Evaluation of liquid-based method in comparison with conventional method cervical cytology smears stained by hematoxylin and eosin stains

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Abstract

Cervical cancer one of the popular cancers among females leads to death, the research was conducted to study the differences between the Liquid-based cytology preparation technique and the conventional method of cervical smears. Cross-sectional included 120 female presented with different clinical variants involved (erosion, hyperemia, unhealthy, cervical mass, nabothen, polyp, postcoital bleeding, and vaginal discharge), the ages were between 31–45 years were enrolled in our study. Our results showed that 60 out of 120 patients diagnosed by LBM, while 43 out of 120 in the conventional methods were positive (apart from NILM), the P-value was (<0.001). In conclusion, we revealed that the Liquid-based cytology method mostly to be more sensitive and specific than conventional smears in discovering dysplastic changes in the cervix.

Keywords: Health, Eosin Stains, Liquid-Based method, Hematoxylin

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Introduction

Cervical cancer considered the common cause of deaths related to cancer in females in developing countries. Cervical cancer mortality is also a signal of health disparity, as 86% of all deaths in developing countries, middle and low-income countries are related to cervical cancer [1]. Worldwide; cervical cancer ranks second among all malignancies for females. Marked differences in the frequency of cervical cancer are noticed throughout the world due to the differences in the availability of screening programs and risk factors [2]. It continues to be the main cause of cancer-related mortality for females in developing countries that represent 80% of cervical cancer worldwide. Approximately 500,000 new cases are discovered each year internationally [3].

The first preliminary report about the incidence of cervical carcinoma in situ in Iraq was reported, in Acta Cytologica; by Professor Kais Kubba [4]. Baghdad Cancer Registry for the period 1976 - 1982 revealed an apparent
deficit of cervical cancer occurrence and that the same frequency in the other Middle-Eastern populations \[5\]. Early detection of cervical cancer is possible with Pap smear tests. Screening would be greatly influenced by:

1- Knowledge about cervical cancer and the screening program related to it.
2- Role of health care providers who come in contact with women in hospitals.
3- Facilities available and the awareness about it.

Beiki et al compared the risk of gynecologic cancer among foreign-born women to the risk among those born in Sweden in a cohort study of 5.3 million women (18,247 had carcinoma of the cervix) between 1969 and 2004. They found that risk of Iraqi immigrant women born in Iraq was lowest compared with those born in other countries \[6\].

**Risk Factors are:**

1. More than six-lifetime sexual partners cause a significant increase.
2. Sexually transmitted agents: HPV is necessary in development of more than 70% of cases of cervical cancer. It is a heterogeneous group of double-stranded DNA viruses. Seventy-seven different genotypes of HPV identified; 6, 11, 16, 18, 26, 31, 33, 35, 39, 42, 43, 44, 45, 51, 52, 53, 54, 55, 56, 58, 59, 66, and 68 which infect anogenital tissues. Currently, there were association between low-risk type HPV 6 and 11 and low-grade squamous intraepithelial lesions (LSIL) and found that 50-80% of HSIL and 90% of invasive cancers are associated with high-risk type HPV 16 and 18 \[7\].
3. Others: Low Socioeconomic Predictors \[8\]. Smoking (both active and passive) \[9\]. Women with seven prior full-term pregnancies have about four times risk and those with one or two have two times risk compared with nulliparous. Also, long-term combined contraceptive pills use may be cofactor \[10\].

The aim of the study was to evaluate and compare the performance of the Liquid-based cytology preparation technique, to the conventional method of cervical smears in the discovering of the cervical lesion.

**Patients and methods**

This cross-sectional study was achieved for the patient attendant the private clinic of gynecology in Al-Kut city during the interval (1st of June 2017 to the 28th of February 2018). A pre-tested questionnaire form was worked for each female. The Inclusion feature was married woman, the divorced and widows are also included; while the exclusion was vaginal bleeding of any type and pregnancy. The obtained data included information on demographic and socioeconomic status as the patient age, age at marriage, age at menarche, age at first live birth, gravidity, parity, and use of contraception. After taking patient agreement the clinical gynecological examination was done. Cervical smear was taken in two methods conventional and liquid-based and the slides stained by hematoxylin and eosin stain examined under a microscope by two histopathologists. In this study, we consider any diagnosis apart from NILM as positive. Statistical analysis was done using SPSS version 10 computer software (statistical package for social sciences).
Result
All the 120 females who performed Pap smear and all their smears were satisfactory. Variable clinical changes were found in all the patients. It was possible to discover more than one clinical finding in the same patient, that is why an accessory number of disparate clinical changes in the (figure 1) of this study are more than 120.

![Figure 1](https://via.placeholder.com/150)

**Figure 1:** Clinical presentation of the patients in this study.

The figure above revealed that cervical erosion is the most clinical presentation of the patients and the last one is the vaginal discharge, and postictal bleeding. Demographic features of the patients displayed in Table 1. The age of Preponderance of females was between 31–45 years, with a mean age of 40.53 years ±10.25. All women were married, however, most presenting women (65%) got married before the age of 20 years, most of them were of good socioeconomic status, and not a smoker.

**Table 1:** Demographic characteristics.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>Mean ±SD</td>
<td>40.53± 10.25</td>
</tr>
<tr>
<td>Range</td>
<td>21-67”</td>
</tr>
<tr>
<td>&lt;30 years</td>
<td>25 (20.8)</td>
</tr>
<tr>
<td>31-45 years</td>
<td>56 (46.7)</td>
</tr>
<tr>
<td>&gt;45 years</td>
<td>39 (32.5)</td>
</tr>
<tr>
<td><strong>Age at menarche</strong></td>
<td></td>
</tr>
<tr>
<td>Mean ±SD</td>
<td>12.29± 0.65</td>
</tr>
<tr>
<td>Range</td>
<td>11-16”</td>
</tr>
</tbody>
</table>

Regarding the pathological findings this study revealed that 60 out of 120 patients diagnosed by LBM; and 43 out of 120 in Conventional method were positive (apart from NILM), and Table 2 and 3 revealed the significant diagnostic yield and sensitivity of the LBM over Conventional one.

Table 2: Concordance between conventional and liquid based methods.

<table>
<thead>
<tr>
<th>Result</th>
<th>Conventional</th>
<th>LBM</th>
<th>P</th>
<th>Kappa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>43</td>
<td>60</td>
<td>&lt;0.001</td>
<td>0.72</td>
</tr>
<tr>
<td>Negative</td>
<td>77</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>120</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3: Sensitivity of conventional method compared to liquid based method.

<table>
<thead>
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</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>120</td>
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</tr>
</tbody>
</table>

Discussion

Cervical cancer is extensively screened cancer in both well and medium-income countries. Community-based programs of screening for cervical cytology presenting Papanicolaou testing each three to four years have decrease incidence and mortality of cervical cancer is in developed countries by up to 80% in the latest five decades [11]. The liquid-based technique makes instantaneous fixation easier and permits better visualization of the cells [12]. The liquid-based method was proved by the Food and Drug Administration (FDA) 1996 based on split-sample analysis [13].

The present study revealed that liquid-based method for cervical smear cytology is more sensitive for detecting cervical lesions than conventional technique, and this result agreed by Ovadia and John C. Pezzullo who reported that liquid-based method characterized by high sensitivity and specificity than conventional method in detecting dysplasia of the cervix, and the elevated sensitivity of liquid-based method lead to rising cytological detection of the atypical cervical lesion, LGSIL, HGSIL, and infiltrative cancer of the cervix [14]. Limaye A and Connor AJ observed that Pap smear had sensitivity to find carcinoma in situ (CIN) type 2&3 of 47% parallel to 66% for liquid-based material. The conformity of the two sampling techniques with the biopsy histological study was 37% and 53%, respectively, which is statistically significant difference [13].

The current study also declared that the liquid-based technique of sample preparation resulted in a significant rise in the cytological diagnosis of precursors of cervical carcinoma and insufficiency of the specimen in the comparison with conventional Papanicolaou testing technique [15]. The National Institute of Clinical Excellence (NICE) concluded that the liquid-based method represented a cost-effective alternative to Papanicolaou smears and offer improvements in sensitivity without any decrease in specificity and reduction in the number of reported inadequate tests [16]. Another study showed no abnormalities documented by conventional smear were missed on the liquid-based slide. Though not statistically linked, this variance suggests that the liquid-based method shows the best diagnosis of abnormalities than the conventional method. The liquid-based method was agreeable to engaging physicians and it was faster and easier to screen than conventional smears [17-19].
In conclusion, the Liquid-based cytology method more likely to be higher sensitivity and specificity than conventional smears in discovering dysplastic changes in the cervix. The elevated sensitivity of liquid-based method leads to rising in the cytological diagnosis of cervical atypia; and thus earlier management of the disease.

References