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COMPARATIVE STUDY OF VISUAL INSPECTION WITH ACETIC ACID (VIA TEST) AND VISUAL INSPECTION WITH LUGOL'S IODINE (VILI) FOR CERVICAL CANCER SCREENING

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ABSTRACT

Beginning: The frequency of cancer and related fatalities is increasing around the world. Cervical cancer is the fourth most common form of cancer. The natural history of the disease's progression is from 10-20 years. As a result, the diagnosis of the disease earlier can mitigate the fatal consequences of the disease. The study intended to assess the effectiveness of visual detection of cervix using acetic acid (VIA) as opposed to the traditional method of observing the cervix for signs of cancer (VILI). **Methods:** A cross sectional study of 100 married or sexual active women in the reproductive age bracket (25-59) who they visited in the Al Elweiya hospital in Baghdad, Iraq. Data was gathered from the women's health care unit in the hospital during the time period from (1/9/2022 to 1/5/2022). The VIA and VILI tests were employed to screen for cervical cancer. Those with positive results for any screening procedure were subjected to a biopsy of the cervix. **RSSULT:** The investigation's sample of 100 participants that were between the ages of 25 and 59. VIA was positive in 20/100 (20%) patients and VILI was positive in 18/100 (18%). Biopsy of the cervix was performed for women who had a positive result on either VIA or VILI. Histological evidence of cervical intrepithelial neoplasia (CIN2+) is considered the highest standard. The sensitivity, specificity, positive predictive value, and negative predictive value of VIA were 100%, 50%, 30%, and 100%, and VILI 100%, 57%, 33% and 100% respectively. **CONCLUSION:** Lesions that are precancerous or cancerous at the cervix can be effectively detected by VIA and VILI in low resource settings. The utilization of both testes increases the specificity of these options, making them ideal candidates for the screening of cervical cancer in this community.

KEYWORDS: Visual Inspection, Acetic acid, Visual Inspection, Lugol's iodine, cervical cancer.

INTRODUCTION

The global prevalence of cancer and its associated mortality is increasing. According to the most recent GLOBOCAN data from 2022, cervical cancer is the fourth most prevalent malignancy, with 660,000 new cases of cervical cancer diagnosed globally and 350,000 cancer-related fatalities; the majority of these deaths occurred in low- and middle-income countries.[1] The disease progresses over a period of 10 to 20 years. Therefore, the early diagnosis of the disease can prevent catastrophic complications.[2] Developing countries and low-middle income economies account for eighty-six percent of cervical cancer-related fatalities. This is a sign of health inequality.[3] The increased prevalence of cervical cancer in developing countries can be attributed to a variety of factors, including the absence of an efficient screening program, limited resources, and inadequately structured healthcare systems that prioritise the identification of precancerous conditions prior to their progression to invasive cancer. As a result, there is a pressing need for cost-effective strategies to enable the implementation of efficient cervical cancer screening programs.[4] The potential of alternative cervical cancer screening methods that are based on direct cervix visualisation following the application of 3% to 5% acetic acid (VIA) or iodine solution (VILI) is encouraging in this context.[5,6] These methods are cost-effective, do not necessitate laboratory infrastructure, are simple to implement, and can be performed by ordinary personnel. They have immediate results, which facilitate quicker treatment and the use of the "screen and treat protocol.[7,8] **Aim of the study:** To compare of Visual

Inspection with Acetic acid (VIA test) and Visual Inspection with Lugol's iodine (VILI) for cervical cancer screening.

MATERIAL AND METHODS

A cross-sectional study was conducted on 100 reproductive-age women (25–59 years) who were married or sexually active and attended the Al Elweiya maternity teaching hospital in Baghdad, Iraq. The woman health unit at the hospital was the source of data for the period from 1/9/2023 to 1/5/2024. The VIA and VILI tests were administered to screen for cervical cancer. The assent of the patients included in the study was obtained prior to the direct interview and examination. The study's exclusion criteria included females who were virgins, pregnant, had undergone a previous total hysterectomy, were experiencing moderate to severe bleeding and/or active infection at the time of examination, were between the ages of 25 and 60, and had current cervical cancer or cervical lesions that were undergoing treatment or chemotherapy. The procedure and its diagnostic value were conveyed to the patients. The procedure was conducted in the outpatient clinics of women's health by individuals who were proficient in administering the VIA and VILI tests. The first stage was the VIA test, which involved the application of a 3-5% acetic acid solution to the cervix using a cotton swab. The acetowhite alterations were observed for 1-2 minutes after the insertion of the non-lubricated speculum. Positive detection of any distinct acetowhite area was regarded as positive, while negative detection of pale, feeble, or doubtful acetowhite areas was regarded as negative. The second stage involved the application of Lugol's iodine solution. VILI was classified as positive (abnormal) when cervical squamous cells appeared mustard yellow or saffron-colored following the iodine application, and as negative (normal) when cervical squamous cells appeared brown or black. For all individuals who had positive VIA and/or VILI tests, a needle biopsy was employed to conduct the biopsy. The gold standard was histopathology. The data that was collected was coded and entered into SPSS 16.0. Frequency (n) and percentage were employed to analyse the categorical data. Categorical correlation was assessed using the Fisher exact test. Statistical significance was defined as a P value of 0.05 or less.

RESULTS

The category of 30-39 years was the largest, comprising 33% of the participants, while the category of 50-59 years was the smallest, comprising 17%. The age at which a significant number of individuals married was in the 18-20 category, which accounted for 35% of the total. The lowest frequency of marriage was in the >=26 category, which accounted for 7% of the total. Additionally, a high percentage of 53% of the women reported regular menstruation, while a low percentage of 18% reported menopause. In terms of marital status, a high percentage (92%) of individuals were married, while a low percentage (3%) were divorced. It appears that a significant number of individuals, 39%, have completed primary education, while a small number of individuals, 9%, have completed secondary high school. In the realm of employment, a significant proportion of individuals, 96%, were unemployed, while only 4% were employed. Additionally, a significant proportion of the participants, 86%, had a parity rate of ≥3. Additionally, a low percentage of 43% were utilising contraception, while a high percentage of 57% did not use any form of contraception. In addition, we have observed that a low percentage (24%) of the participants had a family history of cancer (breast, cervical, uterine), whereas a high frequency (76%) of the participants had no family history of cancer. Additionally, only one percent of the participants reported having a personal history of malignancy. Additionally, table (1) indicates that 4% of women were smokers.

Table 1: Distribution of the study sample according to socio-demographic characteristics,(n=100)

Characteristics	Number(N)	Percentage (%)
Age:		
25-29	19	19
30-39	33	33
40-49	31	31
50-59	17	17
Age at Marriage		
≤17	34	34
18-20	35	35
21-25	24	24
≥26	7	7
Menstrual cycle:		
Regular	53	53
Irregular	29	29
Menopause	18	18
Marital status:		
Married	92	92
Widow	5	5
Divorced	3	3

Education:		
Illiterate	14	14
Primary	39	39
Intermediate	27	27
Secondary	9	9
College	11	11
Occupation:		
Employee	4	4
Not employee	96	96
Parity:		
<3	14	14
≥3	86	86
Contraception:		
Yes:	43	43
No:	57	57
Type of contraception:		
OCP	30	30
Depo	2	2
Iucd	11	11
OCP=(Oral Combined Pills)		
smoking:		
Yes	4	4
No	96	96
Family H. of cancer:		
Yes	24	24
NO	76	76
Personal H. of cancer:		
Yes	1	1
No	99	99

The distribution of the study sample according to their chief complaint is illustrated in Table 2. Vaginal discharge is the most common complaint, with a 31% prevalence, followed by inter-menstrual bleeding at 16% and asymptomatic screening at 13%. Post-menopausal and post-coital bleeding each account for 7% of the sample. The remaining 16% of the sample consists of the following: 5% vaginal discharge and inter-menstrual bleeding, 1% vaginal discharge and post-coital bleeding, 2% inter-menstrual bleeding and post-coital bleeding, 1% post-coital bleeding and dyspareunia, 3% vaginal discharge and dyspareunia, 1% lower abdominal pain and post-coital bleeding, 1% lower abdominal pain and dyspareunia, and finally 2% vaginal discharge and lower abdominal pain.

Table 2: Distribution of the study sample according to their chief complaint, n=100

Chief complaint	Number(N)	Percentage (%)
Vaginal discharge	31	31
Inter-menstrual bleeding	16	16
Asymptomatic (screening)	13	13
Lower abdominal pain	2	2
Post-menopausal bleeding	7	7
Post-coital bleeding	7	7
Polyp:	3	3
Dyspareunia	5	5
Others	16	16
total	100	100%

Table 3 showing the results of screening tests, VIA test was positive in 20% of participants while VILI test was positive in 18% of them.

Table 3: Results of screening tests.

VIA	Positive	20	20%
	Negative	80	80%
VILI	Positive	18	18%
	Negative	82	82%

Table 4 illustrates the results of the visual examination of acetic acid in relation to histopathology, using CIN2 as the reference standard. P-value as determined by the Fisher exact test. The accuracy was 59%, with sensitivity, specificity, positive predictive value, and negative predictive value at 100%, 50%, 30%, and 100%, respectively.

Table 4: VIA with histopathology result.

VIA	CIN2	%	Benign	%	P-value
Positive	6	100	14	50	0.03
Negative	0	0	14	50	
Total	6	100	28	100	

Table 5 illustrates the results of the VILI test in relation to histopathology, with CIN2 serving as the reference standard. P-value as determined by the Fisher exact test. The sensitivity, specificity, positive predictive value, and negative predictive value were 100%, 57%, 33%, and 100%, respectively, contributing to an accuracy of 65%.

Table 5: VILI with histopathology result.

VILI	CIN2	%	Benign	%	P-value
Positive	6	100	12	42.85	0.01
Negative	0	0	16	57.14	
Total	6	100	28	100	

DISCUSSION

Ineffective screening programs have resulted in cervical cancer becoming a significant public health issue in developing countries. There is no cervical cancer monitoring program in Iraq. The absence of awareness and the scarcity of educational programs have resulted in a lack of conviction among women regarding cervical cancer screening. This is the reason for the low number of women who attend the clinic for screening.[9] The age cohort of 30-39 years was the greatest, comprising 33% of the participants. This outcome is consistent with a study conducted in Iraq, which examined the following variables: age group, age at marriage, parity, occupation, residence, and contraception.[10] Additionally, the current study indicated that the highest percentage of vaginal discharge was 31%, followed by 16% for intermenstrual haemorrhage. This finding is consistent with another study conducted in Iraq, which identified vaginal discharge as the most prevalent symptom at 34%.[11] Additionally, vaginal discharge was the most frequently reported issue in a separate study conducted in Egypt, constituting 51% of the complaints.[12] In our study, the sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of VIA were 100%, 50%, 30%, and 100%, respectively, while those of VILI were 100%, 57%, 33%, and 100%. In our study, the sensitivity of both VIA and VILI was 100% greater than the specificity. The results of the present investigation are consistent with the findings of numerous studies. A study was conducted in Iran, where VIA and VILI had high sensitivity and low specificity, respectively (100% and 69.5%) and (100% and 60%).[13] In a separate study conducted in India, it was determined that VIA and VILI exhibited a sensitivity of 90.3% and a specificity of 33.3%, respectively.[14] Additionally, the results of comparable studies are comparable to those of our current investigation.[8, 15, 16, 17, 18, 19, 20] Contrary to our current study, there were others who disagree. For instance, a study conducted in India demonstrated a low sensitivity and a higher specificity (50% and 96.7%) for VIA and (50% and 95.7%) for VILI in the detection of CIN-2+ lesions, respectively.[21] Additionally, another study demonstrated that the sensitivity and specificity of VIA and VILI for CIN2+ were 73.2%, 86.7%, 88.1%, and 85.9%, respectively. The combined form of VIA and VILI could be considered a reliable test for cervical cancer screening.[22] In addition to other distinct investigations.[23,24] This discrepancy in numerous studies may be attributed to a variety of factors, including the presence of co-existing infection, inflammation, metaplasia, criteria for test positivity, illumination source, and observer training. As a screening method, both VIA and VILI have shown promise in all previous studies, particularly in low-resource contexts. The combination of the two tests can enhance both sensitivity and specificity, resulting in more favorable outcomes.

CONCLUSION

Visual inspection of the cervix using acetic acid (VIA) and Lugol's iodine (VILI) can be a cost-effective and accessible method for screening cervical cancer. These methods have a high degree of sensitivity, allowing for the detection of any grade of dysplasia, and a realistic specificity, making them particularly useful in low-resource settings.

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