

## RESEARCH ARTICLE

# Age Specific Cytological Abnormalities in Women Screened for Cervical Cancer in the Emirate of Abu Dhabi

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### Abstract

**Background:** Cervical cancer is the second most common cancer in women worldwide, with about 500,000 new cases and 270,000 deaths each year. Globally, it is estimated that over one million women currently have cervical cancer, most of whom have not been diagnosed, or have no access to treatment that could cure them or prolong their lives. In the United Arab Emirates (UAE) cervical cancer is the third most common cancer in women. **Materials and Methods:** A population-based cross-sectional retrospective survey of cervical smear abnormalities was conducted in the Emirate of Abu Dhabi, UAE, from January 2013 to December 2013 by collecting consecutive liquid-based cytology samples from the Department of Pathology at the SKMC Hospital in Abu Dhabi city. **Results:** The total number of women screened for cervical cancer for the year 2013 at SKMC was 4,593, with 225 (4.89%) abnormal smears. The majority of the abnormal smear results were atypical squamous cells of undetermined significance (ASCUS) 114 (2.48%). This study showed 60% increase in the rate of abnormal cervical smears in the UAE over the last 10 years. In this study the highest incidence of high grade abnormalities were seen in women above the age of 61 years (1.73%), this might be due to the fact that this group of women missed the chance of screening of cervical cancer earlier in their lives or could be explained by the well-known second peak of HPV infection seen in many prevalence studies. **Conclusions:** We conclude that the rate of abnormal cervical smear in the screened Abu Dhabi women is not different from the rate in developed countries. A notable increase in both low and high grade abnormalities has occurred within the last decade.

**Keywords:** Cervical cancer - cervical Pap smear results - Abu Dhabi - age-dependence

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### Introduction

Cervical cancer is the second most common cancer in women worldwide, with about 500,000 new cases and 270,000 deaths each year (WHO, 2014). Globally, it is estimated that over one million women currently have cervical cancer, most of whom have not been diagnosed, or have no access to treatment that could cure them or prolong their lives (WHO, 2006). In the United Arab Emirates cervical cancer is the third most common cancer in women, both in national and non-national (Ministry of Health, 2008). Organized cervical cancer screening has been proved to be one of the most successful cancer prevention strategies (Cancer Research UK, 2014). Countries with established organized cervical cancer screening programs witnessed significant reduction in the incidence of cervical cancer (Cancer Research UK, 2014). UAE has established and launched its organized cervical cancer screening program in 2013. Secondary prevention of cervical cancer goes beyond the laboratory tests; it calls for the establishment of a comprehensive screening

program targeting appropriate age groups (WHO, 2006). This helps to identify asymptomatic women with precursor cervical cancer lesions as well as to create effective links between all levels of care, including appropriate follow-up for definitive diagnosis and the treatment of women with positive screening results (WHO, 2006).

Abu Dhabi Health Authority recommends in their 2012 guidelines on cervical cancer screening to start screening at age 25 regardless the age of initiation of sexual intercourse (HAAD, 2012). For those between 25-49 years old, a three-year screening interval should be considered (HAAD, 2012). From 50 to 65 years old, a five-year interval is appropriate, those above 65 years old will not have any more screening if the three previous smears were negative (HAAD, 2012).

The Emirate of Abu Dhabi is the largest of the UAE's seven member emirates. Abu Dhabi had a population of 2,732,557 in 2013 (HAAD, 2014). Sheikh Khalifa Medical City (SKMC) laboratory is one of the two reference laboratories for cervical cancer cytology in the city of Abu Dhabi and receives the bulk of the smears from

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public sector.

Cervical cytological abnormalities in the Arabian Gulf are under-studied. There are very small studies that looked at these abnormalities in screened women. The aim of this study is to estimate the prevalence of different cytological abnormalities in women screened for cervical cancer in the Emirates of Abu Dhabi in the year of introduction of the cervical cancer screening program. Secondly is to assess the age specific cytological abnormalities in the same category of women.

**Materials and Methods**

A population-based study of cross sectional retrospective survey of cervical smear abnormalities was conducted in the Emirates of Abu Dhabi, UAE from January 2013 to December 2013 by collecting consecutive liquid-based cytology samples from the Department of Pathology at the SKMC Hospital in Abu Dhabi city. The cytology department at SKMC provides the central service for the city of Abu Dhabi. All cervical samples are collected by general practitioners or gynecologists using the Sure Path® liquid-based cytology system (Tri Path Imaging, Burlington, NC) and sent to the department of pathology at SKMC Hospital within 2 days of collection. Upon arrival, all samples are assigned a microscopy number and then processed for cytological examination as per laboratory protocol. Certified cyto-technicians and cyto-pathologists make the diagnosis.

We obtained all smear results that were processed in SKMC laboratory from January to December 2013. Data sheet was designed to extract the following information: demographic data of the patients at the time of screening and results of the Pap smear. All the data was obtained from the patients’ electronic file (CERNER) using the patient’s identification number (MRN) which is unique

**Table 1. Demographic Characteristics of Women Screened for Cervical Cancer (n=4554)**

Characteristics	Results	
	Mean	±SD
Age, years	39.1	±11.4
Parity	3.57	±2.54
BMI, kg/m <sup>2</sup>	29.5	±6.34
Nationality	n (%)	
UAE	2101 (45.8%)	
GCC	119 (2.59%)	
Other	2333 (50.8%)	

**Table 2. Prevalence of Cytological Abnormalities (n=4593)**

Smear Results	Prevalence	(%)
ASC_H	5	0.10%
ASCUS	114	2.48%
CANCER	2	0.04%
GLANDULAR	5	0.10%
HSIL	27	0.58%
LSIL	72	1.56%
NEGATIVE	4229	92.10%
UNSATISFACTORY	139	3.02%

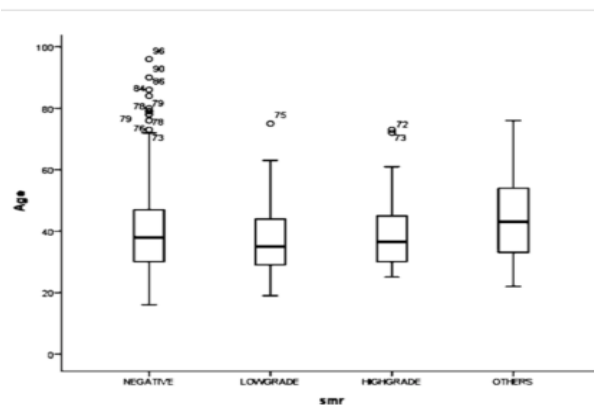
to every national and non-national in the Emirate of Abu Dhabi. CERNER is a medical records system that is used to create and maintain all patient data electronically (Al Alawi et al., 2014). The system captures patient data, such as patient complaints, lab orders and results, medications, diagnoses, and procedures, as well as all demographic information of the patients. It has been in existence since 1979 and is widely used in many countries including the USA, Canada and other countries (Al Alawi et al., 2014). The system was introduced to Emirates of Abu Dhabi in 2007 and is implemented by public health facilities and can be accessed only by authorized individuals. The cervical smear result was classified according to the Bethesda System. Ethical approval was obtained from Human Research Ethics Committee at Al Ain District & from SKMC Ethical Committee.

Descriptive statistics was used to analyze the demographic characteristics of all women screened for cervical cancer to compute the means and standard deviations (SD) for continuous variables such as the age, parity and Body Mass Index (BMI). Frequencies were calculated for nationality and prevalence of cytological abnormalities for each of the smear results sub-types. Cross tabulation of age specific frequencies was deployed to assess age related trends of abnormal smear results across the different sub-types. Data analysis was performed using IBM SPSS Statistics version 21.

**Results**

The total number of women screened for cervical cancer for the year 2013 at SKMC was 4593. Smear results were obtained for all cases, however in 39 cases the demographic data was missing. Out of all cases where demographic information was available; 2101 (45.76%) were UAE national, and 2452 (53.84%) were non UAE nationals (expats).The mean ±SD age of the women included in this study was 39.13 (±11.36) years, with a mean ± SD BMI of 29.45 (±6.34) kg/m<sup>2</sup> and a mean ±SD parity of 3.57 (±2.54) (Table 1).

Table two shows result of cervical smear abnormalities in the screened women, 225 (4.89%) out of 4593 smears



**Figure 1. Age Specific Cytological Abnormalities in Screened Women in the UAE.** Shows that there are no high grade abnormalities seen below the age of 20. There is significant number of cases screened outside the recommended age of screening at both end of screening age boarders

**Table 3. Frequencies of Cytological Abnormalities According to Age Group (n=4518)**

Smear Results	Age Group in years, n (%)					
	≤ 20	21-30	31-40	41-50	51-60	≥61
Negative	68 (91.9)	1041 (92.2)	1325 (92.9)	998 (91.7)	573 (91.2)	155 (89.6)
LSIL	4 (5.4)	28 (2.48)	20 (1.4)	14 (1.28)	5 (0.79)	1 (0.57)
ASCUS	2 (2.7)	24 (2.12)	38 (2.66)	32 (2.94)	13 (2.07)	4 (2.31)
High Grade	0	10 (0.88)	10 (0.7)	9 (0.82)	2 (0.31)	3 (1.73)
Others	0	26 (2.3)	33 (2.31)	35 (3.21)	35 (5.57)	10 (5.78)
Total	74	1129	1426	1088	628	173

were abnormal. The majority of the abnormal smear results were atypical squamous cells of undetermined significance (ASCUS) 114(2.48%).

Table 3 shows the age-specific smear result of cervical abnormalities according to the age groups with ten years interval. The abnormalities were graded into negative, Low grade squamous intraepithelial lesion (LSIL), ASCUS, Other (unsatisfactory smears) and High grade abnormalities which include high grade squamous intraepithelial lesion (HSIL), Glandular lesion and cancer. Low grade abnormalities rate decreases with age. Second peak of high grade abnormalities were noticed after the age of 60 years.

Figure 1 shows that there are no high grade abnormalities seen below the age of 20. There is significant number of cases screened outside the recommended age of screening at both end of screening age boarders.

## Discussion

We looked at all cervical smears that were processed in SKMC in 2013. The laboratory service at the SKMC is the central laboratory for all public hospitals in Abu Dhabi city. We analyzed 4593 cervical smear results which represented all cervical smears processed at SKMC during the year of 2013.

The mean age for screened women in this study is 39 years, as the mean age of diagnosis of cervical cancer is 45 years we trust that our cervical screening program is targeting the right age group with most women having had at least one smear test before the age of 45 years. The mean age in this study for screened woman is almost like (but slightly higher) than that one found by previous study carried out at the Gulf Medical Collage Hospital and Research Center in Ajman, UAE by Al Eyd, G.J. when they found the average age in their screened women is 37±0.9 (Al Eyd and Shaik, 2012). The average age of screening was found to be higher in other studies in the same region, Karabulut in Turkey found the average age of screened woman was 44 (Karabulut et al., 2010) and Bukhari in Pakistan found the average there was 45 years (Bukhari et al., 2012). The World Health Organization recommends that women should have at least one smear test before the age of 45 years, therefore women who started their first smear after the age of 45 might miss the chance of cancer prevention all together. The mean parity in our screened women is 3.57 and the mean BMI is 29.45. Just less than half of screened women were Emirati national 45.76. (Table1)

Of the 4593 cervical smears included in this study

92.07% (n=4229) were negative for any intraepithelial lesion with 4.86% (n=225) have abnormalities and 3.02% (n=139) were unsatisfactory smears. The percentage of abnormal smears in our study is comparable to other studies done in Arabian Gulf region where the rate was found to be 3.3% in Ajman, UAE (Al Eyd and Shaik, 2012), 4.3% in Kuwait (Kapila et al., 2006) and 4.7% in Saudi Arabia (Altaf, 2006). It is also comparable to other studies from other parts of the world, for example in south Africa where the rate of smear abnormalities was found to be 4.69% (Fonn et al., 2002). However in countries with higher prevalence of HPV infection the rate of cervical smear abnormalities were shown to be as high as 7.8% Egypt (Abd El-all et al., 2007), 9.8% Russia (Shipitsyna et al., 2011) & 17.3 % South Africa (Richter ey et al., 2013). (Table 2)

This study showed 60% increase in the rate of abnormal cervical smears in the UAE compared with previous study carried by Aswad et al. in 2001 where the rate was 3.6% (Ghazal-aswad et al., 2006) compared to 4.8% in our study. Similar slow increase rate of cervical smear abnormalities were found in other parts of the world.

ASCUS represented 2.48 % (n=114) of all smear in this study, this is almost double the rate found by Al Eyd and Shaik in the study carried out in Ajman, UAE where the rate was 1.8% (Al Eyd and Shaik, 2012). However similar rate of ASCUS were found in other neighboring countries like Kuwait 3.2% (Kapila et al., 2006) and Saudi Arabia 2.99% (Balaha et al., 2011) and 2.4% (Altaf, 2006). Similar and comparable rates of ASCUS were found in other studies done in other part of the world where 3.38% was reported by Fonn in South Africa (Fonn et al., 2002) and 3.3% by Insinga in USA (Insinga et al., 2004). We observed that the rate of ASCUS smears is almost similar in all studies where smears are processed using liquid based cytology, however in studies with conventional smear technique, there is wide range of differences in the rate of ASCUS abnormality which can be as high as 7.2% in Russia (Shipitsyna et al., 2011), 9.8% in Pakistan (Bukhari, 2012) and 15.3% in Egypt (Abd El-all et al., 2007) or as low as 0.3% in India (Bal et al., 2012). ASCUS abnormalities were almost same among all age groups (Table 3).

We noticed significant increase in the percentage of LSIL in this study population (1.56%), this represent double the percentage of this abnormality compared with the previous rate of 0.77% found by Ghazal-aswad (Ghazal-aswad et al., 2006). As LSIL is an indicator of HPV infection rate, thus our results might be pointing to an increase in the overall rate of HPV infection. However

the prevalence of LSIL in our study is similar to that found by Insinga in USA (Insinga et al., 2004), Gupta in India (Gupta et al., 2013), Schnatz in Nigeria (Schnatz et al., 2008) and Kapila in Kuwait (Kapila et al., 2006) where the prevalence of LSIL was 1.2%, 1.36%, 1% and 1% respectively. Other studies showed much higher rate of LSIL like the studies carried out in South Africa, Russia and Indian 2.42%, 2.5% and 2.7% respectively. (Fonn et al., 2002; Shipitsyna et al., 2011; Gupta et al., 2013). There is a clear relationship between age and LSIL, with younger women having a higher rate of LSIL which decreases with increasing age. This is explained by the fact that HPV is common in younger age group; however the clearance of infection is also common in this group (Table3).

HSIL accounted for 0.58% (n=27) which is higher than other similar size studies where 0.1% was found by Shipitsyna (Shipitsyna et al., 2011), 0.15% by Yalti et al. (2005), 0.19% by Elhakeem et al. (2005), 0.2% by Kapila et al., 2006, 0.3% by Al Eyd and Shaik, (2012) and 0.3% by Insinga et al. (2004). However higher rate was found in some studies that looked at women screened opportunistically where 5.2% was seen in Egypt (Abd El-all et al., 2007), 1.8% in South Africa (Fonn et al., 2002) and 0.9% in India (Gupta et al., 2013) but this represents different cohort of patients than women screened in an organized screening program. In this study the highest incidence of high grade abnormalities were seen in women above the age of 61 years (1.73%), this might be due to the fact that this group of women missed the chance of early screening of cervical cancer earlier in their lives or could be explained by the well-known second peak of HPV infection seen in many prevalence studies.

We found no high grade abnormality in women under the age of 20 years (Figure 1). We are not sure if this is the effect of HPV vaccination which was introduced in 2008 or just by chance. Also (figure1) shows significant numbers of women are screened outside the program age recommendation which obviously indicates more need of training and quality control of the program.

In this study 0.10% (n=5) of all smears were reported as ASC-H and 0.10% were reported as glandular abnormalities which is exactly the same rate found by Yalti in Turkey 0.10% (Yalti et al., 2005) and not far from what Balaha found in the Eastern area of Saudi Arabia 0.09% (Balaha et al., 2011). We also reported 0.10% (n=5) glandular abnormalities, higher rate were seen in western Africa where Schnatz reported 0.5% Nigeria (Schnatz et al., 2008). In this study cervical carcinoma was seen only in two cases 0.04%. No case of cervical cancer was seen in previous study done in 2006 by Ghazal-aswad et al. (2006). Our reported rate of cervical cancer is lower than studies from other part of the world. 1.76% and 1.3% were reported in studies from Turkey and India respectively (Ayhan et al., 2009; Gupta et al., 2013). However similar rate was reported in neighboring countries; 0.1% in Kuwait (Kapila et al., 2006) and 0.34 in Saudi (Balaha et al., 2011).

The overall rate of unsatisfactory specimens among all age group was 3%, this represents significant drop from previous study by Ghazal-aswad where the rate of unsatisfactory smears was 5%. (Ghazal-aswad et al., 2006)

This drop most properly is due to the introduction of liquid based cytology in the recent few years. The maximum rate of unsatisfactory smears was seen as expected in women above age of 50 and 60 (5.57 and 5.78%) respectively, which is well known and can be explained by the natural migration of squamocolumnar junction up to into the endocervical canal.

The rate of cytological abnormalities in screened women in Abu Dhabi is not different from most of the developed countries. There is significant increase of the rate of both low and high grade cytological abnormalities in the last ten years. The rate of unsatisfactory smears has dropped significantly since the introduction of the liquid based cytology.

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