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The Prevalence of Human Papilloma Virus (HPV) among Egyptian Women and Its Impact: An Observational Study

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Abstract

Cancer is one of the most prevalent causes of mortality worldwide. In the cervix, it is confirmed to be caused by different high-risk human papillomavirus (HPV) types. Although many studies have already been conducted worldwide on the epidemiology of HPV infection and their oncogenic properties, limited data are available on HPV prevalence, incidence and its impacts in Egypt.

Keywords

HPV, Screening Test, Cancer Cervix

1. Introduction

Human papillomavirus infection (HPV infection) is an infection caused by a DNA virus from the Papillomaviridae family with more than 170 subtypes which have been described and it is well known as the most common viral sexually transmitted infection (STI) worldwide [1]. About 90% of HPV infections cause no symptoms and resolve spontaneously within two years. However, in some cases, an HPV infection persists and results in either warts or precancerous lesions [2]. These lesions, depending on the site affected, increase the risk of cancer of the cervix, vulva, vagina, penis, anus, mouth, or throat [3]. Nearly all cervical cancer is due to HPV; two strains, HPV16 and HPV18, account for 70% of cases. Between 60% and 90% of the other cancers listed above are also linked to

HPV. HPV6 and HPV11 are common causes of genital warts and laryngeal papillomatosis [3]. Risk factors for persistent infection by sexually transmitted types include early age of first sexual intercourse, multiple sexual partners, smoking, and poor immune function [1].

The majority of cervical cancer-related deaths occur in developing countries, such as Egypt where a population of 25.76 million women over 15 years of age are at risk of developing cervical cancer. In 2010, it has been estimated that around 514 women are diagnosed with cervical cancer and 299 die from the disease in Egypt each year; thus cervical cancer ranks as the second most frequent cancer among Egyptian women [4]. According to the HPV center, Egypt has a population of 30.55 million women aged 15 years and older who are at risk of developing cervical cancer.

Current estimates indicate that every year 969 women are diagnosed with cervical cancer and 631 die from the disease.

Cervical cancer ranks as the 14th most frequent cancer among women in Egypt and the 11th most frequent cancer among women between 15 and 44 years of age.

Data is not yet available on the HPV burden in the general population of Egypt [5]. In October 2014, a very important multicenter observational study in Egypt concluded that the prevalence of HPV among Egyptian women aged 18 years or more is about 10.4% with the highest prevalence of HPV infection which was observed among women aged 45 - 54 years [6].

Liquid Based Cytology (LBC) is a new technique for collecting cytological samples in order to detect cervical cancer. With conventional cytology a smear taker takes a sample that is applied directly to a slide for microscopic investigation. With LBC, samples are collected in liquid vials and the slide is prepared semi-automatically at the laboratory. Potentially the advantages of LBC include a reduction in the number of inadequate slides, increased sensitivity of the test and increased productivity of smear readers.

In addition to assessing LBC, the pilot sites are also evaluating the use of Human Papilloma Virus (HPV) testing in the management of women with mild or borderline smear results. Over 95% of women who develop cervical cancer test positive for HPV [7].

Two vaccines are currently licensed in many countries around the world, including Egypt, to protect against HR HPV types 16 and 18: Cervarix (bivalent; GlaxoSmithKline, Belgium) and Gardasil (quadrivalent; Merck and Co., Inc., Whitehouse Station, NJ, USA). Both vaccines have good safety and efficacy profiles [8] and are reported to provide cross-protection against non-vaccine HPV types. Although both of these vaccines are already licensed in Egypt [4], they are currently not included in the national immunization program [9].

Regrettably, current and recent epidemiological data for HPV in Egyptian women are limited, and only a few publications on HPV prevalence and infection are available [10] [11].

In our study, we aimed to re-assess the prevalence of HPV infection among

Egyptian women using the new liquid based cytology technique and our results provide important information for public health authorities considering HPV prevention in Egypt.

2. Methods

2.1. Design & Sample

Our study was conducted at multiple hospitals of Egyptian public health care Authority (The Comprehensive Health Insurance Authority) between June 2019 and August 2020. Women between 25 - 64 years old were included in our research interests.

Inclusion Criteria

- Age between 20 and 65
- Asymptomatic women
- No recurrent vaginal or cervical infection
- No previous cervical precancerous condition
- No history of malignant disease including cervical cancer
- Agrees to share in the study

Exclusion Criteria

- History of malignancy including cervical cancer
- Recurrent vaginal or cervical infection
- Previous total hysterectomy
- Virgin
- Pregnancy
- Postpartum within 6 months
- Decline to share

Cervical samples were collected by a gynecologist using a cytobrush and placed in a liquid-based cytology medium (using the DC LBC from GZLBP) for the presence of HPV DNA using Linear Array HPV genotyping at Cytolab Laboratory, Cairo, Egypt.

2.2. Statistical Analysis & Outcomes

Our primary outcome was to detect the overall number of infected women with HPV various strains. The secondary outcomes included colposcopy findings of positive infected women and identify the most common strain of HPV in Egyptian community.

Based on overall prevalence of 10.4% [5], with confidence interval 95% and to bypass type I and II errors, a total of 1000 subjects were required. Data were analyzed using 25.0 SPSS version (SPSS Inc., Chicago, IL, USA).

2.3. Ethical Considerations

The study was approved by the Ethics Committee of the Egyptian public health care Authority (The Comprehensive Health Insurance Authority) and was conducted in accordance with the Declaration of Helsinki and the International

Conference on Harmonization Guidelines for Good Clinical Practice. Informed consent was obtained from all eligible women before starting the study.

3. Results

3.1. HPV Prevalence

Among 1000 women underwent the LBC test, 143 women were positive to HPV DNA findings (14.3%), while the rest of women 857 were test free (85.7%) (Diagram 1).

3.2. Secondary Outcomes

97 cases (67.8%) of positive women showed different degrees of cervical intra-epithelial neoplasia CIN as shown in Table 1. They were treated by LLETZ and followed up successfully according to the British society of colposcopy and cervical pathology recommendations BSCCP.

8 cases (5.5%) were diagnosed with invasive cervical cancer stage 1A1 and 1A2 from the positive group of women.

HPV (16) was the commonest strain among all tested samples in comparison to other detected subtypes.

It was very interesting to find complex infection of more than one subtype of HPV in 36 women (26.8%) out of 143 women tested positive to HPV (Table 1).

It looks obvious that the majority of affected cases were in age group from 35 to 45-year-old which reflects the important role of raising awareness in women in that age.

4. Discussion & Conclusion

Our study is the most recent using the most advanced LBC test to estimate the

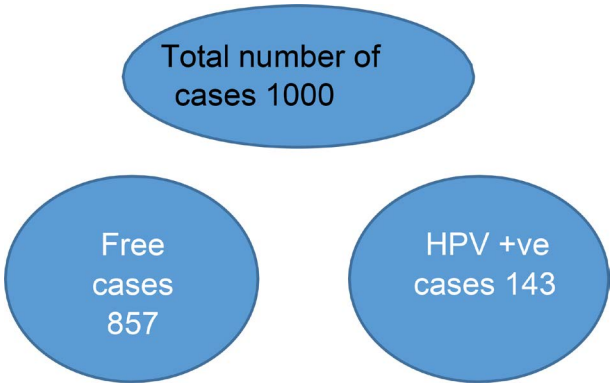

Diagram 1. LBC test result of 1000 women.

Table 1. Different degrees of pathology results among tested women who are HPV positive LBC examination.

Pathology	CIN 1	CIN 2	CIN 3	Stage 1 A1/2
No. of cases	47	39	11	8

prevalence of HPV among Egyptian women between 25 and 65 years. Our results regarding the HPV positive tests are matching with older studies which revealed a prevalence of 10.3%, 15% and 10.4% in Egypt [6] [11].

The HPV is well known to be the most common viral sexually transmitted infection, but it may also be transmitted by close contact to infected patient's clothes and autoinfection. The immunity is playing a vast action in the course of the disease and most of infections will be eliminated from the body within 2 years with good immunity. Many causes are directly affecting the body immunity such as psychological status, smoking, autoimmune diseases and all of them are common nowadays indeed.

Moreover, the multiple sexual relationships are common, either by the marriage of multiple wives or due to the increased incidence of divorce and re-marriage throughout the entire community.

Therefore properly protective strategies and screening plans should be established to protect our patients.

The bivalent vaccine provides protection against HPV 16-18 and quadrivalent vaccine provides protection against HPV-6-11 additionally. Both of them have been reported to provide cross-protection reactivity against non-vaccine HPV-31, 33, 45, 52, or 58. These vaccines might protect Egyptian women from cervical cancers and pre-cancer lesions but unfortunately they are not effective enough to replace the LBC/HPV screening program.

Our study strongly recommends the essential need for a proper screening system for cervical pathologies.

The study had several strengths. We used the most advanced DNA testing for HPV with a single cytology laboratory to avoid mismatched results. Moreover, patients were from different backgrounds covering the whole socioeconomic levels of Egyptian society.

Despite that, our study had many limitations.

The sample size was a little bit small and all patients are from one geographic site in Egypt (Cairo).

Also, the study was cross sectional, and as HPV infections may be transient and resolve on their own, the prevalence of HPV might therefore change over time.

We spend time training the medical staff (doctors and nurses) for the proper use of the test as well as the basic principles of colposcopy.

Nevertheless, we found that most of women had no idea about HPV infection, the screening test and/or the vaccination which showed the ultimate need for mass education for women in our community regarding the HPV Dilemma.

Finally, we think that a national screening program for the early detection of cervical cancer by the international model of LBC/HPV testing is a mandatory step to reduce the disease burden of cancer cervix in Egypt.

5. Recommendations

We concluded that we need more patients and our plan is to examine one mil-

lion and 100 thousands women who are registered to the system of the general public health authority in different governorates (Portsaid, Ismalia, Suez, Luxor, Aswan and South Saini) with collaboration with the Egyptian society of colposcopy and their first awareness campaign which is called NEFERT by using the power of social media, press and television to spread the knowledge among the whole Egyptian women.

Our aim is to cover entire Egypt to know the real prevalence of HPV and its correlation with cervical cancer and CIN precancerous lesions. Offering treatment and following up the patients in different stages of CIN are one of our main goals according to the recommendations of Egyptian society of colposcopy (ESCCP), British society of colposcopy (BSCCP) and the international federation of colposcopy (IFCPC).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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