A Comparative Study to Determine the Effect of Age & Parity on Vaginal Epithelial Cells Diameters

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Abstract

The vagina is lined by stratified sequamous epithelium which is under the effect of hormonal & environmental factors.

The vaginal epithelium is poorly studied & very little & restricted studies made about this subject.

This study which is cross-sectional aimed at studying the effect of age & parity on vaginal epithelial cees diameter. It was conducted in Al-Bakarly primary health center in Hilla. 82 women who attend the center for various reasons were recruited.

After taking history & physical examination vaginal swabs were taken to obtain vaginal epithelial cells, the slides examined under light microscope to measure vaginal epithelial cell diameter in five epithelial cells & the mean was taken for each swab.

A significant difference in mean cell diameter was found in different age groups.

The least diameter (5.35 µm) in those aged 20 years while the largest diameter (6.50 µm) in those aged 31-40 years.

A significant difference in mean epithelial cell diameter was also found in women of different parity. There was a significant increment in mean cell diameter with increasing parity.

The conclusion of this study is that there is a significant effect of both age & parity on vaginal epithelial cell diameter & these factors must be considered when interpretting vaginal swabs & smears.

INTRODUCTION

The vagina, which is one of the female genital organs is a musculomembranous tube 7-8 cm long, extends from the cervix of the uterus to the vestibule (the cleft between labia minora). The superior end of the vagina surrounds the uterine cervix.

The vagina is usually collapsed (H-shaped in cross section) so that its anterior & posterior walls are in contact, except its superior end where the cervix holds them apart .

The vagina lies posterior to the urethra, which projects into its inferior wall, and urinary bladder, and it lies anterior to the rectum , passing between the medial margins of the levator ani muscles. The vaginal fornix, the recess around the cervix, has anterior, posterior & lateral parts. The posterior vaginal fornix is the deepest part & is closely related to the recto-uterine pouch. [1]

The wall of the vagina is devoid of glands & consist of three layers a mucosa , muscular layer & an adventitia. The mucous found in the lumen of the vagina comes from the glands of the uterine cervix.

The epithelium of the vaginal mucosa of an adult woman is stratified squamous & has a thickness of 150-200 µm. its cells may contain a small amount of keratohyline. Intense keratinization does not occur.

Under the stimulus of estrogen, the vaginal epithelium synthesizes and accumulates a large quantity of glycogen, which is deposited in the lumen of the vagina when the vaginal cells desquamate. [2]

The glycogen is acted upon by the lactobacilli (döderlein's bacilli), a normal inhabitant of the vagina, to produce lactic acid which is responsible for the low PH (acidity average 4.5) of the vagina. This acidity offers a great protection against pyogenic bacteria.

Changes in the vagina with age & parity:

The vagina of the newborn child is under the influence of estrogen which has crossed the placenta from the maternal circulation. The epithelium is therefore moderately well developed & contains glycogen.

By 10-14 days the estrogen stimulus is lost & the epithelium atrophies & becomes devoid of glycogen. Near puberty with the onset of full ovarian function, the vagina assumes the features already described.

Marriage & regular coitus results in some stretching of the vaginal walls, and this is increased by child bearing. Repeated child birth leads to obliteration of the rugea & the vagina becomes smooth walled & rather patulous canal. After the menopause the epithelium atrophies because of estrogen deficiency. [3]

Exfoliative cytology: is the study of the characteristics of cells that normally desquamate from various surfaces of the body. Cytologic examination of cells collected from the vagina gives information of clinical importance. the vaginal smear is also useful in the early detection of cervical cancer. [4]

Aim of study

To determine the effect of age & parity on vaginal epithelial cells diameters.

Patients & method:

this study was conducted for a period of six months from the 1st of January 2008 to the 30th of june 2008 in the primary health center in Al- Bakarly district in Hilla.

The study included 80 women who attended the center for different reasons, some request intrauterine device replacement or checking, others had various complaints such as pelvic pain or dyspareunia. Each woman was submitted to a questionnaire which include patient's age, blood group & Rh, date of the last menstrual cycle, number of deliveries & their type (whether normal vaginal, instrumental or by caesarean section), history of drug intake especially hormonal medications such as oral contraceptive pills or progestogenic agents, any symptoms suggestive of genital tract prolapse like cystocele & rectocele. Exclusion criteria include those who are pregnant, those on hormonal medications & those on hormonal contraception. All studied women were in the proliferative phase of the cycle so that all women will be under the same hormonal effect

Then each woman was examined in lithotomy position for any evidence of infection or genial tract prolapse as these conditions may affect the readings of our study.

A vaginal swab was taken from the lower third of the lateral vaginal wall using a cotton swab, the swab was smeared on a clean glass slide & left to be dried (no fixative was added). After collection of samples, the slides were stained by Haematoxyllin & eosin & examined under light microscope   (Olympus) looking for vaginal epithelial cells. Multiple desquamated cells were seen, the diameter of five epithelial cells were measured using oculometer and the mean of the five readings was taken. Figure (1) show one of the slides which contain large squamous epithelial cells from a lady who is fourty two years old & para 5. Figure (2) show the smallest epithetlial cells detected which was from a lady 20 years old & nulliparous.

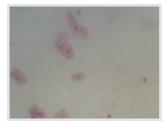Figure (1) a slide show desquamated vaginal epithelial cells, The mean diameter was 36 μm.

Figure (2) a slide show desquamated vaginal epithelial cells, The mean diameter was 17 µm.

Statistical analysis: For statistical analysis SPSS (version 10) program was used. The results were represented through frequency, mean & standard deviation. Student t-test used to compare between means & study the significance of the difference. P value <0.05 was considered to be statistically significant.

Results

In table (1), the women were grouped according to their ages into four groups, those who are 20 years old or less, 21-30, 31-40, & those who are more than 40 years old. The mean vaginal epithelial cell diameters was calculated for the four groups. The smallest diameter (5.35 µm) was found in those aged 20 years while the largest diameter (6.50 µm) was found in those aged 31-40 years. The difference between the age groups was analyzed by t-test & found to be highly significant (P value < 0.05).

Table (1) The mean vaginal epithelial cell diameters in different age groups

Age (yrs)	number	Mean epith. cell diameter(µm)	Standard deviation (±)	t-test	df	P value (significant)
20	12	5.35	.89	20.61	11	.000
21-30	31	6.03	.99	33.80	30	.000
31-40	20	6.50	.73	39.53	19	.000
>40	19	5.55	1.5	16.07	18	.000

Table (2) show the relation between vaginal epithelial cell diameters & parity. Women were grouped into nulliparous, those who are para1 or 2, & those who are para3 & more. The mean epithelial cell diameters was increasing with increasing parity (lowest 3.7 µm in nulliparous women   while 6.8 µm in those who are para 3 & more). The difference in the mean epithelial cell diameters was analyzed by the t-test & again was highly significant (Pvalue < 0.05).

Table(2) the mean vaginal epithelial cell diameters in women of different parity.

Parity	number	Mean epith. Cell diameters (µm)	Standard deviation (±)	t-test	df	P value (significant)
Nulli-parous	12	3.7	0.43	29.67	11	.000
Para1 0r 2		5.7	0.89	35.25		.000
Para3 or more		6.8	0.7	58.52		.000

Discussion:

The vagina is a fibromuscular structure which is under the influence of many factors including hormonal changes that occur from birth to puberty, reproductive age & finally the menopause. In addition mechanical factors also play a part like intercourse & vaginal delivery.

Few studies were done to determine the effect of various factors on vagina epithelial cell diameter.

In our study we grouped the patients according to their ages to see the changes in vaginal epithelial diameter in different age groups, the difference was highly significant. This may be explained by the effect of different levels of estrogen in different ages & the sexual behavior that is usually more in those aged 20-40 years.

The effect of estrogen on vaginal epithelial cell area was assessed in a study done by van der Laak et.al.who used estrogen replacement therapy in post menopausal women to study its effect on vaginal epithelial cell area & found a significant increment in mean cell area indicating a positive effect.[5]

Regarding the effect of vaginal deliveries on vaginal epithelial cell diameter we find a significant increment in cell diameter with increasing parity (vaginal delivery not caesarian section) this may be due to stretching of the vagina during this process.

A similar study done by Uvanwah Po who studied the effect of parity on lateral vaginal wall smear indicating accumulative effect of trauma on the regenerative capability of vaginal epithelium. [6]

Other study done by I.S. Fraser et.al. who examined colposcopic changes in vaginal epithelial appearance & found it to be effected by many factors like sexual intercourse, tampon use, contraceptive method used, cigarette smoking & other environmental factors.[7]

Conclusion :
1- The vaginal epithelium is affected by multiple factors.
2-Age & parity affect the vaginal epithelium in different ways.
3-When interpreting vaginal smear we have to consider these factors.

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