

Burden of human papillomavirus infections and associated cancers in the North Africa region

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Abstract- The North Africa region is characterized by countries that have common cultures and religion and that are more conservative sexual behavior compared to Occidental countries. In this paper, we provide the available information on the burden of *Human papillomavirus* (HPV)-related cancers (cancer of the cervix, anal cancer, vaginal cancer, vulvar cancer and cancer of the pharynx), as well as available data on the prevalence and distribution of HPV types among men and women with an HPV related cancer, for the countries of the North Africa region (NA). The countries in the NA region show a generally low incidence of cervical cancer (ASR: 6.6/100,000). HPV prevalence (%) in the general population women with normal cytology varied from 10.3 in Egypt to 14.6 in Tunisia. The incidence of anogenital cancers other than cervix, as well as the incidence of Pharynx cancer (excluding Nasopharynx) is very low among populations of NA region. There is a lack of available data concerning the epidemiology of HPV in the anogenital cancers associated with HPV in this region. Changes in sexual behavior among the younger generations as well as the location of NA region as an area of sub-Saharan immigrants transition to Europe could change this data on epidemiology of HPV related cancers, so it might be necessary to install large population-based surveys on HPV prevalence among all countries in NA region, mainly for Cervical cancer which is the second most common cancer in NA women.

Index Terms- Human Papillomavirus, anogenital cancers, HPV prevalence, North Africa.

I. STUDY DESIGN

The present study employed an initial literature review of peer-reviewed articles in PubMed, ScienceDirect, and WHO databases. Original research articles written in French, data from institutional reports, and regional meeting abstracts were included in this extensive review. Oncology experts in the Maghreb region were contacted, and data was considered as eligible when the prevalence or other epidemiological figures in the Northern African countries were available. The aim of this study was firstly to summarize data in a region-specific manner, and secondly, to provide genuine and accurate data to the reader. In total, more than (100) papers were evaluated from which 23 studies were included in final analyses.

II. INTRODUCTION

Cancer is normally classified as a leading non-communicable disease, however, a significant proportion of it is caused by infectious agents [1]. The International Agency for Research on Cancer (IARC) Monographs program has classified a number of infectious agents as carcinogenic to humans including human papillomavirus (HPV) and other virus as well as bacteria [2]. The consistency of association of a given infectious agent and a specific malignancy ranges from essentially 100% to 0.4% depending on the infectious agent, the cancer and the geographic location [3].

The North Africa region (NA) is characterized by populations having similar cultures and religions and that have a more conservative sexual behavior compared to the countries of the west. The incidence of HPV related cancers is estimated to be relatively low, although it is difficult to assess exactly because national cancer registries are absent in many countries of the NA region. However, changes in sexual behavior among the younger generations as well as the location of NA region as an area of sub-Saharan immigrants transition to Europe could change this data on epidemiology of HPV related cancers. Cervical cancer is the large studied cancer. The available data is large and sufficient in all NA countries (Morocco, Algeria, Tunisia, Libya and Egypt), and this is probably due to the position of this cancer (2nd after breast cancer) among women in this region.

III. PAPILLOMAVIRUS IN CERVICAL CANCER

HPV is the most common sexually transmitted genital infection worldwide. Cervical cancer (CxCa) is the third most common cancer worldwide among women, with an annual incidence of more than 527,000 new cases (ASR: 14) and an annual mortality of 265,653 (ASR: 6.8). Incidence varies significantly between regions of the world ranging from 4.4 in Western Asia to 42.7 per 100,000 per year in Eastern Africa. Globally, the burden of cervical cancer incidence and death is highest in less developed countries: overall, 85% of cases occur in developing countries, where it accounts for 13% of all cancers diagnosed in females [4].

In contrast to other developing countries in the world, the countries in the NA region show a generally low incidence of CxCa (ASR: 6.6). Noteworthy, cervical cancer is the second most common cancer among women in Morocco, the third in both Algeria and Tunisia. Egypt differs in this respect where

cervical cancer is not one of the leading cancers among women [5]. In addition, an East-West gradient exists for CxCa, with Egypt harbouring the lowest incidence at 1.0, followed by 4.8 in

Tunisia, 8.5 in Algeria, 9.4 in Libya, and 14.3 in Morocco as seen in Figure 1.

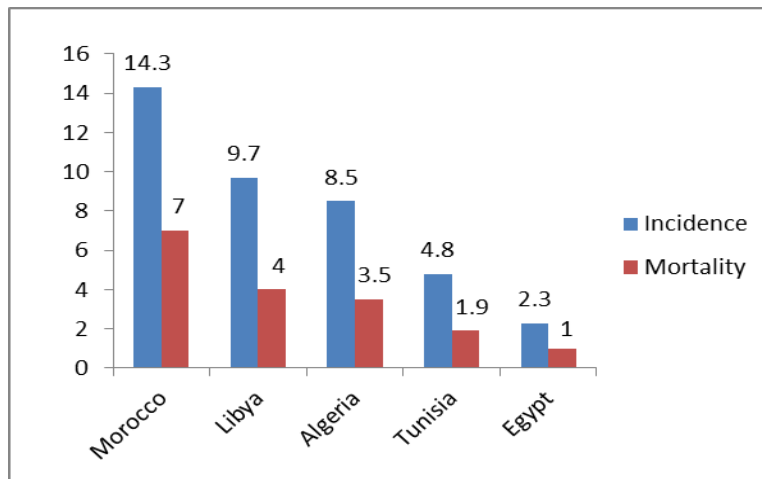


Figure 1 : CxCa incidence and mortality in NA countries (ASR) [5]

HPV is admittedly responsible for almost 100% of all cervical cancer cases [3]. Various factors influence the prevalence and distribution of HPV genotypes, such as patient age, cytology stage, and geographical regions. Human papilloma viruses are a group of more than 150 related viruses, and categorized into low-risk and high-risk types, according to their potential for causing cancer. HPV-16 and 18, the two vaccine-preventable types, contribute to over 70% of all cervical cancer cases, between 41%-67% of high-grade cervical lesions and 16-32% of low-grade cervical lesions. After HPV-16/18, the six most common HPV types are the same in all world regions, namely 31, 33, 35, 45, 52 and 58; these account for an additional 20% of cervical cancer cases worldwide [6-9]. Known risk factors for progression from cervical infection to cancer include smoking, multiple sexual partners, long-term hormonal

contraceptive use, co-infection with other pathogens (HIV, *Chlamydia trachomatis* and Herpex Simplex type-2), immunosuppression, and some dietary deficiencies [10]. In NA, the average prevalence of HPV is 21.3%. Although the studies on the prevalence of HPV in this region are not abundant, there is enough data to suggest that the prevalence of HPV varies from: 5-12% in the low-risk general population (GP), 20-49% in the -risk groups such as prostitutes, 25-90% of cases in cervical intraepithelial neoplasia (CIN) and 61%-98% of cases in CxCa. HPV16 is the most common type in all NA countries with a prevalence rate of 59%, followed by HPV-18 found in 8.6 – 17% of diagnoses. HPV45 ranked third with a prevalence of 5% [11]. The incidence of HPV across the general population in NA varies between 10.3 and 14.6 per 100,000 (Table 1).

Table 1: HPV prevalence in different cell types [12]

	Morocco	Algeria	Tunisia	Libya	Egypt
HPV prevalence (%) in the general population (women with normal cytology)	10.5	10.5	14.6	10.7	10.3
Prevalence (%) of Normal cytology	2.9	9	5.2	5.1	5.1
HPV 16 and/or HPV Low-grade lesions	20.9	18.5	18.5	18.5	18.5
18 among women High-grade lesions	40	40	40	40	40
with: Cervical cancer	79.2	77.1	78.4	78.4	78.4

IV. ANOGENITAL CANCERS OTHER THAN THE CERVIX

HPV is the major cause of other ano-genital cancers (anal, vulvar, vaginal and penile), yet there is few published data on HPV-caused ano-genital cancers other than cancer of the cervix [13].

Anal cancer has a low incidence among the general population with an average rate of 1 per 100,000 population worldwide (27,000 new cases each year). Women have higher incidences of this cancer than men, and the incidence increases

among women with cervical dysplasia and cervical cancer, persons infected by HIV, men having sex with men (MSM) and transplant recipients. Interestingly, anal cancer is more frequent in developed regions [14-16].

These cancers can be for the most part: squamous cell carcinoma, adenocarcinomas, or basaloid and cloacogenic carcinomas.

In 2008, *de Martel et al.* reported the rarity of vulvar cancer among women, with 27,000 estimated new cases in 2008, representing about 4% of total gynaecological cancers.

Developed countries harbor about 60% of vulvar cancer cases worldwide.

Vaginal cancer is rare, with only 13,000 new cases in 2008 representing 2% of gynaecological cancers, with the highest rate (68%) occurring in less developed countries. Penile cancer is rare too among men worldwide with an annual incidence of 22,000 new cases. A high correlation between this cancer and cervical

cancer exists, with the less developed countries harboring the highest incidence worldwide [1].

NA countries show a very low incidence of these cancers with an absence of data in many countries (Libya and Morocco) concerning some cancers (Table 2).

Table 2: Incidence (ASR) of different anogenital cancers by cancer registry and sex in NA countries

	Egypt (Gharbiah) [17, 18]	Tunisia (Sousse) [17, 18]	Algeria [4, 17-19]	Libya [20]	Morocco
Anal cancer	0.4	0.2	Algiers: Male:3.1 ;Female: 2.5 Setif : Male : 0.1;Female:0.1	Male: 0.2 Female: 0.1	-
Vulvar cancer	0.7	0.3	Algiers : 0.1 Setif : 0.0	-	-
Vaginal cancer	0.2	0.4	Algiers:0.1 Setif:0.2	-	-
Penile cancer	0.0	0.0	Algiers : 0.0 Setif : 0.0	Male: 0.0 Female: -	-
Pharynx cancer (excluding Nasopharynx)	Male: 0.7 Female: 0.6	Male: 0.9 Female: 0.5	Male: 0.5 Female: 0.4	Male: 0.2 Female: 0.3	Male: 0.5 Female: 0.3

In Morocco, the epidemiology of anal cancer is not well known. Between 2000 and 2007, a survey was conducted in the University Hospital, Ibn Sina, Rabat, showed that only 20 cases of anal cancer were found during this period. This number represented a very low portion (0. 22%) of total hospitalizations, 2.4% of all digestive cancer and 7.5% of colorectal cancers. The mean age of anal cancer patients was 60 years (min: 33– max: 87 years), male to female ratio was 4. The most common clinical symptoms were anal pain (80%), rectum bleeding (60%) [21].

Other particular cases of anal cancer were reported in Morocco as mucinous adenocarcinoma of the anus which is a rare malignancy (3–11% of all of the anal carcinomas [22]). Out of the 28 anal adenocarcinomas presented to the Hepatogastroenterology Department of the University Hospital Centre of Marrakech from 2000 to 2009, three cases were diagnosed as primary mucinous adenocarcinoma. All patients were males with an average age of 68 years [23].

Belbaraka et al. conducted a retrospective study of 17 patients with anorectal melanoma diagnosed between January 1998 and December 2007. The provided informations showed that the mean age of patients was 58 years, the males were more exposed as females (sex ratio: 12 men per 5 women) and the most common symptom was rectal bleeding [24].

V. CONCLUSION

Generally, the countries of the NA region show a low incidence of HPV-related cancers. However, there is a lack of available data concerning the epidemiology of HPV in the

anogenital cancers associated with HPV in this region. Acquisition of new sexual behavior among the younger generation as well as the location of NA region in the road of sub-Saharan immigrants to Europe could change this data on epidemiology of HPV-related cancers, so it might be necessary to install large population-based surveys on HPV prevalence among all countries in NA region, mainly for Cervical cancer which is the second most common cancer in NA women.

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