

Background

Human Papillomavirus (HPV) is the etiological agent for cervical cancer and genital warts. Worldwide, cervical cancer is the fourth most common cancer in women and the high risk HPV (HR-HPV), namely HPV 16 and 18 are responsible for the most of the cases. The objective was to analyze the HR-HPV frequency in a group of women referred for HR-HPV testing during opportunistic screening.

Material and Methods

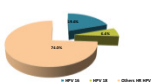
Clinical samples from 3117 women aged 14 – 77 years old (mean 43 years, median 42 years) were performed by Cobas® HPV test (Roche Molecular Systems, CA, USA) following the manufacturer's instructions; this assay detected HPV 16 and HPV 18 and "Other HR-HPV" (-31,-33,-35,-39,-45,-51,-52,-56,-58,-59,-66 and 68). Positive samples for "Other HR-HPV" were further subjected to amplification using MY09/11 primer's followed by sequencing for HPV genotyping.

Results

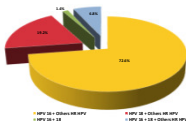
Of the 3117 studied women, **20.1%** (626/3117) were HR-HPV positive. The most frequent outcome was "Other HR-HPV" (74.0%; 521/704) followed by the HPV 16 (19.6%; 138/704) and HPV 18 (6.4%; 45/704) (Figure 1). **Co-infection were found in 11.7%** (73/626), there was all type of combinations but the **most frequent was HPV 16 + "Others HR HPV"** (72.6%; 53/73). 5 cases were a triple infection (HPV 16 + HPV 18 + "Other HR-HPV"), only one case was infected by HPV 16 + HPV 18 (Figure 2).

The majority of women HR-HPV positive were **younger than 45 years old** (47.6%) but 60.9% of the positive women are between 30 and 49 years old. **HPV 16 is more frequent in the age group 40-44**, HPV 18 is more frequent in ages between 35-44 years old, but the age group 25-34 and 55-59 had almost the same number of cases. The "Other HR-HPV" are more frequent in the age group 35-39 years old (Figure 3).

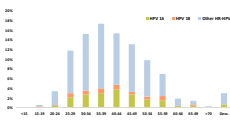
HPV detected by COBAS (Figure 1)



Co-infections detected (Figure 2)



Age distribution among infected women (Figure 3)



HPV 16 was the most frequent (19.6% ; 138/704), followed by the HPV 31 (10.8%; 76/704) (Figure 4). Among the "Other HR-HPV", the HPV 31 (14.6%; 176/521) was the most frequent followed by HPV 56 (13.6%; 71/521) and HPV 66 (12.7%; 66/521) (Figure 5). Concerning co-infection the frequency of genotypes of the "Other HR-HPV" with HPV 16 and/or HPV 18 is shown in table 1.

HPV genotypes detected in the studied population (Figure 4)



Frequency of other HR-HPV with HPV16 and 18 (Table 1)

%	HPV 56	HPV 31	HPV 16 + 18
HPV 21	0.0	0.0	0.0
HPV 22	4.5	0.0	0.0
HPV 25	4.5	0.0	0.0
HPV 45	0.0	30.0	40.0
HPV 51	2.3	0.0	0.0
HPV 52	9.1	20.0	0.0
HPV 56	100.0	30.0	0.0
HPV 58	6.8	10.0	20.0
HPV 59	40.9	0.0	20.0
HPV 66	12.6	10.0	0.0
HPV 81	0.0	0.0	20.0

Over all frequency of HR-HPV (Figure 5)



Conclusions

- The frequency of HR-HPV was high (20.1%), HPV 16 or HPV 18 were responsible for 26.0 % of the infections
- Genotyping of "Other HR-HPV" revealed HPV 31 (14.6%) as the most frequent, followed by HPV 56 (13.6%) and HPV 66 (12.7%)
- HPV 16 was the most frequent genotype (19.6%) followed by HPV 31 (10.8%) and HPV 56 (10.1%).
- HPV 18 is the sixth more frequent HR-HPV (6.4%)
- 58.6% of the HR-HPV infections will be prevented with the current National Immunization Program (nonavalent vaccine)
- The third HR-HPV more frequent isn't included in the nonavalent vaccine, this fact reinforces the importation of HPV Screening Program despite the HPV vaccination
- The highest frequency of HPV 16 occurs in older women when compared to the higher frequency of "Other HR-HPV"