cytological changes in study group (P.value 0.12).



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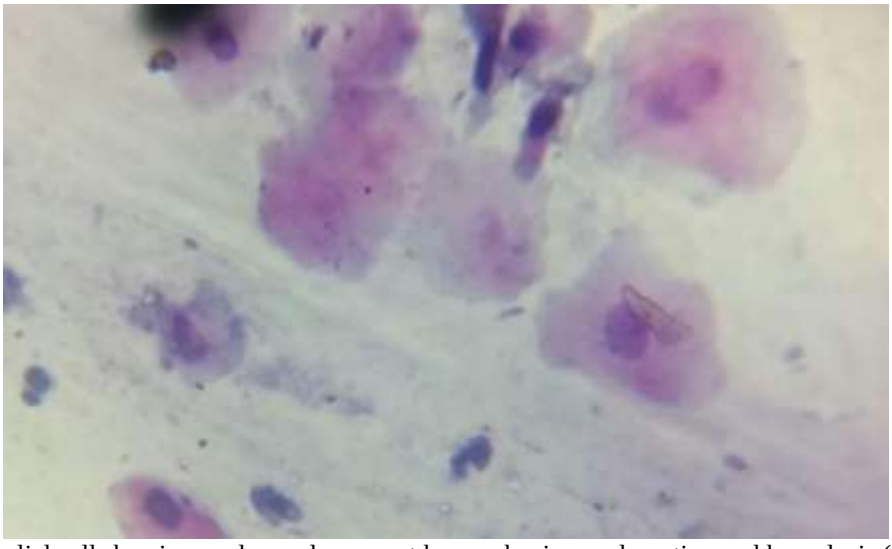

Photo I: Epithelial cell showing unclear enlargement karyorehexis, condensation and karyolysis (micro nuclear changes) by PaP Stain.

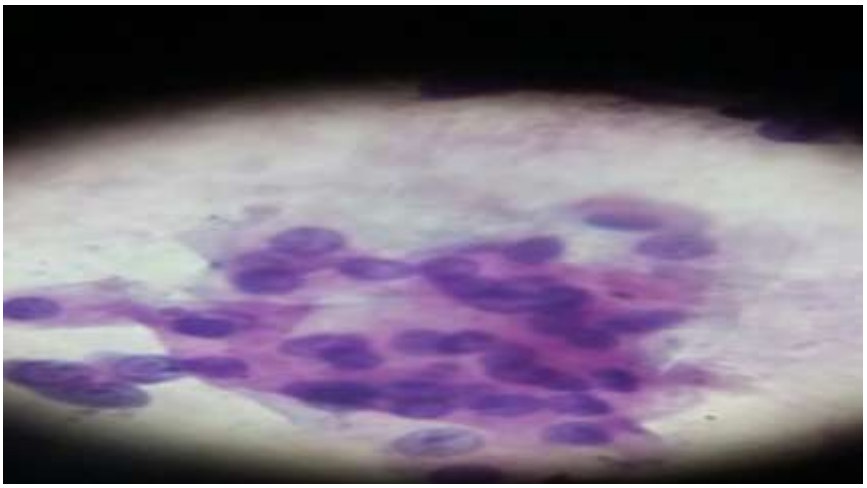

Photo 2: Micro nuclear changes chromatin condensed at nuclear border by MGG time * 40

IV. Discussion

Tobacco is the only legal drug that kills many of its users when used exactly as intended by manufacturers. WHO has estimated that tobacco use (smoking and smokeless) is currently responsible for the death of about six million people across the world each year with many of these deaths occurring prematurely [(10, 11)]). Numerous studies have been carried out to Cigarette smoking has been associated with human nasal cavity change and nasal sinus cancer [(12, 13)]. In Sudan there were many previous studies conducted to assist the effect of exposure to tobacco and other environmental factors affect human health [(10, 14, 15)]. In the present study, PAP stain technique was used to evaluate cellular and cytological changes in nasal smear among smoker Sudanese people comparison with control group. The results showed that the higher percentage of normal epitlial (28%) found in group of age between (19-29 year), micronuclear change (11%) and squamous metaplasia (2%), the lowest percent of normal epithelial found in group above 59 years (4%), micronuclear change (3%) but we not found any squamous metaplasia (0%) in this group. Our finding supported by study conducted by Zimmermann and Zimmerman showed that the cytological change in senile smokers are more numerous compare to young smokers and nonsmokers [(16)]. According to association between number of cigarette perday, duration and cytological change in this study we found there were different change in normal epithelial cell but this change not statistically significant' between number of cigarette per day. most frequent represent of cytological change found in group which using (10-20) cigarettes per day for duration between 5-15 years of smoking as fallow, normal epithelial (16%), micronuclear change (20%) but we not found any squamous metaplasia (3%), but the lower frequent percent of normal epithelial (0%) found in group which using more than 50 cigarettes per day. This finding agreement with several studies concluded that the presence of cell alterations related to the number of cigarettes smoked per day [(17, 18)]. Our result observed in association between type of inflammatory cells and cytological changes in study group the nasal smear showed the eosinophil was predominate cells thee intensity ranged from 10-20 HPF ,fallow by histocyte and polymorph cell. According to smokers and non-smokers our result found there was significant difference between smokers and nonsmokers people in the cytological appearance which stain with papanicolaou stain with P.value (0.00). the nasal smear contain ranged of changes as 5% squamous metaplasia 25% micro nuclear change this was classified as (pyknosis , karyohexis and karyolysis) also 5% of epithelial cells contain nuclear organize region. This finding was supported by numerous studies. Pavanello et al. reported a larger number of inflammatory alterations and an increased rate of cell maturation in smokers [(19)]. Another study conducted by Fontes et al. concluded that the results indicate higher proliferative activity in smoking patients compared to nonsmoking patients [(20)]. Our study has some limitations, such as the relatively small number of subjects which including in this study (case and control). We recommended further studies on large Sudanese smokers must be including to evaluate the effect of cigarette smoking on human health. Also we recommended to adding special and advance technique for cytological investigation such as molecular, tumor marker and applying wavelet analysis for processing cytology preparations images [(21, 22)]. Finally we recommended Increase the awareness of the smokers and nonsmokers people about the risk of tabaco cigarette smoking and other type of tabaco as factors that may increase the risk of developing cancers.

V. Conclusion

The results of current study indicate different rates of epithelial change in nasal cavity among smokers and nonsmokers and higher proliferative activity in cigarettes smoking compared to nonsmoking. Also, our

results suggest a possible relationship between the number of cigarettes per day and duration can increase in the rate of cellular proliferation in nasal cavity.

Reference

[1]. Al-Bayaty, Fouad H., et al. "The influence of cigarette smoking on gingival bleeding and serum concentrations of haptoglobin and alpha 1-antitrypsin." BioMed research international 2013.2- IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. Tobacco smoke and involuntary smoking. IARC Monogr Eval Carcinog Risks Hum 2004;83:1–1438

[2]. Cross CE, Vliet AV. Reactive oxygen species and the lung.The Lancet 1994; 344: 930–32.

[3]. Gelardi M , et al . nasal cytology in children: recent advances .italian j of pediatrics .2012 ; () 38-51 .

[4]. Brinton LA, Blot WJ, Becker JA, et al. A case-control study of cancers of the nasal cavity and paranasal sinuses. Am J Epidemiol 1984; 119:896-906.

[5]. Zheng W, Blot WJ, Shu XO, et al. A population-based casecontrol study of cancers of the nasal cavity and paranasal sinuses in Shanghai. Int J Cancer 1992;52:557-61.

[6]. Reif, John S., Christa Bruns, and Kimberty S. Lower. "Cancer of the nasal cavity and paranasal sinuses and exposure to environmental tobacco smoke in pet dogs." American journal of epidemiology 147.5 (1998): 488-492.

[7]. Lan MY, Ho CY, Lee TC, Yang AH. Cigarette smoke extract induces cytotoxicity on human nasal epithelial cells. Am J Rhinol. 2007;21:218-23.

[8]. Tamashiro, Edwin, et al. "Effects of cigarette smoking on the respiratory epithelium and its role in the pathogenesis of chronic rhinosinusitis." Brazilian journal of otorhinolaryngology 75.6 (2009): 903-907.

[9]. Makarim Salman Ismail , Badr Eldin Hassan ElAbid , Asaad Mohammed Ahmed Abd Allah Babker , Quantitative Assessment of Serum Alpha-1-Antitrypsin, Serum and Salivary Calcium Levels among Sudanese Cigarette Smokers, Journal of Health Science, Vol. 6 No. 2, 2016, pp. 17-21. doi: 10.5923/j.health.20160602.01.

[10]. World Health Organization (WHO), 2015. Global report on trends in prevalence of tobacco smoking 2015. Geneva: World Health Organization.

[11]. Zheng W, Blot WJ, Shu XO, et al. A population-based casecontrol study of cancers of the nasal cavity and paranasal sinuses in Shanghai. Int J Cancer 1992;52:557-61.

[12]. Marocchio LS, Lima J, Sperandio FF, Corrêa L, de Sousa SO. Oral squamous cell carcinoma: an analysis of 1,564 cases showing advances in early detection. J Oral Sci. 2010; 52: 267 – 273.

[13]. Ahmed Abdalla Agabeldour, Tarig Osman Khalafallah , Asaad Mohammed Ahmed AbdAllah: Hematological changes among Sudanese petroleum workers with a broad range of benzene exposure: Sch. J. App. Med. Sci., 2015; 3(8D):3054-3056.

[14]. Ahmed, Hussain Gadelkarim, and Twhida Mahdi Rezgalla. "A Study of lung epithelial atypia in regard to the effect of smoking and traffic-related Air pollution in Sudan." The Open Lung Cancer Journal 3 (2010): 1-6.

[15]. Zimmermann ER, Zimmermann AL. Effects of race, age, smoking habits oral and systemic disease on oral exfoliative cytology. J Dent Res.1965; 44: 627 – 631.

[16]. Ogden GR, Cowpe JG, Green MW. Quantitative exfoliative cytology of normal buccal mucosa: effect of smoking. J Oral Pathol Copenhagen. 1990; 19: 53 – 55.

[17]. Silva MCA. Porto Alegre: UFRGS Faculdade de Odontologia, 1997. Dissertação (Patologia). Faculadade de Odontologia. UFRGS; 1997.Citopatologia: Um Recurso Auxiliar na Prevenção do Câncer Bucal em Pacientes do Sexo Masculino.

[18]. Pavanello MB, Prado FA, Balducci I, Brandão AAH, Almeida JD. Cytological analysis of alterations induced by smoking and by alcohol consumption. Acta Cytol. 2006;50(50):435–40

[19]. Fontes PC, Corrêa GHM, Issa JS, Brandão AAH, Almeida JD. Comparison of Exfoliative Pap Stain and AgNOR Counts of the Tongue in Smokers and Nonsmokers. Head and Neck Pathology. 2008;2(3):157-. doi:10.1007/s12105-008-0059-0.

[20]. Lyashenko, V. V., Babker, A. M. A. A. & Kobylin, O. A. (2016)The methodology of wavelet analysis as a tool for cytology preparations image processing. Cukurova Med J, 41 (3), 453-463. doi:10.17826/cukmedj.237468

[21]. Lyashenko VV, Babker AMAaa, Kobylin OA. Using the methodology of wavelet analysis for processing images of cytology preparations. Natl J Med Res. 2016; 6(1): 98-102.