

Knowledge, Awareness and Perception of Human Papillomavirus Testing Among Staff in a Public University in Malaysia

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ABSTRACT

Introduction: HPV testing has been introduced in Malaysia for nearly 10 years. However, the Malaysian population are largely unaware of its availability and significance in the prevention of cervical cancer. Due to this fact, this study aims to determine the knowledge, awareness and perception of HPV testing and association with sociodemographic characteristics among a university staff, a study sample derived from the community in the state of Selangor, Malaysia. **Methods:** A cross-sectional study was conducted among University Putra Malaysia (UPM) staff from various faculties. Recruitment of study subjects was done through convenient sampling. Data on knowledge, awareness, and perception of HPV testing, alongside with socio-demographic factors were collected using online questionnaires. Statistical analyses were performed using IBM Statistical Package for Social Science (SPSS) version 26.0. **Results:** A total of 166 respondents participated in the study. Gender (female) and ethnicity (Chinese) were associated with higher level of knowledge on HPV testing. Meanwhile, females outperformed males in terms of awareness of the test. Other sociodemographic characteristics have no significant association with perception of HPV testing. **Conclusion:** This study indicated that the level of knowledge on HPV testing was generally poor, especially among Malays and other minority races. Awareness was also lower mostly among male respondents. Our findings highlighted the importance of improving the level of awareness and knowledge of HPV testing, to reduce the prevalence of HPV-related morbidity and mortality in Malaysia.

KEYWORDS: knowledge, awareness, perception, Human Papillomavirus (HPV), HPV testing

INTRODUCTION

Human Papillomavirus (HPV) is a sexually transmitted virus, and it is the most common cause of reproductive tract viral infection [1]. The risks of HPV infection can be reduced by cervical cancer screening which includes Papanicolaou (Pap) smear and HPV testing. HPV test is more effective and safer compared to cytology screening as it has higher sensitivity [1,2].

Elbardiny et al. conducted a cross-sectional study on the level of knowledge and attitudes toward HPV and their associated factors among 450 staff from various faculties, institutes, centres, and schools across public universities in Malaysia in 2014 [3]. They concluded that most respondents had unsatisfactory and

poor levels of knowledge of HPV, in addition to negative attitudes and perceptions [3]. Another study that was conducted among parents of primary schools in Malaysia found that 62% of them have poor knowledge of HPV vaccination, thus this affects their acceptance towards it [4]. Malaysian women were reported to have a relatively high awareness of multiple sexual partners and sexually transmitted diseases (STD) as risk factors for cervical cancer [5]. They were also largely aware that regular Pap smear is a tool of diagnosis, and that cervical cancer can be treated surgically [5,6].

Studies by Koliopoulos et al. in 2017 and Mandelblatt et al. in 2002 showed that HPV testing has



higher sensitivity, does not need frequent screening, and does not cause a major concomitant decrease in its specificity compared to Pap smear [7,8]. The latter, on the other hand, has comparatively lower sensitivity, poorer reproducibility, and a higher likelihood of misclassification. HPV testing also requires minimal resources (e.g.: material and technician), thus making it cheaper. The combination of low costs and high sensitivity favours HPV tests as a primary screening strategy. Other than that, HPV tests can predict who are predisposed to higher risks of HPV infection, besides offering greater convenience by allowing self-tests. Given that the HPV test is fairly new in Malaysia, it is not widely offered in government health facilities, making it less popular among the public.

Knowledge, Awareness and Perception

Knowledge is defined as the understanding of information about a subject that you get by experience or study, either known by one person or by people generally. An international survey done in the USA, UK, and Australia found that among those who had heard of HPV testing, the mean knowledge score was 2.78 out of 6, which was considered to be inadequate [9].

Awareness is an understanding of a knowledge, situation, or subject at present based on information or experience. The same survey done among 2409 men and women in the USA, the UK, and Australia found that 61% had heard of HPV [9]. In the subsample who were aware of HPV, 50% had heard of HPV testing. Awareness of HPV testing was higher in the USA (62%) than in the UK (44%) and Australia (40%) [9]. This difference is likely contributed by the accessibility of the test among different populations of the country. The survey examined the associations between demographic variables and awareness of HPV testing and found that awareness of HPV testing is associated with age, education level, gender, and ethnicity.

Perception is defined as a belief or opinion, often held by many people and based on how things seem. A survey regarding the perceived effectiveness of HPV testing among US providers in 2015 found that many physicians have belief contrary to the guidelines recommended in the country [10]. Feasibility and acceptability of self-sampling HPV testing in primary

care facilities in Malaysia found that the uptake among eligible women was unsatisfactory, varying between states from only 17% to 35% [11]. Nevertheless, the same study reported excellent feedback from pilot participants of ROSE 1.0 (Removing Obstacles to Cervical Screening) pilot project, whereby 99% of women who participated said they would be willing to do the self-sampling HPV test again, 95% would recommend it to family/friends and 94% preferred it to Pap smear screening [11]. Reasons include it was simple, fast, allowed self-performed, and enabled quick results and delivery of results by phone [11]. This method could potentially improve the public's perception of HPV testing.

With the findings of unsatisfactory knowledge, awareness and perceptions among previous studies particularly those done in Malaysia, the authors would like to examine these among our population to see if there are any differences. We chose the university staff population as this represents largely the urban community, and working in education services may reflect whether the knowledge is adequate or not. Both males and females were invited to participate in this study to compare for any similarities or differences. As most local studies targeted the female population, we wish to examine the male population as well as HPV infect both genders, hence it is wise to know the male's knowledge, awareness and perception. The findings will later provide ideas on how we can plan for health education and target groups.

We aim to: a) determine the level of knowledge, awareness and perception of HPV testing among UPM staff, and; b) determine the association between sociodemographic characteristics with each of the variables (knowledge, awareness and perception).

MATERIALS AND METHODS

A cross-sectional study was conducted among 166 Universiti Putra Malaysia (UPM) staff from various faculties between 30th August 2020 and 13th September 2020. Both male and female staff who are literate in Malay or English were invited to participate in this study. Both genders were included to compare the differences in knowledge, awareness, and perception. As HPV is known to affect both genders, we wished to compare our population to previous studies

whereby one of the studies done in Australia showed a higher proportion of men were aware as compared to women [9]. In contrast, most studies found that men were less knowledgeable and aware compared to women [12,13]. Data were collected using a self-administered validated questionnaire. The questionnaires utilised the Google form platform and distributed through official university emails.

The sample size was estimated based on the two-proportion formula by Lwanga et al., 1991. [12, 13] The formula used is $n = 2 \sigma^2 [Z(1-\alpha/2) + z(1 - \beta)]^2 / (\mu_1 - \mu_2)^2$, where, n = sample size, $Z(1-\alpha/2)$: level of confidence = 95% [12]. Hence, $Z(1-\alpha/2)$, level of confidence of 95% = 1.96, $z(1-\beta)$ = Power of study (for a power of 80%, $z = 0.84$), $\mu_1 = 2.77$ and $\mu_2 = 2.29$ (estimated proportion based on previous studies) [10]. The calculated sample size was 166. List of email of university staff were retrieved from the university official website. Invitation email was sent to invite them to participate in this study.

Permission has been obtained to adapt the validated questionnaire from previous studies by Dodd et al. 2014 and Waller et al. 2013 [9,16]. Reliability testing was performed among 20 UPM staff to ensure that this validated questionnaire was suitable to be used among our population. Cronbach alpha of 0.67 was obtained and considered as reliable. Ethical approval was granted from the Ethics Committee for Research Involving Human Subject of Universiti Putra Malaysia (JKEUPM), ethical number JKEUPM-2020-242.

Patient information sheet and consent form was attached together with a questionnaire through the Google form. Clicking the agreed on consent form will bring the participants to the questionnaire. The questionnaire was divided into four parts: socio-demographics, awareness, knowledge, and perception towards HPV testing. Eight questions were asked to determine the respondents' level of knowledge on HPV testing: usage, interval testing, diagnosis and follow-up for positive test. There was one question each for awareness and perception.

Statistical Analysis

Data collected from the respondents were sorted, entered and analysed using the IBM Statistical Package

for Social Science (SPSS) version 26.0. Socio demographics were analysed using descriptive analyses. Normality testing was done for each variable. For knowledge, each correctly answered question was given a score of one (1) and incorrect answer as zero (0). Hence, the minimum score was 0 and the maximum score was 8. Median was used as the knowledge score was not normally distributed. A score above median score was considered 'good'. Awareness was determined by whether the respondent had heard about the HPV test before. Perception was based on respondents' opinion on the most effective method for cervical cancer screening, from the three given options: Pap test alone, Co-testing Pap test with HPV test, HPV test alone.

Pearson's Chi-Square was used to test for associations between categorical variables, while Fisher's Exact test was used whenever Pearson's Chi-Square test assumptions were not met. As the data found to be not normally distributed, non-parametric test were used. Mann Whitney U test was used to determine the association between independent variables with two groups (gender and sexual activity) and knowledge of HPV testing whereas Kruskal-Wallis test was used to determine the associations between independent variables with more than 2 groups (age, ethnicity, marital status, educational level) and knowledge of HPV testing. The alpha level of significance was set at 0.05. Pairwise comparison step was performed when significant association was established between knowledge and ethnicity.

RESULTS

In this study, google form-based questionnaires were distributed to 616 staff of Universiti Putra Malaysia via email and a total of 166 responses were received. The response rate was 26%.

Socio-demographic characteristics of study respondents

Table 1 shows the socio-demographic characteristics of study respondents. Approximately half (43.4%) were between 30 to 39 years old, 68.7% were female and 77.7% were Malays. Most respondents were married (81.9%), sexually active (83.1%), and had a high level of education (77.7% had Master/ PHD).

Table 1 Socio-demographic Characteristics of Study Respondents

Case characteristics	Frequency (n)	Percentage (%)
Age		
Below 20	0	0
20-29	8	4.8
30-39	72	43.4
40-49	60	36.1
50-59	22	13.3
60 and above	4	2.4
Gender		
Male	52	31.3
Female	114	68.7
Ethnicity		
Malay	129	77.7
Chinese	19	11.4
Indian	5	3.0
Other	13	7.8
Marital Status		
Single	28	16.9
Married	136	81.9
Divorced	2	1.2
Sexual Activity		
Yes	138	83.1
No	28	16.9
Level of Education		
Primary	0	0
Secondary	5	3.0
Diploma/ Degree	32	19.2
Master / PhD	129	77.7

Knowledge of HPV Testing and its Relationship with Sociodemographic Factors

The main outcome, knowledge, was graded on a scale of 0 to 8. The median score was 5 and the interquartile range was 5. Thirty-six respondents (21.6%) scored 0 while nine respondents (5.4%) scored 8. This was shown in Figure 1. Table 2 shows the results for each question under the knowledge section.

Table 3 shows the association between socio-demographic factors and knowledge of HPV testing. Mann Whitney U test was used to determine the association between independent variables with two groups (gender and sexual activity) and knowledge of HPV testing whereas Kruskal-Wallis test was used to determine the associations between independent variables with more than 2 groups and knowledge of HPV testing as shown on Table 3. Our results showed a significant association between gender and ethnicity with the level of knowledge on HPV testing ($P < 0.01$). Females had better knowledge on HPV testing than males. As for ethnicities, further analysis using pairwise comparison showed there was significant association between Chinese and ‘others’ ethnic but no significant association was found when comparing to other ethnicity (Table 4). There were no significant associations between age, marital status, level of education and sexual activity with level of knowledge on HPV testing.

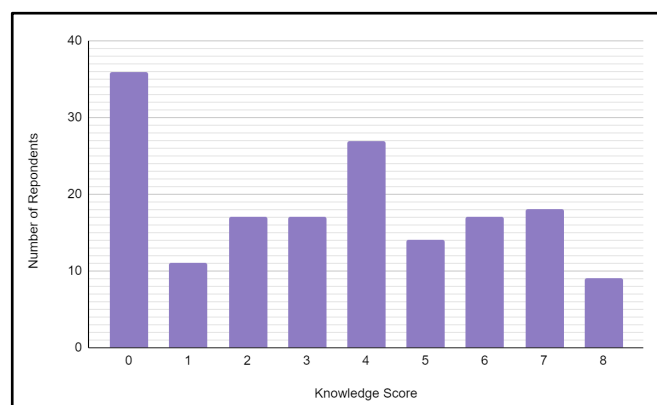


Figure 1 Number of Respondents Against Knowledge Scores

Table 2 Results for Knowledge Section

Parameters	Correct		Incorrect	
	N	%	N	%
Questions				
How does HPV test being administered?	124	74.6	42	25.4
What is the current HPV testing interval?	28	16.9	138	83.1
If a woman tests positive for HPV, she will definitely get cervical cancer.	90	54.2	76	45.8
A HPV test can be done at the same time as a pap smear test.	87	52.5	79	47.5
A HPV test can tell you how long you have had A HPV infection.	51	30.7	115	69.3
HPV testing is used to indicate if the HPV vaccine is needed.	53	31.9	113	68.1
When you have a HPV test, you get the results the same day.	68	40.9	98	59.1
If a HPV test shows that woman does not have HPV, her risk of cervical cancer is low.	109	65.6	57	34.4

Table 3 Association between Socio-demographic Factors and Level of Knowledge on HPV testing

Variables	N	Mean Score (Mean ± SD)	p-value
Age*			0.851
20-29	8	3.38±3.20	
30-39	72	3.43±2.48	
40-49	60	3.27±2.41	
50-59	22	3.95±3.03	
≥60	4	4.25±2.58	
Ethnicity*			0.009
Malay	129	3.33±2.58	
Chinese	19	4.95±2.43	
Indian	5	4.80±1.30	
Other	13	3.46±2.51	
Marital status*			0.695
Single	28	3.07±2.14	
Married	136	3.53±2.67	
Divorced	2	4±2.82	
Level of education*			0.085
Secondary	5	2.40±2.30	
Diploma/ Degree	32	3.57±1.99	
Master/PhD	129	3.40±2.64	
Gender**			<0.001
Male	52	2.15±2.51	
Female	114	4.05±2.39	

Sexual activity**			0.225
Yes	138	3.57±2.65	
No	28	2.89±2.17	

*Kruskal Wallis Test (p<0.05)

**Mann Whitney Test (p<0.05)

Table 4 Pairwise Comparisons of Ethnicity

Ethnic 1-Ethnic 2	p-value
Other-Malay	0.088
Other-Indian	0.039
Other-Chinese	0.002*
Malay-Indian	0.198
Malay-Chinese	0.013
Indian-Chinese	0.959

Awareness of HPV Testing and Socio Demographic Factors

Majority of respondents (74.7%) were aware of the existence of HPV testing. Table 5 demonstrates the relationships between awareness level and sociodemographic factors. There was a significant association between gender and awareness on HPV testing (P=<0.01); females reported higher awareness compared to males. Other variables such as age, ethnicity, marital status, sexual activity and level of education had no relationship with awareness on HPV testing.

Perception of HPV Testing and Socio Demographic Factors

Total of 116 respondents (69.9%) perceived co-testing as the most effective method for population based cervical cancer screening, which is considered as the most effective method. Nevertheless, 14 respondents (8.4%) chose pap test alone while 36 (21.7%) chose HPV test alone. Data was then analysed for association between perception and each independent variable using Chi-square test. Table 6 presents the association between the perception on HPV testing and socio-demographic characteristics. There was no association between age, gender, ethnicity, marital status, sexual activity, and level of education with perception on HPV testing.

Table 5 Association between Socio-demographic Factors and Awareness on HPV testing

Variables	Frequency, n (%)		X² value	p-value
	Aware	Unaware		
Age*				
20-29	5 (62.5)	3 (37.5)	4.567	0.279
30-39	56 (77.8)	16 (22.2)		
40-49	42 (70.0)	18 (30.0)		
50-59	19 (86.4)	3 (13.6)		
60 and above	2 (50.0)	2 (50.0)		

Gender*				
Male	26 (50.0)	26 (50.0)	24.440	<0.001*
Female	98 (86.0)	16 (14.0)		
Ethnicity*				
Malay	95 (73.6)	34 (26.4)	6.955	0.089
Chinese	17 (89.5)	2 (10.5)		
Indian	5 (100.0)	0 (0)		
Other	7 (53.8)	6 (46.2)		
Marital Status**				
Single	21 (75.0)	7 (25.0)	0.692	1.000
Married	101 (74.3)	35 (25.7)		
Divorced	2 (100.0)	0 (0)		
Sexual activity*				
Yes	104 (75.4)	34 (24.6)	0.191	0.662
No	20 (71.4)	8 (28.6)		
Level of Education*				
Secondary	3 (60.0)	2 (40.0)	2.397	0.491
Diploma	27 (84.3)	5 (15.7)		
Master/ PHD	94 (72.9)	35 (27.1)		

*Chi square Tests (p<0.05)

**Fisher's exact test (p<0.05)

Table 6 Association between Socio-demographic Factors and Perception on HPV Testing

Variables	Frequency, n (%)			X ²	p-value
	Pap test alone	Co-testing	HPV alone		
Age					
20-29	1 (12.5)	3 (37.5)	4 (50.0)	10.705	0.133
30-39	6 (8.3)	56 (77.8)	9 (13.9)		
40-49	4 (6.7)	42 (70.0)	14 (23.3)		
50-59	3 (13.6)	13 (59.1)	6 (27.3)		
60 and above	0 (0)	2 (50.0)	2 (50.0)		
Gender					
Male	3 (5.8)	32 (61.5)	17 (32.7)	5.620	0.060
Female	11 (9.6)	84 (73.7)	19 (16.7)		
Ethnicity					
Malay	9 (7.0)	92 (71.3)	28 (21.7)	6.154	0.622
Chinese	2 (10.5)	14 (73.7)	3 (15.8)		
Indian	0 (0)	4 (80.0)	1 (20.0)		
Other	3 (23.1)	6 (46.2)	4 (30.8)		

Marital Status					
Single	2 (7.1)	20 (71.4)	6 (21.4)	1.120	0.800
Married	12 (8.8)	95 (69.9)	29 (21.3)		
Divorced	0 (0)	1 (50.0)	1 (50.0)		
Sexual activity					
Yes	11 (8.0)	98 (71.0)	29 (21.0)	0.529	0.768
No	3 (10.7)	18 (64.3)	7 (25.0)		
Level of Education					
Secondary	0 (0)	4 (80.0)	1 (20.0)	0.666	0.996
Diploma/ Degree	3 (9.4)	22 (68.8)	7 (21.8)		
Master/ PHD	11 (8.5)	90 (69.8)	28 (21.7)		

DISCUSSION

Response Rate

Google form-based questionnaires were distributed to 616 staff of Universiti Putra Malaysia via email and the response rate was 26%. The low response rate could partly be due to movement control order (MCO) instruction during the pandemic, where most staff work from home and may not check their email regularly. Nevertheless, the sample size anticipated was achieved.

Association of Sociodemographic Characteristics with Knowledge, Awareness and Perception of HPV Testing

The majority of our study respondents were in the 30-39 age group, which corresponded to the working age group in UPM. More than half were female; this was likely due to the gender imbalance among UPM staff (higher number of females). Alternatively, it could be attributed to the higher levels of interest in HPV among females.

This study found that most respondents had poor knowledge of HPV testing, only 26.5% of respondents score above the median score of 5. This echoed the results of a prior study by Dodd et al. in 2014 [9]. Lack of knowledge of HPV and HPV testing results in underutilization of screening programs, a lack of interest, and participation in initiatives designed for preventing cervical cancer. Gender was shown to be significantly associated with knowledge of HPV testing with female respondents showing greater knowledge compared to male. A similar finding was reported in

studies on HPV testing knowledge in the USA, UK, Morocco, Brazil and Malaysia [9,12,13,16]. As cervical cancer is the third most common cancer among women, it is unsurprising that women are more knowledgeable than men. This could be driven by a higher level of interest or motivation to learn about HPV, given women's status as being 'at risk'. We also found that being Chinese was associated with greater knowledge about HPV, a result that is corroborated by existing evidence [17,18]. For instance, the study found that Chinese subjects had more knowledge about HPV given that Chinese women had the highest rate of cervical cancer incidence in Malaysia [18]. Contrary to the findings by Dodd et al., 2014, marital status, sexual activity, and level of education were not significantly associated with knowledge of HPV testing in our study.

We found that 74.7% of respondents have high awareness of the existence of HPV tests. Being female was found to be significantly associated with awareness of HPV testing, compared to males. This was in line with findings by Dodd et al. in 2014. This could be due to higher HPV infection incidence in women compared to males, resulting in more awareness. There was no relationship between ethnicity and awareness of HPV testing, in contrast with what was found by Dodd et al. in 2014. While awareness of HPV testing was associated with higher educational levels among the US and Australian populations, such findings were not replicated in our study [9]. Being a staff in an education centre with higher academic qualifications did not correlate with the knowledge of HPV testing. This could be due to a lack of health education, promotions and

outreach programs to familiarise the staff with health prevention programs such as HPV testing. Similarly, awareness of HPV testing had no association with marital status and sexual activity.

More than half (69.9%) of our respondents perceived co-testing as the most effective method of population-based cervical cancer screening, followed by HPV test alone (21.7%), and Pap test alone (8.4%). This differed from a study among USA respondents, where 75.3%–86.1% of respondents in 2009 and 79.5%–91.8% of respondents in 2012 chose the HPV test alone as the effective screening modality [10]. This discrepancy can result from differences in guidelines for HPV tests or other factors such as reimbursement policies and patient preferences. Age had no role in perception of HPV testing, a finding that is in agreement with the US Study [9]. With regards to gender, we found no association between this variable and perception of HPV testing. This, however, contradicted the findings of Cooper et al., 2015 [10]. This difference could be due to different levels of education among the studied population and health promotion on HPV which is more diverse in the USA. Ethnicity, marital status, sexual activity, and level of education showed no association with the perception of HPV testing. We could not find any previous local study to back the evidence (or otherwise) on the relationship between ethnicity and perception of HPV testing.

Besides being an aetiology to cervical cancer, HPV is also known to be related to the vulva, oropharyngeal, penile and anal cancers. With the poor knowledge and awareness among our study population, healthcare professionals must educate the public on the existence and role of HPV in our health regardless to both males and females. Effective preventive measures such as HPV vaccinations and sexual education should be advocated to the public to further reduce the burden of HPV-related health risks.

Limitations

This study has several limitations. First, our study respondents were recruited through convenient sampling method. Two possible drawbacks can result from this: a) selection bias; those who participated in the survey were more likely to have higher interest and thus, level of knowledge of the issue, and; b) non-

representativeness of the sample; our sample may not represent the whole community in Malaysia or beyond. Therefore, our results are not necessarily generalisable to the larger population. Second, the selection bias mentioned was compounded by the online nature of our questionnaire; the researcher was unable to explain face-to-face in cases of misunderstanding or confusion related to the questionnaire items. Third, due to logistics issues (mainly time constraints), we limited the survey period. Last but not least, the cross-sectional design did not imply causality but merely associations.

Recommendations

This study provides baseline information on the awareness, knowledge, and perception of HPV testing among academic staff and the associated factors. This would be of great help to health educators and future researchers, in planning programs for the community. Health campaigns and the use of social media platforms can be designed to create awareness and improve knowledge among the public. Health workers shall pay more attention in educating the public about HPV testing by setting up information booths or planning an awareness programme for example cervical cancer awareness month. Improving the levels of awareness and knowledge is the key to reducing prevalence of HPV-related morbidity and mortality in Malaysia.

CONCLUSION

Our findings point towards poor knowledge of HPV testing, especially among Malays and other minority races. Both genders in particular the male respondents found to have low awareness. With these findings, it is important to find ways to improve the level of awareness and knowledge of HPV testing, hence reducing the prevalence of HPV-related morbidity and mortality in Malaysia.

Conflict of interest

Authors declare none.

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Authors' Contribution

Idea and draft were by NIB. Literature review and data collection were done by ACY, NFM and MHN. The manuscript was written and edited by NIB and RAD.

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